

# Differentiating the Elements of Clinical Thinking

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## Abstract

*Clinical judgment, clinical reasoning, clinical thinking, critical thinking and decision-making are often used concurrently or interchangeably in the literature, which can lead to confusion. This article is a succinct review, by no means an exhaustive one, of these various concepts related to clinical practice in the health professions in order to distinguish them from each other. Moreover, the need for research on these subjects for optometry is highlighted so that schools and colleges of optometry can adapt their teaching and assessment methods to the specific context of the optometric profession.*

**Key Words:** *clinical judgment, clinical reasoning, clinical thinking, critical thinking, decision-making, optometric education*

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## Introduction

Critical thinking related to clinical reasoning and decision-making in patient care is taking center stage in optometric education. However, many of those terms and others related to clinical practice are similar and inter-related. This may be confusing when it comes to understanding clinical practice, and especially to making it explicit to optometry students.

The objectives of this article are 1) to define different terms related to clinical practice in order to clarify them and distinguish between them; and 2) to underline the need for further research on these topics specifically for the optometric profession.

## Untangle Concepts Related to Clinical Practice

Many terms are often used interchangeably to describe the processes necessary to resolve complex clinical problems and make the appropriate clinical decisions in the practice of health professions: decision-making, critical thinking, clinical thinking, clinical reasoning, clinical judgment, diagnostic reasoning, diagnostic thinking, etc. The use of these terms concurrently or interchangeably without defining them may lead to confusion. In order to clarify educational curricula, thereby orienting teaching, learning and assessment towards appropriate educational objectives, the concepts need to be distinguished from one another. In addition, the final goal of the optometric encounter must be kept in mind.

Patients consult their optometrist for several reasons. They seek his or her advice to resolve symptoms or to be reassured, and they want to return to a sense of well-being. Patient encounters are often described as problems to be solved with the diagnoses and treatment considered the solutions. However, as Fuks, Boudreau and Cassel<sup>1</sup> stipulate, "Diagnosis is neither the goal, nor the end point, of the clinical encounter." Considering this, diagnostic reasoning and diagnostic thinking may not be terms that are representative enough of the health professional's activity. They seem to address only the processes related to the diagnosis.

## Decision-Making vs. Clinical Reasoning

The medical literature mostly uses the terms decision-making or clinical reasoning, the latter being increasingly frequent in recent decades. Originally issued from research on the psychology of decision-making, decision theory is a model of idealized rationality,<sup>2</sup> a prescriptive approach telling doctors how they should make decisions based on statistical decision theory, rather than a description of how people actually make judgments and choices. Today, decision-making is mainly used to describe choices between different alternatives, either to decide what procedures to do, to make a diagnosis or to decide what treatments to prescribe.<sup>3</sup> Decision-making is regularly used as a synonym of clinical reasoning even though the concepts differ from each other.

Clinical reasoning focuses on the cognitive processes involved not only in the decisions to make in clinical context, but also in all the problem-solving “*démarche*” leading to the understanding of the whole clinical situation. Problem-solving involves the identification of the patient problems and of data required to resolve them and make a diagnosis.<sup>3</sup> Problem-solving and decision-making are clearly interdependent: Problems must be solved in order to make decisions, while decision-making is required all along the problem-solving process.

Therefore, clinical reasoning implies both solving problems and making decisions. It is defined as the thinking and decision-making processes associated with clinical practice<sup>4</sup> and the cognitive processes that are necessary to evaluate and manage a patient’s clinical problem.<sup>5</sup> There are various interpretations and representations of clinical reasoning, depending on the disciplines, the models of practices and the research paradigm in which it is investigated. Clinical reasoning is often categorized as analytical or nonanalytical. Hypothetico-deductive reasoning, relying on hypothesis formulation and testing,<sup>6,7</sup> is a widely accepted conception of analytical clinical reasoning. Depending on the patient’s history, physical appearance and the results of clinical examination, the clinician formulates

one or more diagnostic hypotheses that are subsequently validated or eliminated. On the contrary, nonanalytical reasoning relies on rapid, automatic and often unconscious recognition of characteristic features, based on a wide background of well-organized clinical knowledge. Pattern recognition is a well-known form of nonanalytical clinical reasoning. A simple example of pattern recognition is a patient presenting with a subconjunctival hemorrhage, a condition that is usually automatically recognized without additional data acquisition. Analytical and nonanalytical modes of clinical reasoning are usually combined in clinical practice.<sup>8-10</sup> For instance, recognition of a condition by the means of nonanalytical reasoning will often trigger an analytical process of hypothesis testing after more information gathering.<sup>11-13</sup> This is the case when, for example, a patient comes to the office wearing glasses and the eye through the right ophthalmic lens looks smaller, while the left eye looks bigger. By the means of nonanalytical reasoning, an optometrist will rapidly recognize antimetropia or anisometropia.

