



## Clinical Decision Making—The Danger of Confirmation Bias

Clinical decision making is a crucial process to any diagnosis and treatment. Decision making in pain and dysfunction was the main topic of the recent annual meeting of the European Academy of Craniomandibular Disorders (see Meeting Review in this issue of the journal).

Clinical decision making is by no means a simple process. Beyond the complexity of each case and the continuous accumulation of professional knowledge, it is also strongly affected by clinicians' cognitive structure and an inherent cognitive bias. Schematic thinking and confirmation bias are often overlooked in the discussions concerning decision making in the clinical setting. However, no one is infallible, including physicians and dentists.

The medical inquiry process is often described as a multiple-stage model that includes collecting data, forming preliminary judgments about the case (hypothesis generation), judgments as to whether information confirms or disconfirms the tentative hypothesis, and integration of cue weights to select the most possible diagnosis (hypothesis evaluation). Each of these stages is prone to the possible danger of cognitive bias. During information collection, physicians are often more prone to pursue answers to their clinical questions when they believe that definite answers exist<sup>1</sup> and often have difficulty recognizing the diagnosticity of information.<sup>2</sup>

In many cases, the clinician's intuitive diagnostic judgment is influenced by availability heuristics and by wishful thinking, which may lead to underestimating the likelihood of a disease for patients most at risk for its consequences.<sup>3</sup> Furthermore, clinicians have an inherent bias toward action, particularly in therapeutic procedures with relatively low risk, possibly due to a personal need to show greater activism in their patients' care and increasing clinical satisfaction.<sup>4</sup>

The issue of cognitive structuring and information was first addressed by Festinger<sup>5</sup> in the 1950s through the term "cognitive dissonance," which tried to explain the existence of incompatible beliefs or attitudes held simultaneously by humans. Any serious decision made to resolve a doubt when no additional evidence exists creates dissonance. With the choice finally made, the individual "forgets" about the weaker alternative. If the consequence proves that the choice was wrong, one does something to justify the decision, such as rationalizing, distorting the cognition, etc.

Over the years, the issue of cognitive structuring and information gathering has been discussed under various labels, such as tolerance of ambiguity, dogmatism, open-mindedness, certainty of orientation, need of cognition, desire for simple structure, schematic thinking, etc. It has been suggested that people predict the future faster and more confidently if they have schema for the stimulus domain. Schematic thinking allows one to attain certainty by using a "category-based" process. This process facilitates certainty by helping us to omit inconsistent or irrelevant information, while adding information concerning the validity of the interference.<sup>6</sup> Once the stimulus in question is categorized under a scheme, there is a tendency to look for features that are more probable to fit the scheme, such that will result in a "yes" answer.<sup>7</sup> We have a tendency towards positive testing, that is, to test instances we think will fit our hypothesis and pay less attention to those that will not.

The cultural pattern in western medicine is to pursue a test or therapy that might be beneficial even if the indications are questionable.<sup>4</sup> In many clinical situations, the dentist is "pushed" (both by the patient and by him/herself) to reach a quick diagnosis and impose immediate action. Once the decision is reached, it enhances schematic closure and unavoidable confirmation bias, leading the clinician to pay more attention to more information that will justify the decision and disregard information that might suggest it was wrong.

Furthermore, it was suggested that expertise in medicine is not so much matter of superior reasoning or in-depth knowledge of pathophysiological states, as it is based on cognitive structure that describes the features of prototypical or actual patients. It is assumed that while diagnosing routine cases, physicians operate upon cognitive models ("illness scripts") that emerge from continuous exposure to patients.<sup>8</sup> Such cognitive models enable the experienced clinician to take shortcuts and reach decisions more quickly and efficiently, but concomitantly increase the tendency toward "positive testing."

Patients suffering from orofacial pain are often referred to specialized secondary or tertiary care centers, where highly trained and experienced clinicians diagnose and treat the syndromes in question. This is the group of clinicians that is possibly more prone to the danger of confirmation bias, in spite of, or maybe due to, their extended expertise. "Illness scripts"

developed over years of specialized practice, an unconscious “need” to supply answers and solutions for cases where primary-care clinicians failed, may lead to an increased tendency to look for findings that confirm an initial, often intuitive, hypothesis.

It is important to accept the fact that we are all prone to confirmation bias, in the clinic as well as in everyday life. If we accept that there are at least two separate levels of clinical decision making—a rapid non-analytical dimension used in most problems, and a slower analytical approach applied in some problems that present difficulties,<sup>8</sup> both types of solution strategies should be acknowledged. This will enable us to improve our thinking through opening existing schemes and developing broader thinking through continued search for information.

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## References

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