The heart has its reasons of which reason knows nothing
Blaise Pascal

Gut Feelings:

Short Cuts To Better Decision Making

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An intuition is a judgment

(i) that appears quickly in consciousness,

(ii) whose underlying process we are not fully aware of, yet

(iii) is strong enough to act upon.

She works by intuition and feeling... If she abandons her natural naiveté and takes up the burden of guiding and accounting for her life by consciousness, she is likely to lose more than she gains, according to the old saw that she who deliberates is lost.

Stanley Hall, 1904

April 8, 1779

If you doubt, set down all the Reasons, pro and con, in opposite Columns on a Sheet of Paper, and when you have considered them two or three Days, perform an Operation similar to that in some questions of Algebra; observe what Reasons or Motives in each Column are equal in weight, one to one, one to two, two to three, or the like, and when you have struck out from both Sides all the Equalities, you will see in which column remains the Balance. […]

This kind of *Moral Algebra* I have often practiced in important and dubious Concerns, and tho' it cannot be mathematically exact, I have found it extreamly useful. By the way, if you do not learn it, I apprehend you will never be married.

I am ever your affectionate Uncle,
B. FRANKLIN

What Is the Process Underlying Intuition?

- God's voice; mysterious and inexplicable
- Biases due to cognitive limitations
- Optimal weighting of all reasons
- Fast and frugal heuristics

Intuitions in Sports

When a man throws a ball high in the air and catches it again, he behaves as if he had solved a set of differential equations in predicting the trajectory of the ball... At some subconscious level, something functionally equivalent to the mathematical calculation is going on.