Along with this diagnosis, other hypotheses will be triggered: Does this patient have diplopia when reading? Does he suffer from aniseikonia? Does he have binocular vision troubles? These hypotheses will have to be tested with more data acquisition. Some of them will be rejected while others will be part of the final diagnosis. This corresponds to analytical reasoning. Thus, optometrists gradually construct a mental representation of the clinical case to be resolved, that is, in essence, an understanding of the patient’s condition and of the patient as a whole.<sup>14</sup> This representation evolves and is refined progressively from the first contact with the patient until the end of the encounter. Following Faucher,<sup>14</sup> the management plan would also be elaborated throughout the examination. This makes sense because most optometrists would probably agree that they often have an idea of what kind of treatment will be prescribed early on in the examination, rather than wait until the end of the examination to be formulated.

Finally, knowledge and other resources are capital to clinical reasoning. In medicine, research has shown that

knowledge acquisition and clinical reasoning development go hand in hand.<sup>15</sup> That makes clinical reasoning harder for first- and second-year students to learn because their knowledge is mostly limited to theoretical biological, medical and optics concepts. As they are involved in real clinical scenarios, students integrate theoretical knowledge into clinical knowledge.

## Critical Thinking

What about critical thinking? It is important to clarify this concept and to distinguish it from others since the Association of Schools and Colleges of Optometry (ASCO) has included it in its report on attributes of students graduating from schools and colleges of optometry.<sup>16</sup> This report states that, to be professional and ethical, new optometrists must demonstrate personal attributes that include “problem-solving and critical thinking skills that integrate current knowledge, scientific advances, and the human/social dimensions of patient care to assure the highest quality of care for each patient.” New optometrists should also be skilled in demonstrating “the critical thinking skills needed to assess the patient’s visual and physical status and to interpret and synthesize the data to formulate and execute effective management plans.”<sup>16</sup>

A general definition of critical thinking is “the process of analyzing and assessing thinking with a view to improving it.”<sup>17</sup> Although critical thinking has been largely investigated in many health sciences and particularly in nursing, there is still no consensus on its definition, teaching or learning strategies.<sup>18</sup> Behar-Horenstein, Schneider-Mitchell and Graff<sup>19</sup> recently provided a comprehensive review of critical thinking. They reported that it is “regarded as intellectually engaged, skillful, and responsible thinking that facilitates good judgment because it requires the application of assumptions, knowledge, and competence and the ability to challenge one’s own thinking.” Moreover, critical thinking requires self-monitoring and active argumentation, initiative, reasoning, envisioning and analyzing complex alternatives, as well as making contingency-related value judgments.<sup>20</sup>

Critical thinking involves some skills and attitudes necessary for the devel-

opment of clinical reasoning.<sup>21</sup> Therefore, critical thinking can be viewed as a complement or a facilitating factor to the clinical reasoning process.

### Clinical Judgment

Clinical judgment or professional judgment involves deliberate and conscious decision-making, with a particular emphasis on higher-level awareness, discrimination and evaluation in the face of complexity of professional practice. It refers to the ways in which health professionals interpret patients' problems and issues and demonstrate saliency and concern in responding to these matters.<sup>22</sup> Clinical judgment develops through practice, experience,

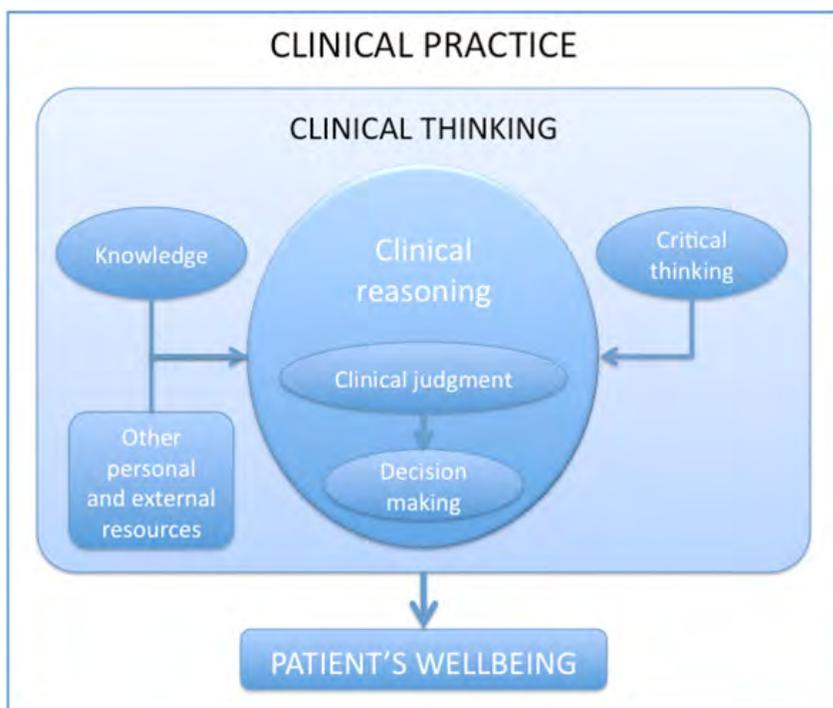
knowledge and critical analysis.<sup>23</sup> Finally, Fish and de Cossart<sup>24</sup> distinguish between the professional judgment corresponding to the end product of the whole process of clinical thinking, and what they call a "personal professional judgment," that is, an ability to weigh competing elements, ideas and actions and to adjudicate between conflicting but equal priorities.

