

Cognitive bias in the patient encounter:

Part II. Debiasing using an adaptive toolbox



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Learning objectives

After completing this learning objectives, the reader will be able to better discuss this aspect of the literature.

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Cognitive bias may lead to medical error and awareness of cognitive pitfalls is a potential first step to addressing the negative consequences of cognitive bias (see Part 1). For decision-making processes that occur under uncertainty, which encompass most physician decisions, a so-called “adaptive toolbox” is beneficial for good decisions. The adaptive toolbox is inclusive of broad strategies like cultural humility, emotional intelligence, and self-care that help combat implicit bias, negative consequences of affective bias, and optimize cognition. Additionally, the adaptive toolbox includes situational-specific tools such as heuristics, narratives, cognitive forcing functions, and fast and frugal trees. Such tools may mitigate against errors due to cultural, affective, and cognitive bias. Part 2 of this two-part series covers metacognition and cognitive bias in relation to broad and specific strategies aimed at better decision-making. (J Am Acad Dermatol 2025;92:223-30.)

Key words: cognitive bias; cognitive forcing function; cultural competence; cultural humility; deliberate practice; emotional intelligence; error; feedback debiasing; heuristic; illness script; metacognition; patient safety.

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Abbreviation used:

RISK: Resources, Individual Identity, Skills, and Knowledge

INTRODUCTION

- Metacognition is thinking about how we think, including cognitive bias related to judgments and decisions
- Debiasing is directed at combatting the negative consequences of cognitive bias
- Broad strategies like self-care and situational strategies tailored to specific decision-making scenarios may help prevent cognitive error
- Feedback is necessary for successful cognitive debiasing

Metacognition refers to thinking about our thinking, including the cognitive biases that influence decision-making.¹ There are fast, intuitive processes (fast or System 1 thinking or Type 1 processing) as well as slow, analytic thinking (slow or System 2 thinking or Type 2 processing).¹ Cognitive bias, as an important source of diagnostic error, is often considered to be more related to System 1, but System 2 processing can also be influenced by cognitive bias.^{2,3} As detailed in Part 1 of this series, cognitive bias can be defined as “the class of effects through which an individual’s pre-existing beliefs, expectations, motives, and situational context influence the collection, perception, and interpretation of information”.⁴ Using this definition, cognitive bias cannot be completely eliminated from the patient encounter. However, more conscious awareness of potential pitfalls in the thinking process might be able to help prevent errors.^{2,5,6} Part of the debiasing process can include developing awareness,² although awareness alone does not address what to do when faced with decisions under uncertainty.⁷⁻⁹

Beyond awareness of cognitive bias, there are potential tools that can help prevent cognitive error. Tools that are broadly applicable include cultural humility, emotional intelligence, and self-care. Cultural humility¹⁰ aims to enhance patient-centered care via increased understanding of the patient point of view. Emotional intelligence¹¹ and self-care¹² are associated with decreased burnout which may also decrease error. More specifically, expert decision-making is based on the appropriate use of heuristics, narratives, and other tools. Appropriate use of tools like cultural humility,

emotional intelligence, self-care, heuristics, and narratives takes practice over time.

There is a specific type of practice called “deliberate practice”. Deliberate practice involves conscious setting of a discrete, measurable goal or task, with opportunities for repetitive practice, often with a coach or mentor or teacher giving immediate feedback.¹³ Relevant to making a diagnosis, feedback on the correctness of that decision can encompass patient response to treatment, colleagues’ opinions on a case, testing results including radiologic or histopathologic findings, as well as root cause analysis of error. As an example, a measurable goal might be to accurately predict if a patient’s lesion is benign or malignant using dermoscopy. The next 10 biopsy results can be assessed for the correct versus incorrect prebiopsy clinical dermoscopic diagnosis, considering how to further refine criteria.

