

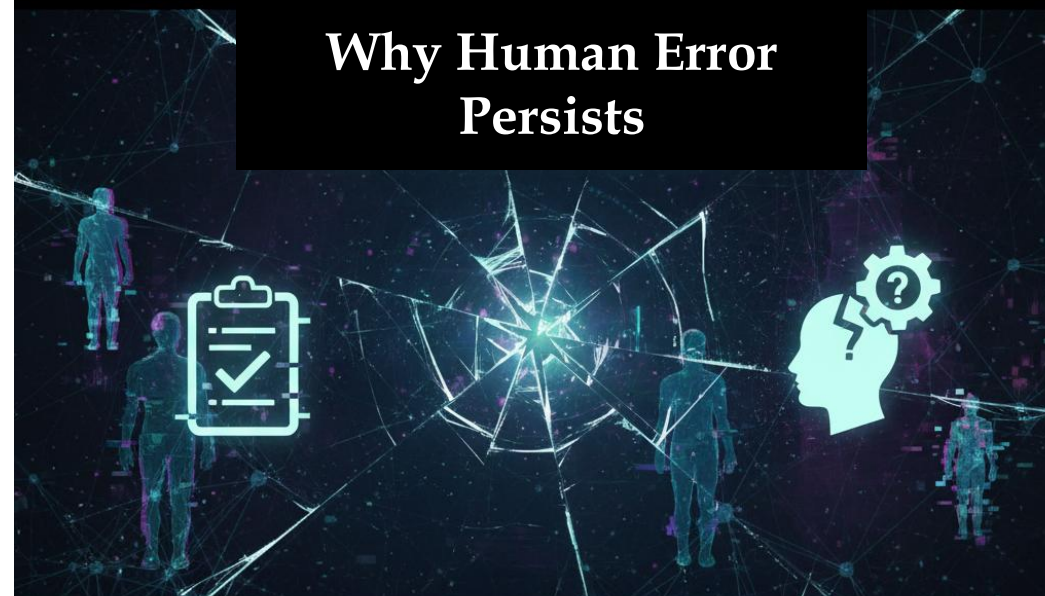
Human Nature and Cognitive Constraints

A Scientific Framework for Error Mitigation



*Despite the Implementation of Protocols
and Procedures*

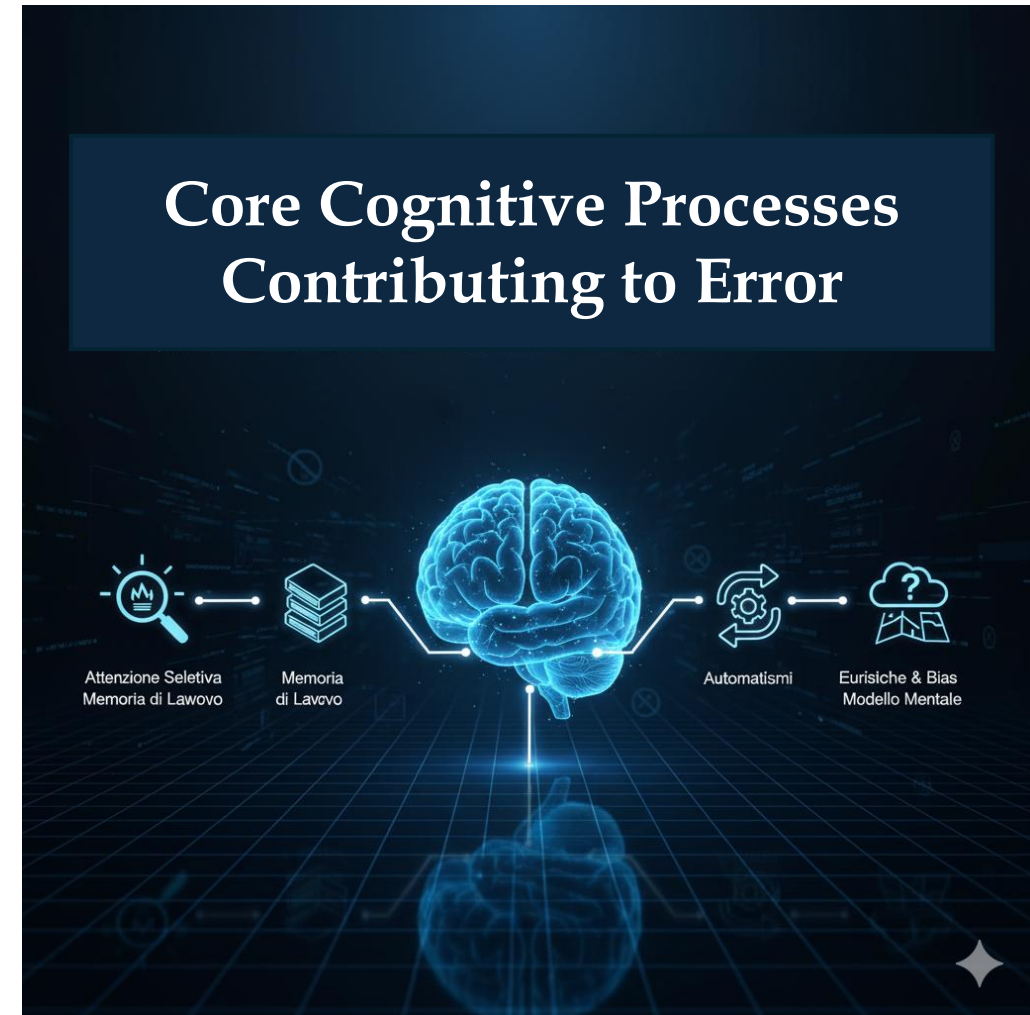
**Why Human Error
Persists**



(Un'analisi scientifica della fallibilità umana)

Understanding cognitive mechanisms is essential. The goal is not to eliminate error, but to coexist with human fallibility in a safe and productive manner.

Our brain is not perfect, but it is predictable. These limitations are at the root of many errors