Clinical judgment is facilitated by critical thinking.<sup>19</sup> It also differs from clinical reasoning, but is intimately related to it. In fact, judgment is part of the clinical reasoning process and is also necessary to reflect on the product of clinical reasoning, that is, the decisions made in clinical practice.<sup>25</sup>

### Clinical Thinking: All These Concepts Intertwined in Clinical Practice

Clinical thinking seems to be a larger concept that encompasses all the others. Following Fuks et al.,<sup>1</sup> clinical thinking refers to the cognitive processes of a health professional in the course of his or her work. It includes clinical inquiry, clinical reasoning and clinical judgment. Fish and de Cossart<sup>24</sup> also include many processes in what they call the clinical thinking pathway. In their model, clinical thinking begins with a complex clinical situation that triggers the need for clinical reasoning, which involves personal and professional judgment in order to take wise action for every specific case.

**Figure 1**  
An Integrative Model Of Clinical Thinking



**Figure 1** presents an arrangement of the terms described above in a coherent schematic representing what clinicians do in clinical practice. The most common definitions of those terms are presented in Table 1.

Clinical thinking includes knowledge and other personal (abilities, values, ethic principles, etc.) and external (colleagues and assistants, reference material, instrumentation, etc.) resources, as well as critical thinking. Those are considered as input to clinical reasoning, which is the core of clinical thinking. They must be mobilized in order to resolve clinical problems, use appropriate clinical judgment, and then make the best decisions for each specific patient. The whole clinical thinking process is oriented toward the goal of maintaining, improving or recovering a patient's well-being.

**Table 2** presents a simplified example of what could be the clinical thinking processes of an optometrist during a clinical consultation. Clinical practice is complex. Many elements captured by an experienced clinician may be hard to make explicit, for example, a patient's attitude, subtle corneal change, and global integration of multiple clinical data in a coherent mental representation. Therefore, it is obvious that all the mental actions of an optometrist resolving a clinical case cannot be summarized in a single table. Another optometrist faced with the same clinical case would probably have managed it differently. This example is provided to

**Table 1**  
Most Common Definitions of Terms Related to Clinical Thinking

<b>Decision -making</b>	Making choices between alternatives in order to decide what procedures to do, to make a diagnosis or to decide what treatments to prescribe.
<b>Clinical reasoning</b>	Thinking and decision-making processes associated with clinical practice. Cognitive processes required to evaluate and to manage a clinical problem.
<b>Critical thinking</b>	Analyzing and assessing thinking with a view to improving it. Intellectually engaged, skillful and responsible thinking that facilitates good judgment. Requires the ability to challenge one's own thinking.
<b>Clinical judgment</b>	Ability to weigh competing elements, ideas and actions and to adjudicate between conflicting but equal priorities. Involves a particular emphasis on higher-level awareness, discrimination and evaluation in the face of complexity of professional practice.
<b>Clinical thinking</b>	Cognitive processes of a health professional in the course of his or her work (larger concept that encompasses the previous ones).

give an idea of how critical thinking, decision-making and clinical judgment differ from each other and how they are all intertwined and related.

## What about in optometry?

It is essential to clearly define and distinguish the concepts described above before they are explicitly included in an educational curriculum in optometry. Moreover, many authors recommend that clinical reasoning (and its related concepts) of experts in a profession should be made explicit to the learners of that same profession.<sup>12, 26-29</sup> In order to do so, research studies must be conducted specifically for the optometry profession. This is important to establish the competencies to develop, their course of development through the studies, as well as to define the assessment objectives and create the appropriate assessment tools to achieve them.