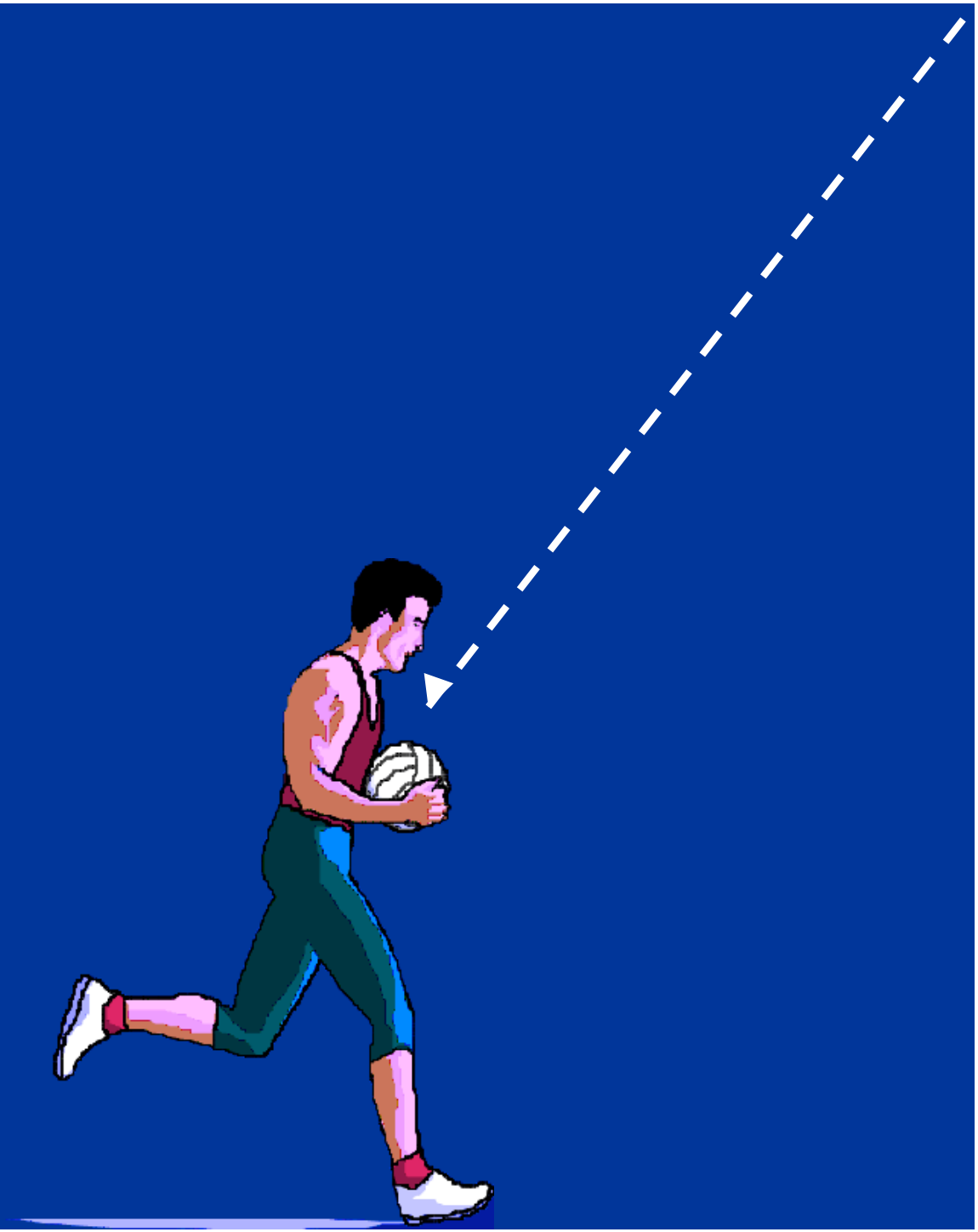
Richard Dawkins, The Selfish Gene

Gaze heuristic

Gaze heuristic

Gaze heuristic

Gaze heuristic



Gaze Heuristic

- How to intercept a potential pray or mate?

  bats, birds, dragonflies, hoverflies, teleost fish, houseflies

- How to avoid collisions?

  sailors, aircraft pilots

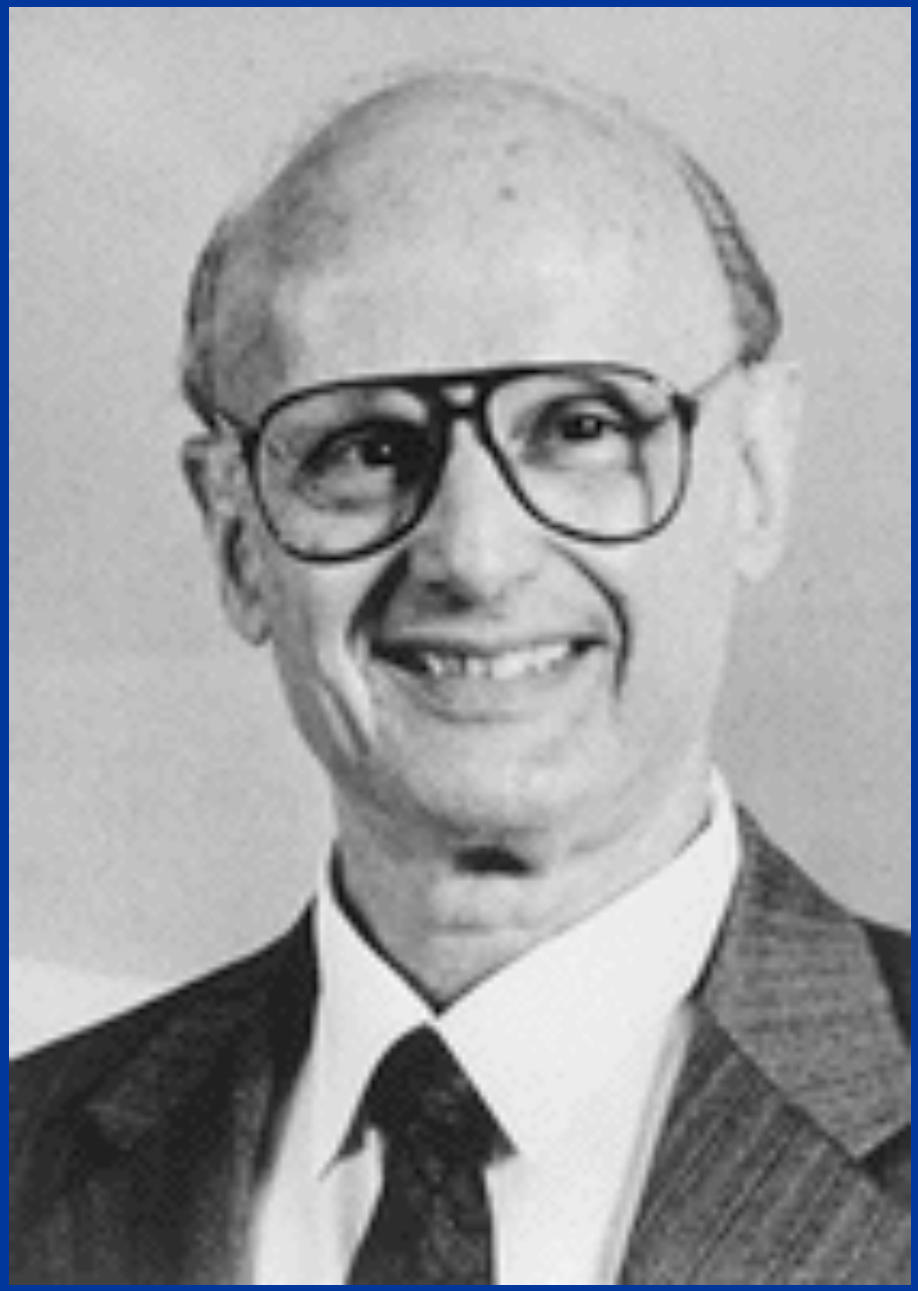
- Where to run to catch a ball?