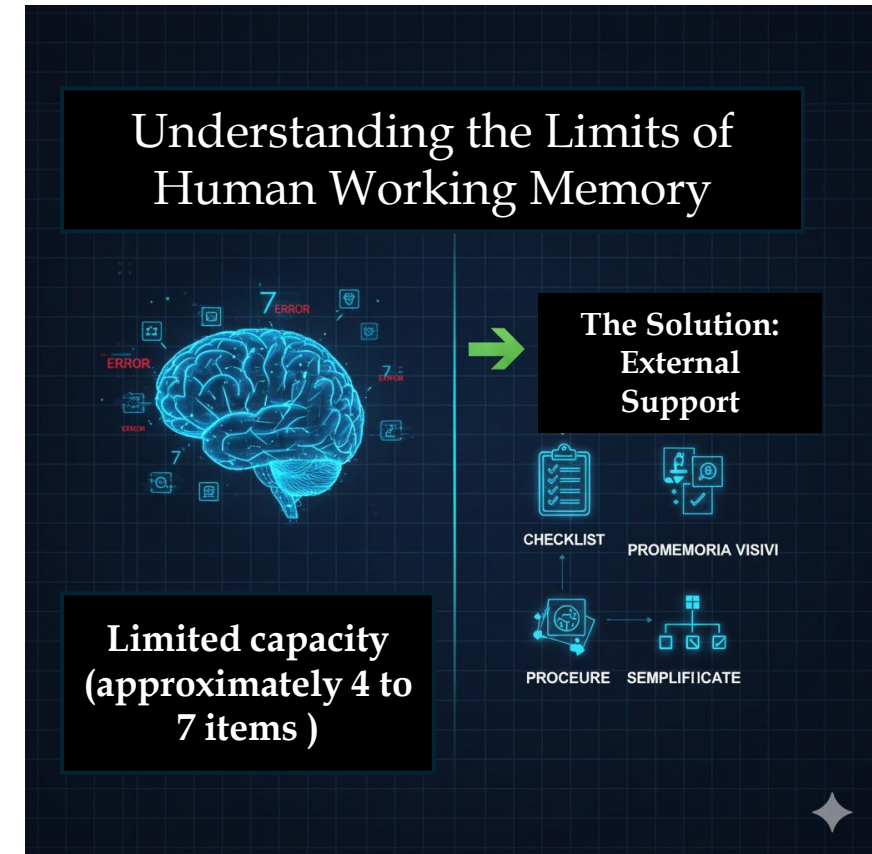


The brain filters information by focusing on what it deems 'relevant'.

Under stress or cognitive overload, 'tunnel vision' drastically narrows perception.

Limited capacity (approximately 4 to 7 items can be actively held at once).

When this capacity is exceeded, steps are forgotten and sequences become confused



The design of interfaces, checklists, and operational procedures should aim to minimize cognitive load during high-stress or time-sensitive situations.