The concepts defined and explained above have been largely studied in many health professions, such as medicine,<sup>6, 7</sup> nursing<sup>30</sup> and physiotherapy.<sup>31</sup> However, there is a paucity of research in the area of optometry. With the exception of a doctoral thesis in which the clinical reasoning processes of expert and of recently graduated optometrists were studied using a qualitative research protocol,<sup>14</sup> literature on clinical thinking or related concepts mostly refers to results from other professions. This is the case of Werner,<sup>32</sup> Corliss,<sup>3</sup> Ettinger and Rouse,<sup>33</sup> who were all inspired by the medical model. So there is clearly a need to investigate the way practicing optometrists resolve clinical problems in order to answer their patients' needs, rather than to infer optometrists' clinical reasoning and thinking from results obtained in other health professions.

## Conclusion

It has been shown that there may be confusion between many terms related to a health professional's clinical practice. Many of them are often used alternatively, but it is important to distinguish between them as they usually represent different concepts. This paper also underlines the need to investigate clinical thinking and its related concepts specifically for the optometric profession. This is fundamental when

**Table 2**  
**Example of Clinical Thinking in Clinical Practice**

HISTORY / FINDINGS	CLINICAL THINKING	
A 20-year-old man presents with pain and redness left eye; he is wearing sunglasses indoors	Clinical reasoning: • Mental representation of the clinical case by hypotheses generation	Pain, hyperemia, sensitivity to light Anterior uveitis? Corneal erosion? Contact lens related complication? Corneal ulcer? Other ocular health problem?
	Decision-making	Additional questions to ask Procedures to do: visual acuity, pupils and slit lamp examination (carefully examine cornea and look for cells and flare in anterior chamber)
	Clinical reasoning: • Expectations	Visual acuity probably reduced; left pupil may be smaller; limbal injection, possible corneal involvement, cells and flare may be present
	Critical thinking	Do I consider all the possibilities given the available information? What if expectations are not confirmed by clinical data?
It started suddenly upon waking 3 days ago Not a contact lens wearer No recent eye trauma but a corneal foreign body was removed from the involved eye 3 months ago Was worse when blinking until yesterday, but pain has reduced since then	Clinical reasoning: • Mental representation refinement • Hypothesis elimination	Recurrent corneal erosion? Anterior uveitis still a possible diagnosis Contact lens related complication impossible Recent corneal erosion improbable
	Critical thinking	Am I thinking and reasoning correctly? What else can I ask before starting the eye examination?
	Decision-making	Additional questions to ask before the eye examination
	Clinical reasoning: • Hypothesis refinement • Hypothesis elimination • Expectations	Recurrent corneal erosion or other corneal involvement more probable Healing process in course (re-epithelialization if corneal) Anterior uveitis improbable Cells and flare probably not present (or traces); probable corneal involvement
Corrected visual acuity left eye slightly reduced Left pupil smaller Limbal and bulbar redness, central corneal erosion (depth: anterior stroma); stromal edema, no positive fluorescein staining, small negative staining adjacent to epithelial debris No cells, no flare	Clinical reasoning: • Hypothesis elimination • Diagnosis formulation • Management plan • Patient-centeredness	Anterior uveitis and corneal ulcer eliminated Recurrent corneal erosion, re-epithelialization in course Think to prescribe hyperosmotic solution and lubricant, with topical steroids Planning follow-up and patient education
	Critical thinking	Am I sure that there is no infectious process? Did I carefully look at all the possible hypotheses? Do I understand the whole situation? Did I look carefully to make sure the epithelium is repaired? Is there any other procedure to do to confirm diagnosis? Are there alternative treatment options? What is more appropriate to this specific case?
	Clinical reasoning: • Patient-centeredness and management plan	Planning the best management plan for this specific patient, considering his own personal situation and all the available information
	Clinical judgment	Knowing that standard of care for treating corneal erosions includes cycloplegia, broad spectrum antibiotics and analgesics Considering that pain is less severe than yesterday; that the cornea has re-epithelialized, and that the patient has a recent history of corneal foreign body Considering that the patient is leaving the next day Make the following decisions:
Patient is leaving tomorrow night for one month abroad in a country with easy access to healthcare services	Decision-making following clinical judgment	Prescribe hyperosmotic agents Prescribe topical steroid Follow-up tomorrow morning Educate patient: importance of the one-day follow-up Immediately consult an eyecare specialist if worsening or recurrence Follow-up in one month when back home
	Critical thinking	What is my confidence in the diagnosis and management? Is the management plan appropriate to that specific patient, given his own personal situation? How can I learn from this clinical case?

it comes to formulating a curriculum, in order to clearly elaborate the teaching, learning and assessment goals of an optometric program, with the view of facilitating the integration of optometric evidence-based knowledge in clinical practice through a patient-centered approach.

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