

Problems for clinical judgement: introducing cognitive psychology as one more basic science

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Medical practice is not easy because of its inherent widespread uncertainty. Some questions are settled eventually through clinical trials, whereas others are impossible to resolve. Between these 2 extremes rests a large grey area where physicians must exercise their judgement. Good clinical judgement has been prized since the time of Hippocrates and will continue to be important for many years to come. However, practical tips for improving judgement cannot always be found in MEDLINE, a textbook or a colleague. Furthermore, one dazzling diagnostic feat is no guarantee of sustained excellence.

Clinical judgement can be defined as the exercise of reasoning under uncertainty when caring for patients. The essential feature is that physicians do not act solely on an evidenced basis or on an arbitrary basis. Instead, clinical judgement combines scientific theory, personal experience, patient perspectives and other insights. Examples of clinical judgement range from the monumental (such as whether to discontinue life-support for a patient on dialysis) to the banal (such as whether to discontinue a telephone call when on hold with nephrology). Common elements in this process include missing data, conflicting information, limited time and long-term trade-offs.

Cognitive psychology is the basic science that explores how people reason, formulate judgements and make decisions. The recurrent observation is that people make mistakes when they encounter complex problems. The distinctive finding is that everyday situations are often sufficiently complex to elicit mistakes. The fundamental assumption is that these mistakes are not random. Research suggests that human reasoning is susceptible to predictable errors; that is, some mistakes are made repeatedly by most people. Hence, cognitive psychology is a scientific discipline that might inform clinical judgement.

Rationale for this series

Effective clinicians seem to understand intuitively a lot about human psychology when they practise medicine. Physicians, in particular, use many of the tools of cognitive psychology without necessarily knowing that there is a body of science that underpins their intuition. Awareness of this science might accomplish 3 things. First, it may broaden the list of pitfalls that a clinician can anticipate and possibly avoid. Second, it may provide a language and a logic for understanding repeated mistakes. Third, it may

encourage greater circumspection in daily practice and more ideas for future medical research.

Here we introduce a series of articles that apply research into human psychology to the practice of clinical judgement. Our group was motivated to tackle the topic because of our ongoing work as practising clinicians and our active research as scientists in the nonbiologic aspects of medicine. Another qualification was that we have made plenty of mistakes ourselves. We are not authorities in psychology; hence, we rely primarily on reviewing what has been discovered by others. Many of the concepts are not new discoveries: they are classic findings that have endured with time, yet have escaped medical attention.

Our implicit supposition is that clinical judgement will always be needed. For example, the diagnostic ability of an astute clinician is still much better than the performance of a sophisticated computer programmed with an encyclopedic knowledge of medicine.^{1,2} In contrast, the judgements of forensic psychologists that are intended to predict parole violations or those of university admissions committees that are intended to predict student performance are not much better than simple statistical models.^{3,4} Clinical judgement can also be swift, elegant, enjoyable and highly regarded by society.

Failures of clinical judgement

Overview of errors

Clinical judgement might be flawless under 3 conditions. First, if the demands of medicine fell beneath the intellect of clinicians, clinical judgement would be easier (just as watching television is easy because the complexity of most shows is below the intelligence of most viewers). Second, if practitioners were diligent at checking for errors, serious error would be less likely to occur (just as serious pilot error rarely occurs in commercial flights because of the many error-checking protocols). Third, if the environment offered sufficient safeguards against latent errors, such errors would be diminished (just as children are rarely hurt in daycare because their surroundings compensate for their limitations).

The medical arena tends to violate all these 3 conditions, thereby forming the basis for errors of judgement (Table 1). For example, consider the fact that about 1 of 20 patients presenting to an emergency department with an acute myocardial infarction is mistakenly sent home.⁵ This error might occur less frequently if chest pain were not so compli-

cated to diagnose, if second opinions were automatic in emergency medicine or if follow-up were infallible. The way to reduce this error is to make the task easier (e.g., with a troponin test), provide more double-checking (such as may occur in a teaching hospital) or install more safeguards (such as CPR training for family members).

Underlying intellectual ability

Individual clinicians may not always recognize that errors in clinical judgement occur in their own practice. The core problem is that people are often poor at judging their own performance. For example, studies show that 85% of people believe that they are better-than-average drivers, contrary to the laws of probability.⁶ The reason for this misconception is that drivers are often unaware of their mistakes, and occasional lapses are more easily spotted by others. Similar distortions may occur in medicine because of imperfect feedback to clinicians, such as when unsatisfactory care causes patients to complain elsewhere.

The basic reason for worrying about our clinical judgement is that the human brain is a finite organ with bounded capacity. We could all gain by having more memory or intellect, but this is not possible. Although some weaknesses may be offset by technology such as computers, the core exercise of medical decision-making remains fallible because of human limitations and intense time pressures. In addition, the 1.5-kg brain must be directed to more than just clinical judgement: it must juggle simultaneously responsibilities for maintaining balance, modulating personality and all the other usual tasks of daily life. Thus, failures in judgement can confront any physician.⁷

A distinct fountain of mistakes relates to the mysterious actions of random chance.⁸ Consider a physician who sees a patient because of a cough, finds no abnormalities, but has

a hunch about lung cancer. A series of tests is undertaken, and the physician is eventually proved correct. This experience may lead to an overestimation of the physician's talent, if the initial judgement was more a matter of luck than of skill. More generally, one natural psychological tendency is to assign high praise to personal triumphs with insufficient credit being given to the role of random chance.⁹

Diligent checking for errors

A related problem involves the tendency for people to form opinions on the basis of early information and, once these opinions are formed, their reluctance to change their opinions even when given important new information. Research in nonmedical settings suggests that experts are particularly prone to persevere with their initial ideas and to change their minds less frequently than would be ideal.¹⁰ Changing one's mind is unpleasant because it implies that the original thinking was incorrect. Changing one's mind in medicine is even more troublesome because of the need to explain the switch to patients, families, colleagues and others.