ERROR

Deviation from an Expected Standard

Human — *stemming from cognitive biases, lack of attention, or procedural mistakes.*

Technical — *involving equipment failure, system breakdowns, or design flaws.*

Evaluative — *resulting from incorrect judgments, miscalculations, or poor situational analysis*

Risk

(noun, masculine) [from Italian rischiare, meaning “to take a chance”]

1.a. *The possibility of suffering harm linked to more or less foreseeable circumstances (thus less intense and less certain than danger).*

Risk = Probability × Impact

Culture (*noun, feminine*)

[from Latin cultura, derived from colĕre “to cultivate”, past participle cultus; in sense 2, influenced by German Kultur]

1.a. The sum of intellectual knowledge a person has acquired through study and experience, which they have reworked through personal and profound reflection – thus transforming mere erudition into a foundational element of their moral character, spirituality, and aesthetic sensibility, and ultimately into self-awareness and understanding of their world.

**Protocols, Guidelines, and Procedures
As barriers to human fallibility**



**Human fragility has led to the
development of tools
designed to limit errors:**

**Guidelines, Protocols, and
Procedures**

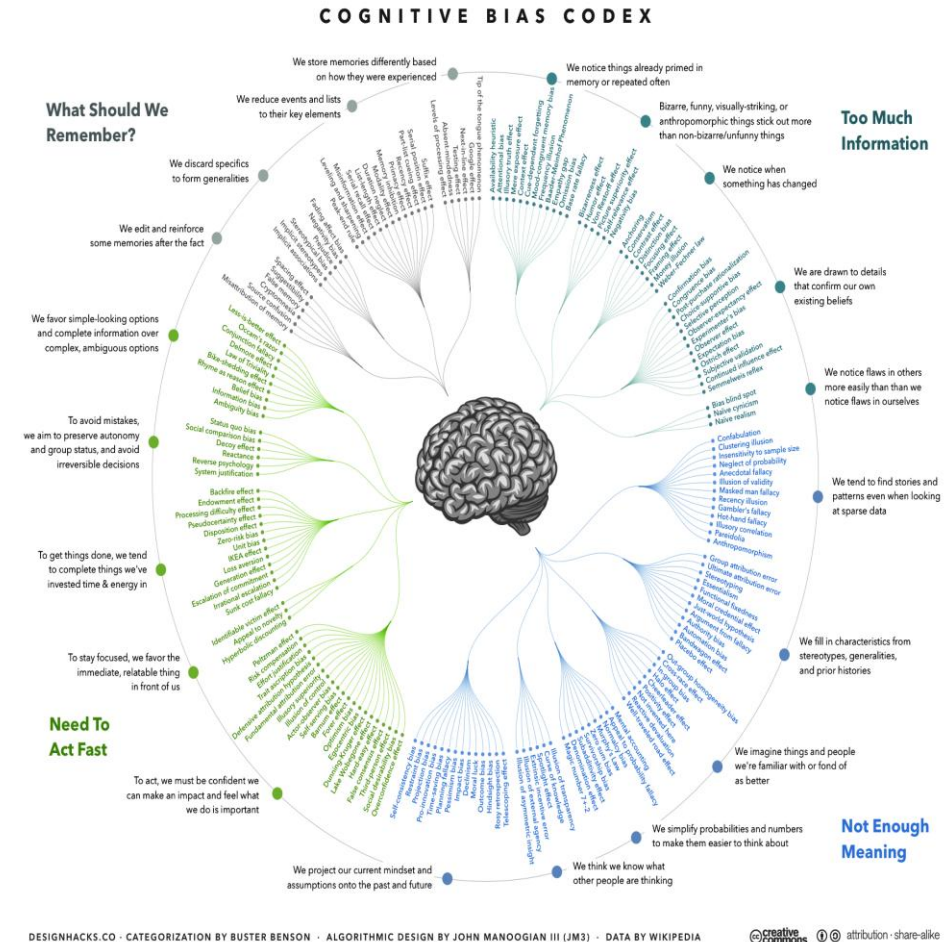
Mental Models and Situational Awareness

Human cognition continuously generates mental representations of reality.

Mistakes occur when these internal models diverge from the external environment

COGNITIVE BIAS

An automatic and unconscious cognitive process that results in the flawed analysis of logical information.



How Competence and Bias Contribute to Human Error

- Professional competence encompasses metacognitive awareness.
- Cognitive biases significantly affect decision-making and are a frequent source of error.
- These errors often arise from heuristic shortcuts – such as confirmation bias and overconfidence.
- The ability to identify and regulate such biases is a core component of expert performance.

