The Canadian Journal of Neurological Sciences (2026), 1
doi:10.1017/cjn.2026.10636

Canadian Journal of Neurological Sciences
Journal Canadien des Sciences Neurologiques

Reflections

A Neuronal Perspective

Omar Bokhari
Division of Neurology, Department of Medicine, Dalhousie University, Halifax, NS, Canada

Keywords: Neuroscience; perception; predictive processing; reality construction; self-awareness

He looked at his motionless left arm in a state of awe.

"Why won't you lift it?" I asked gently and quietly.

He glanced at it, then back at me with mild bewilderment, as though I had asked why the sky was blue.

"It is up," he said confidently.

Hours earlier, a right middle cerebral artery infarct had silenced the cortical networks responsible for his awareness of that side of his body. Yet as he sat before me, calm and certain, there was no distress in his voice. His reality was internally coherent. To him, there was no paralysis to acknowledge; he appeared unaware of his deficit and behaved as though the left side of his world no longer existed.

That experience stayed with me.

As residents in adult neurology, we are taught by our preceptors to localize lesions, identify disrupted pathways and correlate deficits with anatomy. We learn that a lesion in the nondominant posterior parietal cortex may produce neglect and that injury to specific neural networks can fracture awareness itself.[1] But standing at the bedside, watching a patient sincerely deny what was plainly visible to everyone around him, one confronts a deeper question.

Do we truly perceive what we actually see, hear and touch?

When one studies the brain in its entirety, from the macroscopic architecture of neural networks to the microscopic cosmos of neurotransmitters, engaged in a perfectly harmonized, conductorless waltz… an extraordinary reality emerges. The brain is not merely an organ of passive reception; it is an active constructor of experience, continuously assembling reality from fragments of sensation, memory and expectation.[2]

Modern neuroscience suggests that perception is not a direct recording of the external world. It is a probabilistic inference. The brain continuously generates internal models of reality and updates them by comparing expectation with incoming sensory evidence, a process often described through predictive processing.[3,4]

In this sense, perception is not a photograph.

It is a hypothesis.

The healthy brain performs this negotiation seamlessly. It fills in missing information, resolves ambiguity and allows us to navigate an uncertain world with remarkable confidence. Neurotransmitters such as dopamine and serotonin help assign salience and value to sensory information, shaping how reality is interpreted.[5]

But when these systems falter, certainty can persist even as accuracy dissolves.

My patient was not lying. He was not confused in the ordinary sense. His brain had constructed the most probable reality available to it, one in which his arm remained under his command.

That bedside encounter forced me to reconsider the confidence with which we trust our own perceptions.

What we experience as reality may not be an objective reflection of the world, but rather the brain's best approximation, shaped by prior experience, constrained by biology and continuously revised through inference.

In essence, every perception is a negotiation between reality and expectation.

And perhaps the most humbling lesson neurology offers is this: *what we call reality is often only the brain's most convincing interpretation of it.*

References

1. Heilman KM, Watson RT, Valenstein E. Neglect and Related Disorders. In: Heilman KM, Valenstein E, eds. *Clinical Neuropsychology*. 5th ed. Oxford: Oxford University Press; 2012.
2. Friston K. The free-energy principle: a unified brain theory? *Nat Rev Neurosci*. 2010;11(2):127–38.
3. Rao RP, Ballard DH. Predictive coding in the visual cortex. *Nat Neurosci*. 1999;2(1):79–87.
4. Clark A. *Surfing Uncertainty: Prediction, Action, and the Embodied Mind*. Oxford University Press; 2016.
5. Bang D, Kishida KT, Lohrenz T, et al. Sub-second dopamine and serotonin signaling in human striatum during perceptual decision-making. *Neuron*. 2020;108(5):999–1010.e6.

Email: Omar.bokhari@dal.ca
Cite this article: Bokhari O. (2026) A Neuronal Perspective. *The Canadian Journal of Neurological Sciences*, https://doi.org/10.1017/cjn.2026.10636

© The Author(s), 2026. Published by Cambridge University Press on behalf of Canadian Neurological Sciences Federation.

https://doi.org/10.1017/cjn.2026.10636 Published online by Cambridge University Press