Mortality and morbidity conferences can provide feedback on presented cases. However, such conferences often do not directly address error¹⁴ and may not specifically name relevant cognitive or affective biases.¹⁵ At 1 institution’s Department of Medicine Mortality and Morbidity conference, presentations were generally lecture-based, with only 7 of 48 conferences and just 10% of presented cases discussing or addressing error.¹⁴ Errors occurring on other services were also preferentially discussed.¹⁴

Outside of such conferences, an individual practitioner can perform a so-called “cognitive and affective autopsy”, carefully searching for root cause analysis after any adverse patient event.¹⁵ Such an autopsy benefits from identifying specific cognitive and affective biases, including detailed feelings, ambient conditions, and other individuals involved (as well as their feelings).¹⁵ Consciously tracking how decisions were made and what information was used versus perhaps inadvertently ignored may improve future decisions. In doing so, an adaptive toolbox may be created. An adaptive toolbox is the concept of using particular cognitive tools when making decisions,¹⁶ that is adapting the decision-making process according to specific ambient or contextual conditions.¹⁷

AN ADAPTIVE TOOLBOX

- Creating an adaptive toolbox for good judgments and decisions involves consciously choosing the right tool in a given environment

Table I. An adaptive toolbox for decisions under uncertainty

Metacognitive tools for decision-making	
Broad	More situationally specific
Cultural humility	Heuristics, including intuition
Emotional intelligence	Narratives
Self-care	Cognitive forcing functions, including checklists and linear sequential unmasking
	Fast and frugal trees

- Situational-specific strategies include the appropriate use of heuristics, narratives, and fast and frugal trees
- More broadly, cultural humility, emotional intelligence, and self-care may help combat negative effects of bias

Decision-making can be simple or complex; for difficult decisions, especially with time pressure, it can be helpful to have particular decision-making tools. For a given situation or decision, time, effort, and analysis, including comparing your judgments/decisions to those of others can help determine which tool is best.¹⁶ Each of the tools in [Table I](#) have some degree of overlap but are described separately.

An adaptive toolbox: Situational-specific strategies

Heuristics. Heuristics are conscious or unconscious tools that can tell you what to do.⁹ “Heuristic” can also be defined as a simple procedure used to answer a difficult question, adequately but often imperfectly.¹ While these definitions are slightly different, under both definitions, heuristics are largely useful and are not inherently good or bad. Examples of heuristics include intuition, a largely unconscious heuristic.⁹ Trusting or imitating others (eg, copying how a senior resident sutures a wound) is also a heuristic that applies to interpersonal behavior. Imitating another’s actions gives a road-map for what to do.

The best heuristics are fast and frugal and help make decisions rapidly and simply, using a minimum of information that is most appropriate and robust.⁹ Although many heuristics are unconscious, thinking about the heuristics used in decision-making can help refine what information is being used to make decisions. As an example, it is

proposed that heuristics are generally built based on particular search, stopping, and decision rules.¹⁶ The search rule sets parameters on what we are looking for, the stopping rule for when to stop the search, and the decision rule gives the basis for a judgment or decision for particular search and stopping rules.¹⁶

Applying this to dermatology, a useful heuristic is to use the morphology of a primary lesion to build a differential diagnosis. The search rule would be to look for a primary lesion, the stopping rule to end the search once a primary lesion is found, and the decision rule to use the primary lesion to build a list of potential diagnoses. Awareness of the heuristics that are used in clinical practice may lead to better decisions through making us more aware of what information is being used versus any information that is being unwittingly ignored.

Narratives. Narratives also give direction on what to do next and these narratives may be on a large or small scale.¹⁶ For example, many religions provide an overarching narrative that is a backdrop for moral behavior. A more discrete narrative pertinent to the practice of dermatology might be something like, “Blaschkoid lesions suggest mosaicism,” with mosaicism being an important consideration in choosing how to perform genetic analysis. Patient specific anecdotal evidence or a case report is a narrative.

