

Journal Pre-proof

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PII: S0002-9343(23)00157-2
DOI: <https://doi.org/10.1016/j.amjmed.2023.02.023>
Reference: AJM 17094



To appear in: *The American Journal of Medicine*

Received date: 13 February 2023

Accepted date: 13 February 2023

Please cite this article as: Martin A. Samuels MD , Morning Distort, *The American Journal of Medicine* (2023), doi: <https://doi.org/10.1016/j.amjmed.2023.02.023>

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(Commentary)

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Conflict of Interest: None

Funding: None

Sole author is responsible for all content.

A 35-year-old woman complains of weakness of the right side of her face and pain behind the right ear. She lives in an urban environment and denies any recent illnesses. She is not vaccinated against COVID-19 but is COVID negative.

What do you think, I was asked at our Morning Report? Well, I said, it sounds like a straightforward Bell palsy. The pain around the ear suggests swelling of the VIIth cranial nerve in the facial canal and the stylomastoid foramen, a very common historical point, I opined; so much so that its absence would make me doubt the diagnosis and make me consider other causes of facial palsy such as sarcoidosis or Borreliosis, though the urban environment argues against that tick-borne disease. Then we went around the room, expanding the differential diagnosis (as this exercise is often called) to include tumors of the parotid gland, leptomeningeal metastases and many more. At one minute before the end of the thirty-minute conference, a photo of the patient was shown. There was only one problem. There was no facial weakness, but rather she had a definite Horner syndrome on the right with a smaller pupil and subtle ptosis due to weakness of the Muller muscle, a small circular sympathetically innervated muscle that acts as a minor controller of the palpebral fissure. The patient's pupils were not tested in bright and then dim light, nor was sweating tested because why would one do those things in someone with facial weakness and pain around the ear. In fact, this patient had nothing like a Bell palsy but rather Raeder syndrome, a painful oculosympathetic (Horner) syndrome, which implicates a disease of the carotid artery. Once this was discovered it was learned that the patient had hyperextensibility of the joints and hadn't suffered any neck trauma. Now a spontaneous dissection of the right carotid artery becomes the focus of thought with a very different implication for therapy and prognosis.

This experience vividly emphasizes two traps in the diagnostic process: thinking fast and framing. As Daniel Kahneman and the late Amos Tversky have articulated and summarized in their book, *Thinking Fast and Slow*,¹ there are two subsystems within the nervous system that they dubbed system one and system two. System one is a very rapidly acting, involuntary system which estimates the likelihood of a given circumstance and reacts to it. System two is a voluntary, tedious, slow system that weighs evidence, considers the frequency of a likelihood in the environment according to The Reverend Bayes's prior probability. In neurology, system one is the autonomic nervous system (or the reptilian brain as it was called by the late Paul MacLean in his *Triune Brain*²). System two is the cerebral cortex with its complex networks that facilitate various aspects of awareness, an aspect of consciousness. Neither system is good nor bad, as both have their place. The first presumably survived the rigors of evolution because it allowed our ancestors to react to potential threats rapidly (i.e. a movement in peripheral vision is not analyzed; it is rather escaped as if it were a snake, even though Bayesian reasoning would predict that it was probably a stick). System two allows for more accurate conclusions in less time-sensitive circumstances. What happened to me in the conference was that my system one rapidly generated a theory, but this was based on incorrect data (it was a snake; not a stick). If a mistake is made early in the diagnostic process, the processes thereafter are all distorted and there is virtually no way to reach the correct answer. Recall Conrad Waddington's epigenetic landscape, wherein he used a metaphor (marbles rolling down a hill) to describe how mistakes early in a developmental process have enormous effects on the ultimate outcome, whereas errors later in the process are less destructive.³ In addition to my system one error, I was also taken in by the framing shortcut (heuristic). The person who presented the case had a theory of his own, which was promulgated in the headline: a woman with a painful facial palsy. In fact, it was a woman with a painful Horner syndrome. The moral of the story is that I should have looked at the photograph first. That would have avoided the futile task of elaborating an expanded differential diagnosis which, after all, is a nothing but a list of wrong answers followed by the right answer.

Morning report is a longstanding academic tradition. We don't know exactly where and when it began but it was clearly used as a way for the person responsible for the patients' care (the Professor) to learn about what had happened overnight by getting a report from the people on call (the house officers). It was about the care of patients. Over time it has morphed into just another conference; often with completely evaluated patients presented to an expert in a field relevant to the case in point. In other words, it changed from live theater to movies and with this evaporated the higher limbic valence that is demanded by the reality of the engagement rather than some form of pedagogy (education of children) or even andragogy (education of adults). When I was Chief Medical Resident at the Boston City Hospital, I tried to resuscitate the original meaning of the exercise by acting as the responsible person myself. When I came to my current hospital as head of Neurology in 1988, I brought this concept with me and our Morning Report became the focal point of our program. It was literally standing room only, but over time this tradition slipped away such that participants began to think that the conference was for them (pedagogy) as opposed to being for the patients. Despite all the lip service paid to so-called patient-centered care, morning report became distorted into being the poster child for entertaining the participants with good cheer and coffee.

As Anders Ericsson has demonstrated, expertise requires at least 10,000 hours of mindful practice,⁴ meaning corrected in real time by a more expert teacher. This process is not always fun, but it is necessary. Otherwise one lives in an echo chamber which reinforces wrong ideas. If Horner syndrome is mistaken for facial weakness, Waddington would predict that the final location of the metaphorical marble will be far off the mark.

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