  Shaffer et al., 2004, *Psychological Science;* McLeod et al., 2003, *Nature*

- How to infer intention from gaze?

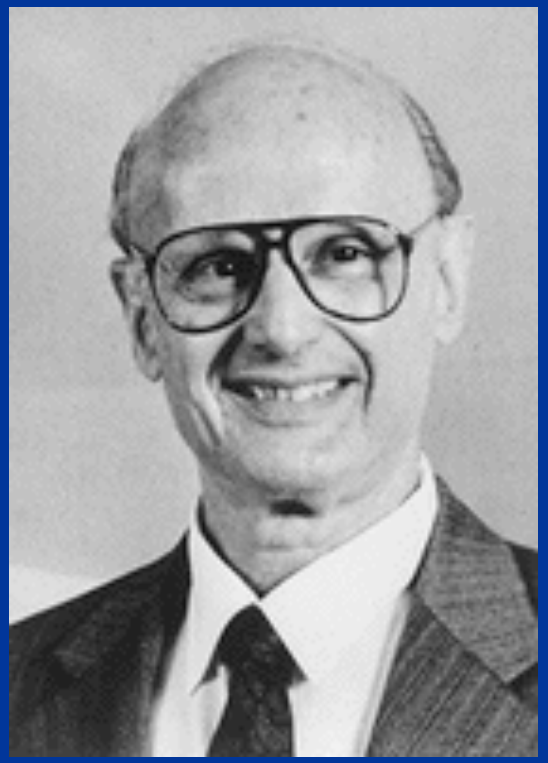
  Baron-Cohen 1995; Blythe et al., 1999; in Gigerenzer et al., 1999,*Simple Heuristics That Make us Smart*

Intuitions About Investments



How to make investment decisions?

Optimal Asset Allocation Policy
"Mean-Variance-Model"

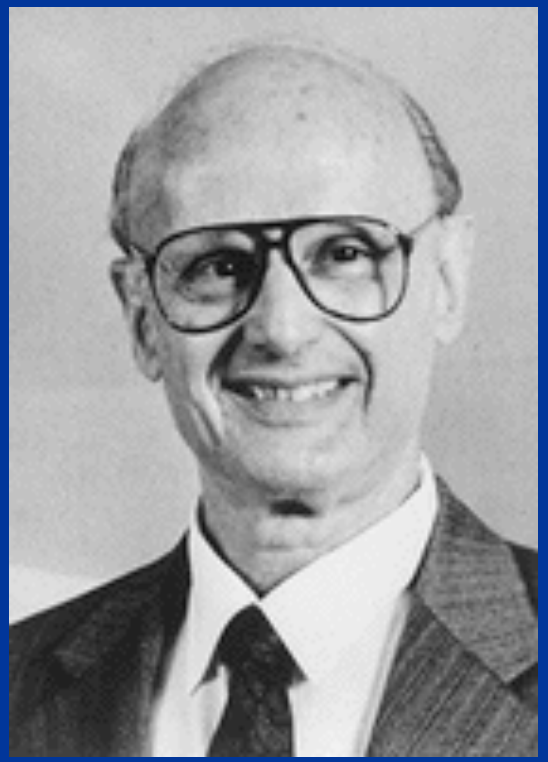


Harry Markowitz

Optimization or Heuristic?