Human Error and the Just Culture Framework:

Toward a New Paradigm in Safety and Accountability

Errors should not be attributed solely to individual blame, but understood within the context of systemic and complex contributing factors.

While negligence and intentional misconduct warrant accountability, honest mistakes should be embraced as learning opportunities.

The goal is to identify underlying causes, improve systems, and prevent future errors.

Recognize error as an opportunity for growth (through case studies and shared experiences).

Develop empathy: avoid judgment, focus on understanding.

The Foundation for Preventing Human Error

Human error is inevitable, but **manageable** when recognized and addressed systematically.

CRM provides practical tools to **reduce clinical risk**: → Effective communication → Shared leadership → Situational awareness → Resource management

It transforms the team into an **intelligent, adaptive system**, capable of facing the unexpected with clarity.



Crisis Resource Management

Crisis Resource Management is a cornerstone in preventing human error in healthcare.

It doesn't eliminate fallibility – it acknowledges and manages it through practical tools: effective communication, shared leadership, situational awareness, and resource management.

CRM turns the clinical team into an intelligent, adaptive system capable of facing the unexpected with clarity and coordination.

BOX 7-7 *Crisis Resource Management—Key Points in Health Care*

1. Know the environment.
2. Anticipate and plan.
3. Call for help early.
4. Exercise leadership and followership with assertiveness.
5. Distribute the workload (use the 10-seconds-for-10-minutes principle).
6. Mobilize all available resources.
7. Communicate effectively—speak up.
8. Use all available information.
9. Prevent and manage fixation errors.
10. Cross check and double check (never assume anything).
11. Use cognitive aids.
12. Reevaluate repeatedly (apply the 10-seconds-for-10-minutes principle).
13. Use good teamwork—coordinate with and support others.
14. Allocate attention wisely.
15. Set priorities dynamically.

Modified from Rall M, Gaba DM: Human performance and patient safety. In Miller RD, editor: Miller's anesthesia, ed 6. Philadelphia, 2005, Churchill Livingstone.

CRM in Practice – Active Risk Prevention

- **Briefing and debriefing:** plan ahead and learn from events
- **Workload distribution:** avoid overload and foster collaboration
- **Call for help early:** activate support before the situation escalates
- **Stress management:** maintain clarity and emotional control
- **Simulation and NTS training:** strengthen non-technical skills to handle crises



Anaesthetists' Non-Technical Skills (Anesthesia)

Adaptation of the **NOTECHS framework**
to the high-risk context of the Operating Theatre.



ANTS Category	Specific Focus	Key Behavior
1. Task Management	Planning, Prioritization, Resource Utilization.	Systematically verifies equipment and prepares emergency drugs before a complex procedure.
2. Team Working	Coordination, Assertiveness, Consideration of opinions.	Communicates assertively to the surgeon the need to pause the procedure due to hemodynamic instability.
3. Situation Awareness (SA)	Integration of data from physiological monitors, patient observation, and the team.	Continuously integrates multiple sources of information to anticipate complications
4. Decision Making	Selection and implementation of time-critical actions with incomplete information	Manages sudden hypotension by rapidly ruling out causes and intervening appropriately.

