Thinking 5

Are Expertise and Intuition Related: 2 Perspectives

- Which best describes becoming an expert in some domain requires.

A. Developing intuitions – System 1 thinking – so that correct answers are more readily apparent.

B. Developing the ability to reason more accurately – System 2 thinking – within the domain.

C. Both (A) and (B)

D. Neither (A) or (B)

Intuition and Expertise – Antithetical or Related

Two perspectives

- Heuristics and Biases (HB) approach
  - Associated with the work of Kahneman & Tversky
  - Intuitive judgments are often flawed
- Naturalistic Decision Making (NDM)
  - Intuitive judgments of experts often reveal important regularities within task situations
  - Gary Klein

Naturalistic Decision Making: Roots in Studies of Chess Masters

B. Larsen - B. Spassky

Black to move

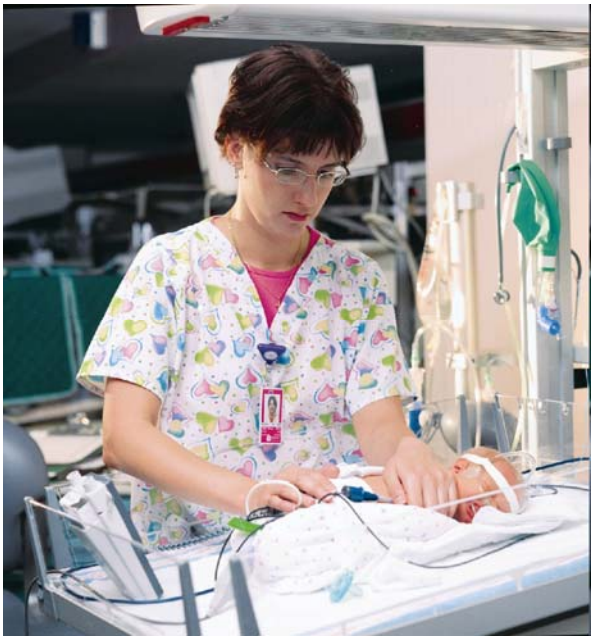
- Chase and Simon (1973): performance of chess experts is a perceptual skill in which complex patterns are recognized

Naturalistic Decision Making: Early Work

- Klein, Calderwood, and Clinton-Ciroco (1986): Decision making of fire commanders
  - Recognition-Primed Decision making (RPD)
- Goal: Demystify intuition
  - Cognitive Task Analysis (CTA)

Naturalistic Decision Making: Success Story

- Crandall and Getchell-Reiter (1993) studied nurses in a neonatal intensive care unit
  - Able to detect infants developing life-threatening infections even before blood tests came back positive.



Heuristics and Biases: Roots in Critical Studies of Clinicians

- Paul Meehl (1954)
  - Reviewed studies comparing the accuracy of forecasts made by human judges and those predicted by simple statistical models
  - Statistical predictions were more accurate than human predictions in almost every case
- Inconsistency is a major weakness of intuitive judgments
- Kahneman – Illusion of validity
- Tversky & Kahneman (1971)
  - Described the often sub-optimal performance of statisticians and researchers choosing sample sizes for experiments

- Consider the distinction between the HB and the NDM approaches? Which statement below is most accurate?

A. Both NDM and HB focus on inconsistencies that often emerge when experts are asked to make the same judgment at different times.

B. The HB approach is based on the premise that there is much to be learned by studying how experts in many areas are like chess masters in their ability to look at a complex situation and quickly decide on a possible solution.

C. Often experts are not aware of the cues that they use to make intuitive judgments. NDM uses Cognitive Task Analysis to find these cues.

D. All of (a) – (c) above are correct.

Expectations of HB and NDM: Decision Algorithms vs. Expertise

- HB researchers view experts with skepticism
  - Advocate the use of decision rules
- NDM researchers adopt an admiring stance toward experts
  - Have little faith in formal approaches

Role of Intuition?

- Role of the System 1 vs. 2 thinking
  - NDM (RPD model):
    System 1 precedes System 2
  - HB
    Most reasoning should be System 2
    System 1 thinking should be monitored by System 2
- HB and NDM focus on different types of intuition

Skilled Intuition as Recognition

- Simon (1992) skilled intuition: "The situation has provided a cue: This cue has given the expert access to information stored in memory, and the information provides the answer. Intuition is nothing more and nothing less than recognition"
- Two conditions for an intuition to be skilled
  - The environment must provide adequately *valid* cues to the nature of the situation
    - Tetlock (2005) *Expert political judgment: How good is it? How can we know?*
    - Validity is not the same as absence of uncertainty
  - People must have an opportunity to learn the relevant cues

Distinguishing Expert Intuitions from Incorrect Intuitions (Guesses)

- No marker distinguishes correct from incorrect intuitions
- Intuitions that originate in heuristics are not necessarily wrong

  "In general these heuristics are quite useful, but sometimes they lead to severe and systematic errors" (Tversky & Kahneman, 1974, p. 1124)
- Subjective confidence depends more on the internal consistency of the information on which a judgment is based than the quality of that information

Professions in which Expert Judgments Develop

Shanteau (1992) Competence in experts: The role of task characteristics. *Organizational Behavior and Human Decision Processes, 53,* 252–262.

- Areas in which expert judgments were found to develop:

  livestock judges, astronomers, test pilots, soil judges, chess masters, physicists, mathematicians, accountants, grain inspectors, photo interpreters, and insurance analysts
- Areas in which expert judgments did ***NOT*** develop:

  stockbrokers, clinical psychologists, psychiatrists, college admissions officers, court judges, personnel selectors, and intelligence analysts
- What the difference?
  - The presence of valid cues
  - The opportunity to learn about the valid cues

Fractionated Expertise

- 3 professions appeared in both of Shanteau's lists
  Auditors, Nurses, and Physicians
- Most professionals encounter situations and tasks that they have not had an opportunity to master
- Two perspectives
  - NDM: Experts are those who recognize anomalous situations
  - HB: Experts often know how to use their knowledge for some purposes but too often attempt to use the same knowledge for other purposes

Rule Systems versus Human Judgment

- Under certain conditions mechanical rule systems outperform human judgment
  - When validity is low
  - When validity is very high, in highly predictable environments

Summary: Expertise & Intuition

- Two approaches to the study of expertise and intuition: HB and NDM
- Skilled intuitions
  - Require valid cues and opportunities to learn
  - Are not distinguishable from guesses
- Simplifying heuristics
  - Often lead us to the correct answer
  - But are far from foolproof
- In some important areas
  - “Expertise” may not be possible
  - Fractionated expertise is common
  - Advantages & disadvantages of augmenting human judgment with rule systems

Looking Ahead

- Tuesday review sessions cancelled
- Wednesday
  - Chapter Test on Thinking
- Friday No Class
- For Monday
  - Gleitman: Ch. 10 (Language), pp. 379-385
  - Reader: Baker, pp. 108-114
  - Zap #17: Feature Net
- Coffee at Phoenix Grill?