~~*Optimal Asset Allocation Policy*~~
~~*"Mean-Variance-Model"*~~

1/N
Allocate your money equally to each of N funds

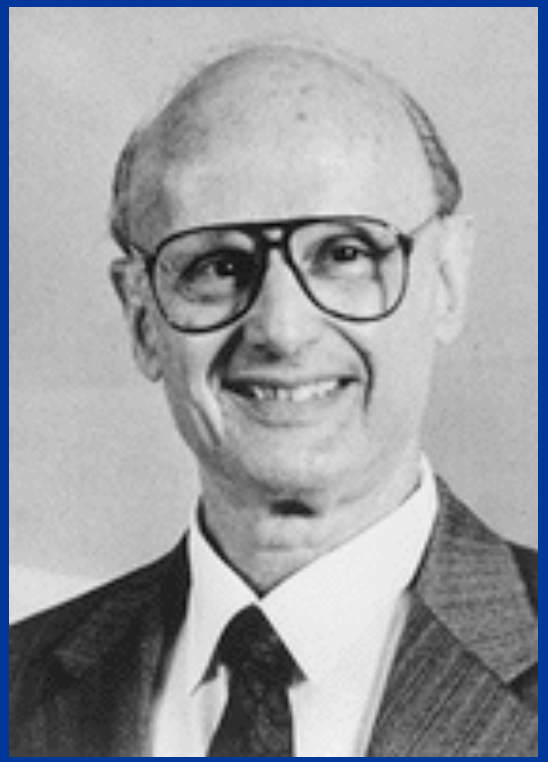


Harry Markowitz

When Is Intuition Better Than Optimization?

1/N

Allocate your money equally to each of N funds



Harry Markowitz

Ecological rationality of 1/N:

1. **Predictive uncertainty: *large***
2. **N: *large***
3. **Learning sample: *small***

DeMiguel, Garlappi & Uppal in press, *Review of Financial Studies*

Mit nobelpreisgekrönter Strategie zum Anlageerfolg!

Kennen Sie Harry M. Markowitz? Nein? Dann sollten Sie ihn kennenlernen: Der amerikanische Wissenschaftler erhielt im Jahr 1990 den Nobelpreis für Wirtschaftswissenschaften. Mit seiner Portfoliotheorie hatte er nachgewiesen, dass die richtige Gewichtung von Einzelwerten das Chancen-Sicherheits-Verhältnis eines Wertpapierdepots erheblich optimieren kann.

So viel zur Theorie. Die Depots der meisten Anleger sehen jedoch anders aus. Da sie oftmals eher willkürlich denn systematisch zusammengestellt worden sind besteht starker Optimierungsbedarf.