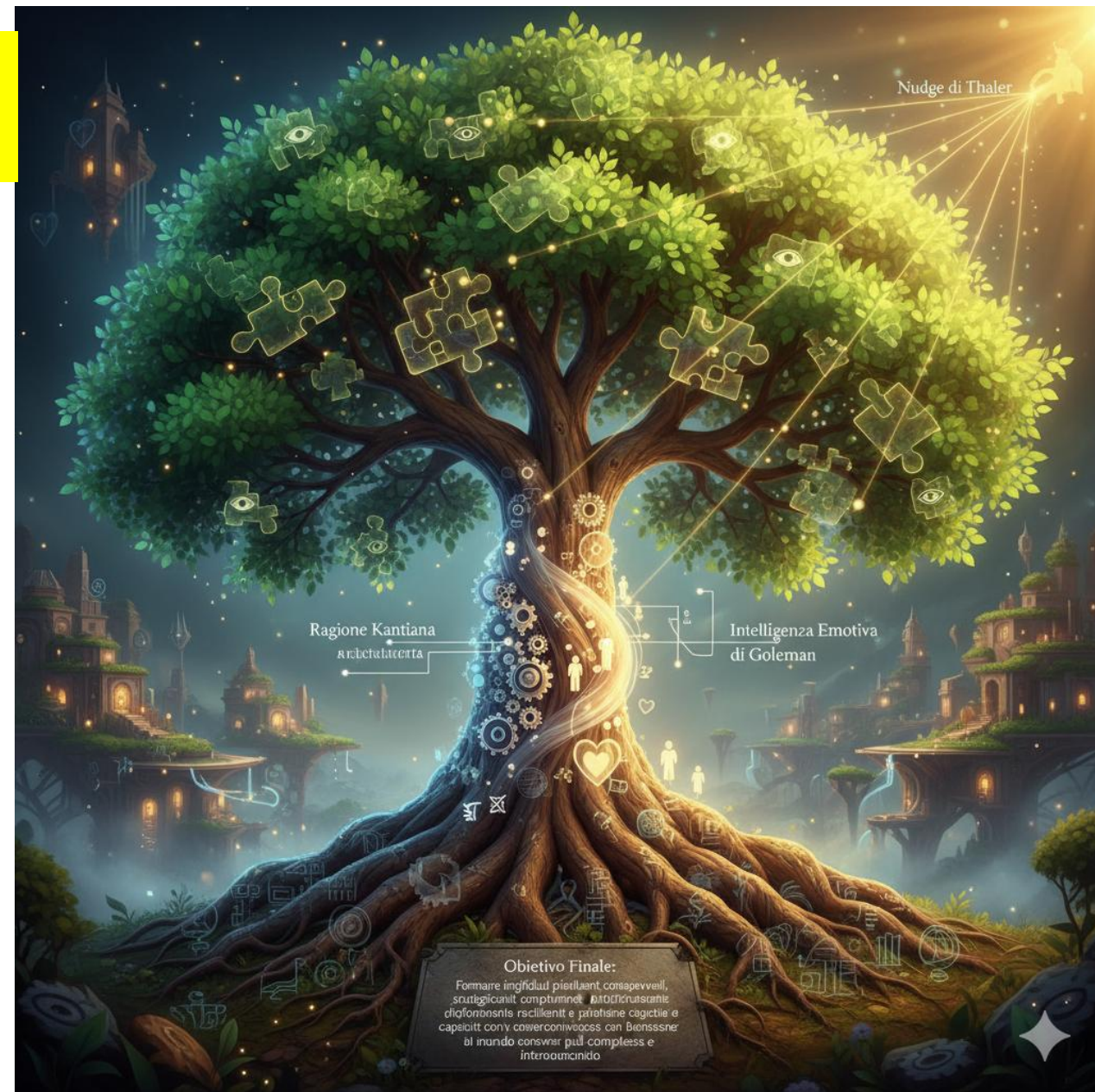
The 5 key elements of a legally robust and well-structured medical record

- **WHY:** Justify the technical choice based on the patient's characteristics.
- **WHAT:** Describe in detail what was done.
- **HOW:** Explain the technique used (ensuring reproducibility).
- **ALTERNATIVES:** Document the options considered and discarded.
- **RISKS:** Demonstrate that the patient was informed and aware.

Toward an Integrated Framework:

Shaping the Holistic Education of Tomorrow

- **Kantian Reason:** To stimulate critical thinking.
- **Goleman's Emotional Intelligence:** To manage relationships by regulating one's own emotions and understanding those of others.
- **Freudian Awareness:** To overcome unconscious resistance.
- **Just Culture Approach:** To learn from mistakes without fear, fostering an environment where deviations are seen as opportunities for systemic improvement rather than individual blame.
- **Thaler's Nudge (Architecture of Conscious Choice):** To design contexts and “choice architectures” that gently guide individuals toward optimal behaviors and wiser decisions – without restricting their freedom.



To develop individuals equipped with competence, accountability, and resilience, capable of navigating and acting effectively within an increasingly complex and dynamic world.

Risk Prevention:

Valuing the Human, Training the Professional

Safety begins with a **culture that acknowledges human fallibility** and transforms it into strength.

We need **integrated training**: → *Technical skills* (procedures, protocols, guidelines) → *Non-Technical Skills* (communication, leadership, decision-making, stress management)

CRM (Crisis Resource Management) bridges competence and behavior: → It helps manage resources, time, priorities, and relationships in critical situations.

Respect, empathy, and awareness are as vital to prevention as monitoring and technology.

Medical record accurate, comprehensive and legally protective.

Recapping Key Insights



Human Fallibility



Integrated Training



CRM



Human-Centered Risk Prevention

Gianrico
Carofiglio
Elogio
dell'ignoranza
e dell'errore



EINAUDI
STILE LIBERO EXTRA



The European Society
of Regional Anaesthesia
& Pain Therapy
ESRA ITALIA



ESRA ITALIAN CHAPTER

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