A script can be thought of as a type of narrative, story, mental schema, or map that coherently streamlines and stereotypes knowledge in different domains, often to a very high level, based on direct or vicarious experience.^{18,19} Scripts function to understand behavior, integrate new knowledge with prior experience, and guide predictions or expectations as well as future behavior.¹⁹ Scripts are activated according to context and a classic example is the restaurant script.^{18,19} If one is at a restaurant or thinking about a restaurant, there is core information (eg, food is served) and variable information (eg, there are booths to sit in). “Illness scripts” are schemas more specific to medicine, unique to each physician that integrate prior medical experience and knowledge, directing expectations, inferences, and actions in the real-world.¹⁸ Illness scripts include normal as well as acceptable variations, for a given disease, encompassing past patient presentations (ie, individual patient narratives), what decisions worked in the past for specific patients, and how physicians frame disease.¹⁹

Table II. Key questions that can counter common biases in patient encounters

Has a thorough history and complete physical examination been done?
Has a differential diagnosis been made with pertinent negative and positive signs and symptoms?
Could therapy have altered the current presentation?
What's the worst-case diagnosis? Is it ruled out?
If the patient is not improving, has the diagnosis been reassessed?
Would a second opinion be useful?

Habitual use of these questions can be considered a heuristic. Conscious use of these questions, for example in the chart note, would represent a cognitive forcing function. The yes/no answer to these 6 questions each creates a fast and frugal tree that can direct further examination, expand the differential diagnosis, account for any effect of therapy, and promote patient safety. Adapted from reference²⁰.

Cognitive forcing functions

Cognitive forcing functions have been put forth as a conscious, self-directed debiasing method in particular situations.⁷ “Heuristic” has been contrasted with “cognitive forcing function”, with “heuristic” referring to simplified, unconscious decision-making.⁷ However, deliberate use of a given cognitive forcing function can be considered an example of a conscious heuristic, with “heuristic” defined in this paper as a tool that directs behavior. For example, a physician might deliberately always ask 1 or more questions before settling on a diagnosis (Table II).²⁰ Forcing oneself to always create a differential diagnosis helps prevent cognitive error due to premature closure (settling on a diagnosis without adequately considering alternatives) or diagnostic momentum (accepting an existing diagnosis without thinking further). Considering pertinent positive and negative signs and symptoms for and against a diagnosis can mitigate against confirmation bias (only looking for supportive evidence), search satisficing (stopping a search once 1 thing is found), and availability bias (only considering what easily comes to mind). Systemic interventions can also promote use of conscious heuristics.

Cognitive forcing functions can be categorized as universal, generic, or specific.⁷ Universal strategies encompass understanding metacognition and basic error theory. Generic strategies include recognizing how decisions are made in a given situation like a patient encounter. For example, in terms of diagnosis, it is common to compare a patient

presentation to prototypical examples, and error can arise when signs or symptoms that do not fit are inadvertently ignored. One can prevent error by asking, what does not fit? Is there anything atypical? Is anything being overlooked? Specific cognitive forcing strategies are predicated on awareness of particular scenarios that are rife with the possibility for error due to classic and predictable pitfalls in diagnosis or management. Defined rules or caveats can serve as specific strategies.

Checklists. Checklists are a cognitive forcing function. Habitual use of a given checklist can standardize and routinize care. For example, vital signs and Apgar scores are a type of checklist. Specific to dermatology, the synoptic reporting of malignant melanoma is a checklist of elements that includes depth of invasion, ulceration, and perineural invasion.

Linear sequential unmasking. Linear sequential unmasking is a cognitive forcing function in which information is obtained in a particular sequence, to reduce potential negative effects of bias.²¹ In dermatology, examples of linear sequential unmasking include performing a skin examination before obtaining history from a patient as well as examining a microscopic slide before reading the information given on a biopsy requisition form.

The “inner crowd.” The concept of the “inner crowd” can help hone intuition as well as decisions under uncertainty.²² The “inner crowd” can be defined as multiple different judgments or estimations for the same situation by the same individual. Research supports that the average of multiple opinions is often more accurate than just 1.²² Interrogating one's own opinions and noting if they vary across time is informative, especially if put in context of other data like patient course or outcome. Because one's opinions tend to vary more with the passage of time, time pressure can be a barrier to using the inner crowd.