DAB bank

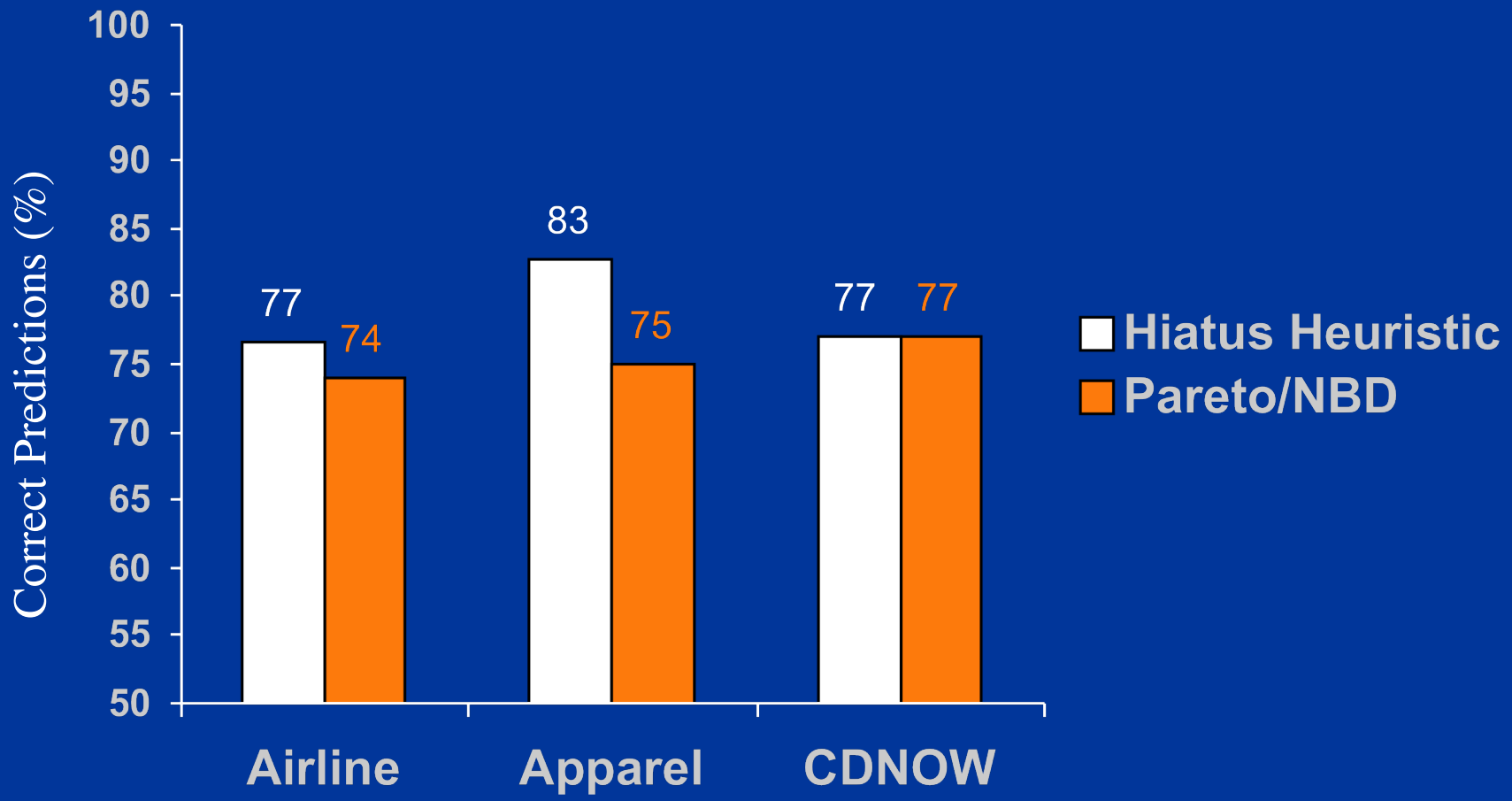
Oktober 2007

1/N

- How do parents divide investment between their children?
  Hertwig et al., Psychological Bulletin 2002
- How do children divide resources in the Ultimatum game?
  Takezawa et al., J of Economic Psychology 2006
- How do people allocate financial resources?
  Hubermann & Jiang, Journal of Finance 2006
- How to weight reasons to make good predictions?
  Dawes' Rule; see Hogarth & Karelaia, Psychological Review 2007

Intuitions About Customers

How to Distinguish Active from Inactive Customers?



Wübben & Wangenheim 2008 *Journal of Marketing*

Four Misconceptions

1. Heuristics produce second-best results; optimization is always better.

2. Intuition relies on heuristics only because of cognitive limitations.

3. People use heuristics only in routine decisions of little importance.

4. More information, time, and computation is always better.

Research Questions

What Are the Mechanisms of Intuition?

The Study of the Adaptive Toolbox

When Are Intuitions Successful?

The Study of Ecological Rationality

How to Design Intuitive Decision Systems?

Adaptive Design

Gigerenzer 2008. *Gut Feelings: Short Cuts To Better Decision Making*. Penguin

Gigerenzer 2008. *Rationality for Mortals*. OUP

I.

What Are the Mechanisms of Intuition?

Heuristics Underlying Intuition

1. Gaze heuristic

2. 1/N (Equality)

3. One-reason decision making

Take-the-best: Gigerenzer & Goldstein 1996 *Psychological Review*
Fast & frugal trees: *Martignon, Katsikopoulos & Woike 2008, J of Mathematical Psychology*
Priority heuristic: Brandstätter, Gigerenzer & Hertwig 2006 *Psychological Review*

4. Recognition

Recognition heuristic: Goldstein & Gigerenzer 2002 *Psychological Review*
Fluency heuristic: Schooler & Hertwig 2005 *Psychological Review*

5. Default heuristic

Johnson & Goldstein 2003 Science

6. Satisficing

Simon 1955 Quarterly J of Economics

7. Imitate the majority/successful

Boyd & Richerson 2005 The Origin and Evolution of Cultures

Gigerenzer 2008. *Gut Feelings: Short Cuts To Better Decision Making*. Penguin

II.

When Are Intuitions Successful?

Evidence

The results [of 45 studies] firmly demonstrate that noncompensatory strategies were the dominant mode used by decision makers. Compensatory strategies were typically used only when the number of alternatives and dimensions were small.

Ford et al. 1989. Organizational Behavior and Human Decision Processes, p. 75

Evaluation

Lexicographic heuristics are

"more widely adopted in practice than it deserves to be"
"naively simple" and
"will rarely pass a test of 'reasonableness'".