A paradox also arises because clinical judgement is so cherished that it verges on being incorrigible. As an analogy, note that grandparents often consider their own grandchildren to be distinctly attractive, even when no genetic link is present.¹¹ In consequence, the grandparents' adoration makes it hard for them to compare their grandchildren fairly with other children, to hear negative feedback about their grandchildren and to discipline their grandchildren. The same failures may occur when physicians consider their own judgement. This paradox, furthermore, can make articles on clinical judgement seem pretentious or something to be avoided.

A further pitfall is that some errors may remain invisible despite repeated failures and serious introspection. As an analogy, consider the ability to write using proper grammar. The skill needed to construct a sentence that is grammatically correct is the same skill that is needed to check that a sentence is grammatically correct. Likewise in medicine, the wisdom needed to produce good judgement may be the same wisdom that is needed to recognize good judgement.¹² Conversely, confidence in one's judgement may merely indicate an unawareness of repeated mistakes. Bad judgement, like bad breath, is often not noticed by its source.

Safeguards in the environment

One further reason for circumspection is that faulty judgement can lead to self-fulfilling prophecies. Imagine a transplantation committee allocating a small number of organs to a large pool of candidates. Competition for selection is intense, so that only patients judged likely to do especially well will receive one of the scarce organs, however, the committee can never really know whether those who were denied transplantation might have done equally well. Moreover, such patients may develop more ominous signs

Table 1: The basis for errors in clinical judgement

Root cause of fallibility	Solution
Intellectual factors	
Overconfidence in oneself	Prompt unambiguous feedback
Finite capacity of the human brain	Simplifying technologies
Random chance and self-limited disease	Training in probability theory
Lack of checking for errors	
Reluctance to change initial opinions	Searching for contrary data
Unquestioning self-approval	Maintaining greater humility
Unawareness of subtle failures	Peer review of performance
Environmental factors	
Impracticality of looking for mistakes	Automatic follow-up systems
Propagation of errors made by others	Nonpunitive supervision
Unawareness of limits of judgement	Staying up with the literature

that reinforce the decision, but which might not have occurred had the transplant been granted.

Another vexatious issue relates to the collaborative nature of medical care. Most physicians are highly dependent on the work of others. Thus, clinical judgement can be seriously faulty if based on erroneous charting of vital signs, reports of radiology studies, messages about biopsy specimens or other misinformation. Each of us has the weighty problem of deciding how much time to spend trusting others and how much time to spend personally double-checking. Learning from experience is made even more difficult because of shared guilt and a tendency to blame others when a mistake is discovered.

A final concern is that judgement is a complement to but not a substitute for knowledge. An experienced general surgeon who trusts only his or her judgement and never reads the literature, for example, might be brilliant at diagnosing recurrent ulcer disease but may never realize that it might have often been prevented by antibiotic therapy. Moreover, a physician who does not appreciate the limits of judgement may be unaware of situations when technology offers a superior approach. Even the masterly skills of Sir William Osler could not achieve the results that practitioners obtain routinely today.

Intent of this series

Mistakes are made in clinical judgement because medicine is a demanding human endeavour. Flawless intellectual reasoning, diligent checking for errors and foolproof environmental safeguarding would require superhuman talent. This series, therefore, seeks to rectify some problems in clinical judgement, not to deny them nor to demonize them. To do so, we will concentrate on concepts valuable to all physicians regardless of specialty. In addition, we will focus on what has been discovered by nonmedical scientists but may have been overlooked by clinicians. The ultimate aspiration is to help physicians accumulate judgement and avoid a decline in skill.

We have informally surveyed our peers and have already identified a few specific exercises in clinical judgement that merit scrutiny. We have found, for example, that physicians need more effective ways to get patients to say what matters when recounting their medical history. Physicians need tools for interpreting numerical data and avoiding big mistakes. Physicians can additionally benefit from strategies designed for thinking clearly in an emergency. Some safeguards also seem worthwhile for interacting with administrators and others who may question clinical judgement by collecting crude statistics. All of these topics are covered in forthcoming articles.

Our review of the psychology of clinical judgement also has several limitations. Most importantly, this series focuses on issues that have special bearing for physicians and counterintuitive features: this series does not follow a structured approach with explicit selection criteria.¹³ In addition, we

cannot cover all the available territory because the terrain is just too large, too varied and too undiscovered for a brief review to include more than a few salient landmarks. Moreover, the importance of the selected pitfalls is also controversial because the distribution of specific failings is not documented by field studies of real practice settings.¹⁴

The hardest problems to solve in medicine are the ones where no one recognizes that anything is wrong. We hope that this series helps to advance both the practice and science of medicine. In addition, the series might help those outside medicine to better understand our profession and inspire those inside medicine to pursue future research on human error. Clinical judgement deserves just as much scrutiny as a drug, device, test, procedure or other component of patient care. Indeed, clinical judgement might merit more attention because of the potential for huge error and the opportunities for immediate improvement.

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