Prospective hindsight. Prospective hindsight is the process of imagining a future and looking back and evaluating for areas of improvement. In dermatology, specifically after an initial diagnosis is made, one can ask, If I assume I am wrong, what is an alternative diagnosis?⁶ Like the “inner crowd”, prospective hindsight can give information on practical search, stopping, and decision rules to create heuristics for a given scenario in dermatology. Predicting the histopathological diagnosis and interrogating why the clinical impression may be right versus wrong is an example of using prospective hindsight.

Table III. Questions to promote cultural humility: RISK

RISK term	Example questions
Resources	Have other community members faced something similar? Any insurance or transportation issues?
Individual identity	What language is best? What are patient concerns regarding illness?
Skills	Who can help the patient with the illness and other activities of daily life? Who supports the patient?
Knowledge	Does the patient want someone else to know about the illness? Is there any cultural/religious/other factor that might influence the illness experience?

As for Table II, use of these questions can create heuristics, cognitive forcing functions, and/or fast and frugal trees. Adapted from reference.²⁶

Fast and frugal trees. Fast and frugal trees are a type of heuristic.¹⁶ A fast and frugal tree is a decision tree composed of 1 to several questions that branch according to the answer, with defined actions corresponding to each branch. A simple fast and frugal tree in the dermatologic encounter would be, do I recognize this patient's rash? If the answer is yes, then there is a working diagnosis. If the answer is no, the next action could be to perform a biopsy. For each dermatologic sign, morphology, or pattern, there are associated fast and frugal trees. For example, a linear rash would lead a dermatologist to think of diseases like herpes zoster, poison ivy dermatitis, and Blaschkoid dermatitides.

An adaptive toolbox: Broad strategies

Cultural humility. A strong body of research suggests that implicit bias can negatively affect the patient encounter.²³ Implicit bias may adversely influence us toward a particular group based on a given characteristic like race or gender or age, and this can be contrary to conscious values. Taking an implicit association test may be informative, as it may show that an individual's subconscious attitudes are contrary to explicitly endorsed values,²⁴ but notably, implicit associations are not necessarily predictive of behavior as indicated by a 2013 meta-analysis.²⁵

Cultural competence is the ability to address "social, cultural, and community influences on health care behaviors and incorporate these

elements into patient care".²⁶ Instead of the term "cultural competence", which may imply that a certain amount of knowledge allows full proficiency in another culture, the term "cultural humility" may be more accurate.¹⁰ Cultural humility is promoted by being aware of cultural differences and using strategies (which include heuristics) to reduce the effect of implicit associations on medical judgment, placing the patient's own lived experience as a crucial component of the doctor-patient interaction.¹⁰ An example of a strategy would be the use of RISK in the patient encounter — RISK stands for Resources, Individual Identity, Skills, and Knowledge.²⁶ Identifying each of these factors for a given patient will increase connection and communication, which should benefit the doctor-patient interaction (Table III).²⁶ Language is included in RISK as a key part of individual identity,¹⁵ and documenting a patient's preferred language and having a translator available is an example of a best practice heuristic.²⁷

Emotional intelligence. Affective bias refers to emotions affecting judgments and decisions. Affective bias has received little attention in medical literature on debiasing.^{15,28} Affective bias can be categorized into transitory states, clinical situation-induced, and endogenous.²⁹ Transitory states include environmental factors like sleep deprivation and stress. Situational factors include countertransference and fundamental attribution error (judging or blaming the patient rather than relevant psychosocial elements).²⁹ In countertransference, patient characteristics like gender or race may influence decision-making and care.¹⁵ Endogenous factors encompass emotional dysregulation in the physician.²⁹ Transitory, clinical-situation-induced, and endogenous states may induce negative affect,²⁹ and suppression of such negative emotion by an individual can cause increased stress in the individual, resulting in less effective communication.³⁰ Particular emotions, like shame, can be difficult to even acknowledge in medicine.³¹

Optimally, emotions can be used as data points or signals to more effectively make a given judgment or decision.³² One can ask, why am I angry about this? Is there something I can change? Having a basic understanding of one's own emotions, emotional triggers, and cultivating emotional intelligence may lessen any negative impact of affective bias over time.

