Clinical judgment gets lift from research

Psychiatrists and other mental health clinicians demonstrate considerable flaws in the judgments they make about their clients, according to studies published over the past several decades. Statistical formulas employing background information better predict a client's prognosis or propensity to behave violently than do clinicians, and the professionals' years of experience fail to improve their insight into clients, these data indicate.

Think again, says a team of psychologists at Ball State University in Muncie, Ind. Preliminary results of their compilation and analysis of many clinical-judgment studies indicate that statistical models perform no better than flesh-and-blood clinicians on judgments common within the mental health field. Moreover, clinicians indeed become more accurate decision makers for many tasks as they accumulate experience, the researchers argue.

Previous dour assessments of clinical judgment have often rested on selective reviews of investigations that frequently contain methodological problems, contends project director Paul M. Spengler. Nonetheless, convictions about inherently inept clinical decisions have flourished, he says.

"Unevaluated assumptions are repeated like a mantra and achieve the level of myth, perpetuated by the very scholars who wish to reduce bias in clinical judgment," Spengler says.

He and his colleagues presented initial results of their metanalysis of clinical judgment research at the annual meeting of the American Psychological Association last week in San Francisco.

The Ball State group spent nearly 6 years tracking down 1,048 empirical studies of clinical decision making. These range from published articles to unpublished dissertations by psychology graduate students.

In one investigation derived from this research sample, Stefania Aegisdóttir and Alan Maugherman chose 74 articles comparing statistical and clinical prediction in the mental health field. They have summarized the findings of 30 of those studies so far.

Experiments described in these articles focused on a number of assessments regarding individual clients, such as ascertaining the presence of brain damage, identifying personality traits, estimating future emotional adjustment or criminal behavior, and judging school performance. Statistical formulas used readily available information such as socioeconomic status, sex, medical history, and criminal record. Clinicians learned about real or hypothetical clients through written material, videotapes, or personal interviews.

In common clinical practices, such as making diagnoses and gauging future emotional adjustment, statistical formulas and clinicians proved correct on about one out of every two judgments, Aegisdóttir says.

In a second analysis, Michael J. White and Genna Freels identified 67 studies that addressed the effects of experience on clinical judgment.

In investigations that focused on objective measures of judgment accuracy, such as predicting a person's future criminal acts or discerning an individual's mental diagnosis, performance improved substantially—from an average success rate of 43 percent to one of 57 percent—as a clinician's professional experience increased. Experienced clinicians, however, were neither more nor less optimistic about clients' conditions and prospects than fledgling clinicians.

Many studies of clinical experience were excluded from the metanalysis because they presented clinicians only with written descriptions of clients, a task that poorly reflects the actual process of decision making, White says.

"This work is potentially of great value, but the results may change when [the analysis] is completed," comments psychologist David Faust of the University of Rhode Island in Kingston. Faust has coauthored research that found an overall superiority of statistical models over clinicians' predictions.

Even in the event of a tie between statistical and clinical methods of prediction, number-based approaches win out as easier to use and cheaper to implement, Faust asserts. *—B. Bower*

Math prizes: Moonshine to quantum logic

For research ranging from string theory to chaos, four mathematicians have won the Fields Medal, the most prestigious award in mathematics.

First presented in 1936 at the International Congress of Mathematicians (ICM), the Fields Medal is given every 4 years to mathematicians age 40 and younger "in recognition of work already done and as an encouragement for future achievements."

The recipients—announced this week at ICM 98 in Berlin—are Richard E. Borcherds and William T. Gowers of the University of Cambridge in England, Maxim Kontsevich of the Institut des Hautes Études Scientifiques in Bures-sur-Yvette, France, and Curtis T. McMullen of Harvard University.

Borcherds, 38, proved a conjecture establishing an unexpected connection between a class of geometric equations and an algebraic entity called a group. That entity consists of a set of objects for which chosen arithmetic rules apply. For example, all whole numbers and their sums constitute a group.

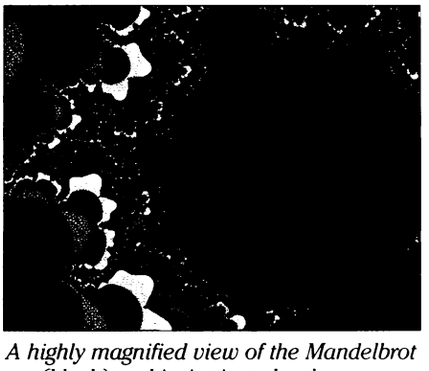
Simple groups are the building blocks from which all other groups are assembled. In the late 1970s, two mathematicians proposed that one particular simple but huge group—dubbed the monster—shares an important characteristic with mathematical expressions called elliptic curves.

That suggestion seemed so outrageous at the time that experts dubbed it "monstrous moonshine." To establish the link, Borcherds used mathematical ideas from string theory, which posits that particles of matter are made up of tiny, extended objects called strings (SN: 2/27/93, p. 136).

Kontsevich, 34, made important contributions to string theory, demonstrating the mathematical equivalence of two quantum-gravity models (SN: 6/13/98, p. 376). He also discovered a compact way to characterize mathematical knots (SN: 3/21/92, p. 186).

McMullen, 40, investigated the Mandelbrot set (SN: 11/23/91, p. 331), which compactly summarizes the chaotic behavior of certain equations, including those often used to describe phenomena such as flowing liquids and changing weather systems. His research provided a precise characterization of the Mandelbrot set's convoluted boundary.

Gowers, 35, proved important conjectures in the field of functional analysis. He extensively applied combinatorial techniques to explore sets of functions.



A highly magnified view of the Mandelbrot set (black) and its intricate border.

Also awarded this week was the Nevanlinna Prize, which goes to mathematicians who make significant contributions to theoretical computer science. The recipient is Peter W. Shor, 39, of AT&T Labs Research in Florham Park, N.J.

In 1994, Shor discovered a mathematical technique that takes advantage of the peculiarities of quantum mechanics to speed up the factoring of large composite numbers into their prime-number components (SN: 5/14/94, p. 308). That finding sparked a major, ongoing effort to develop a computer based on quantum logic (SN: 1/14/95, p. 30). *—I. Peterson*