Self-care. Cognition and emotional regulation are optimized when well-rested,³³ and sleep deprivation has been associated with medical error.³⁴

Table IV. An example of a cognitive autopsy with suggested cognitive forcing functions for debiasing

Case history	
A female patient in her teens presents to the emergency department with headache, abdominal pain, diarrhea, vomiting, and facial petechiae. Intending to read the triage notes after examining the patient, the emergency physician sees the patient and distinctly remembers a similar rash in a fatal case of meningococemia. The emergency physician orders a lumbar puncture, initiates antibiotics, and ends his shift before reading the triage notes. The patient's lumbar puncture is normal. Ultimately, once she is feeling better, the patient is discharged without a clear diagnosis.	
Cognitive autopsy of probable biases	
Anchoring and adjustment	The physician anchored on meningococemia and did not consider alternative diagnoses.
Unpacking failure	The physician relied too much on the petechial rash alone.
Omission error	The physician forgot to read the triage notes.
Commission error	The patient did not need a lumbar puncture.
Potential cognitive forcing functions for debiasing	
Always create a differential diagnosis.	
Just 1 symptom or sign should not allow one to anchor on only 1 diagnosis. Look for other pertinent positive and negatives.	
Do not enter orders without somehow signing off on the triage notes.	
Create a checklist of minimal necessary signs/symptoms for ordering a lumbar puncture.	

Adapted from reference⁵, Case 10.

After 17 to 19 hours without sleep, cognitive functioning is impaired to the same level as driving under the influence of illegal blood levels of alcohol.³⁵

Self-care, inclusive of activities that promote and maintain personal well-being along with adequate sleep, may help mitigate poor decisions.¹² Self-awareness is a key factor, as shown by the importance of self-awareness for psychologists to function well.^{12,36,37} Self-awareness can be promoted by thinking about one's own beliefs and attitudes, including any core beliefs, boundary setting in patient care, considering medical mistakes, and stress management.³⁷ In addition to self-awareness, both professional and personal relationships are conducive to self-care.¹² A network of peers and coworkers can increase engagement and promote good communication. A strong professional network may also help to balance empathy with objectivity. Personal relationships can promote reflection and encourage maintenance of healthy habits like exercise, time away from work, and hobbies.¹² Other self-care options that can increase well-being and potentially improve decision-making in health care professionals include meditation, body scan, Hatha yoga, and three-minute breathing space.³⁸ Reflective writing is another potential self-care tool.³⁹ Good self-care, including adequate sleep, should optimize cognition and emotional regulation, which may help decrease negative effects of cognitive bias.

CONCLUSIONS

- Metacognitive work may identify cognitive errors and help prevent them
- A range of tools may optimize good decision-making
- Emotional intelligence and self-care may aid good decisions
- Awareness can be a first step to combat implicit bias and cultural incompetence
- Cognitive debiasing takes practice

Metacognition creates space to consider cognitive bias, debiasing, and how to improve decision-making under uncertainty. Increased understanding of how and when to use particular tools is adaptive and may lead to improved decision-making. Such tools include heuristics, intuition, narratives, cognitive forcing functions, prospective hindsight, fast and frugal trees, emotional intelligence (ie, regulation of self and other emotions), self-care, and strong relationships. The exact how and when to use these various tools in decision-making requires feedback on the decision-making process with reflection on any negative

consequences of cognitive biases. Periodic assessment (eg, at the end of a clinic day or at the end of each week or month) on patient encounters and diagnoses that went well versus several that did not can perhaps highlight clinical situations at higher risk for pitfalls of cognitive bias as well as the proper tool that can combat any future bias (Table IV). Such metacognitive work does not need to be time consuming and yet potentially can have a markedly positive effect on physicians and patients.

Conflicts of interest

None disclosed.

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