Keeney & Raiffa 1993. Decisions with multiple objectives, p. 77-8

Two Heuristics

no trade-off

Take-the-best

Search rule: Look up the cue with the highest validity

Stopping rule: If cue values differ (+/-), stop search. If not, look up next cue.

Decision rule: Predict that the alternative with the positive cue value has the higher criterion value.

don't add

trade-off

Tallying (1/N)

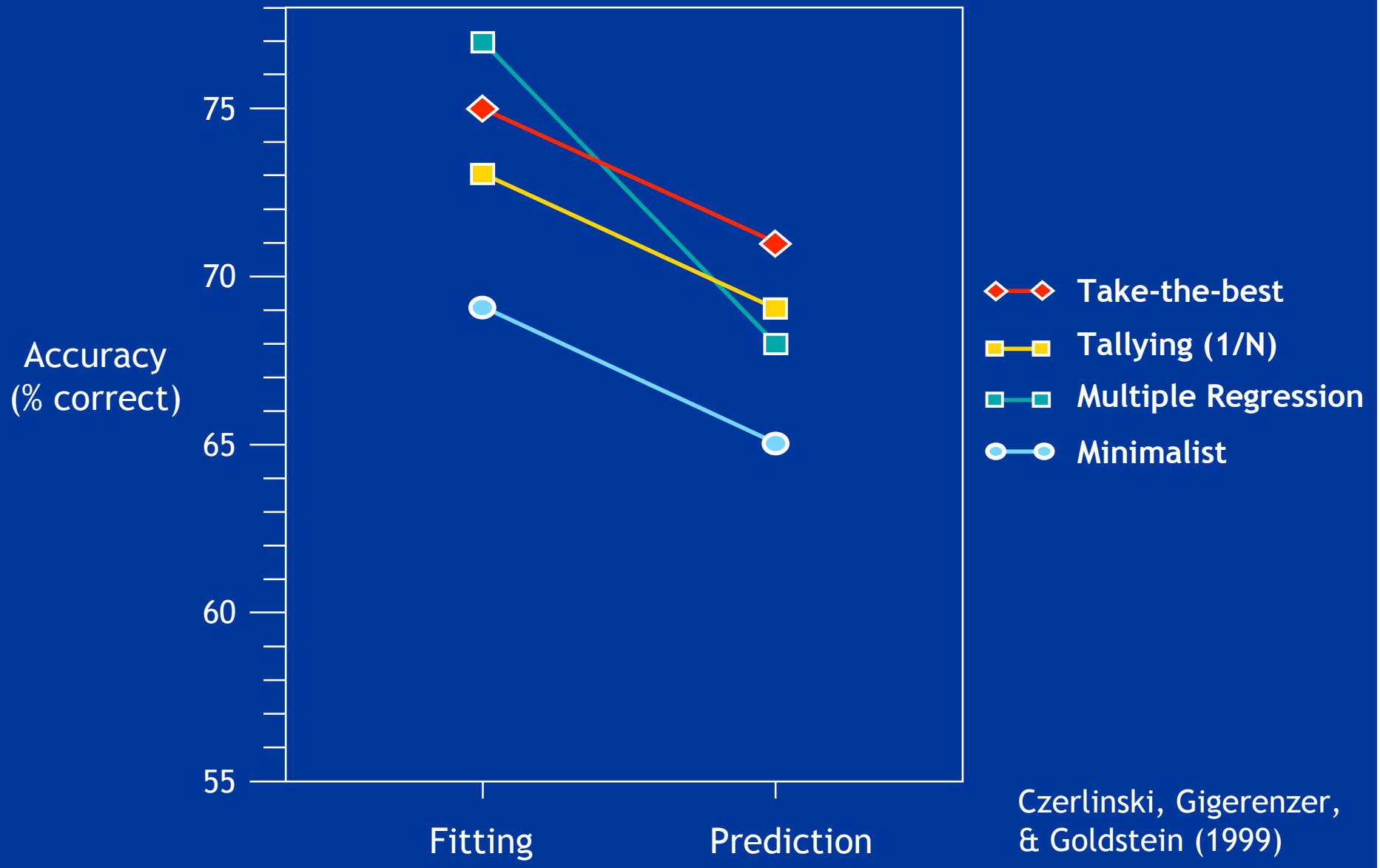
Search rule: Look up a cue randomly.

Stopping rule: After m ($1 < m \leq M$) cues, stop search.

Decision rule: Predict that the alternative with the higher number of positive cue values has the higher criterion value.

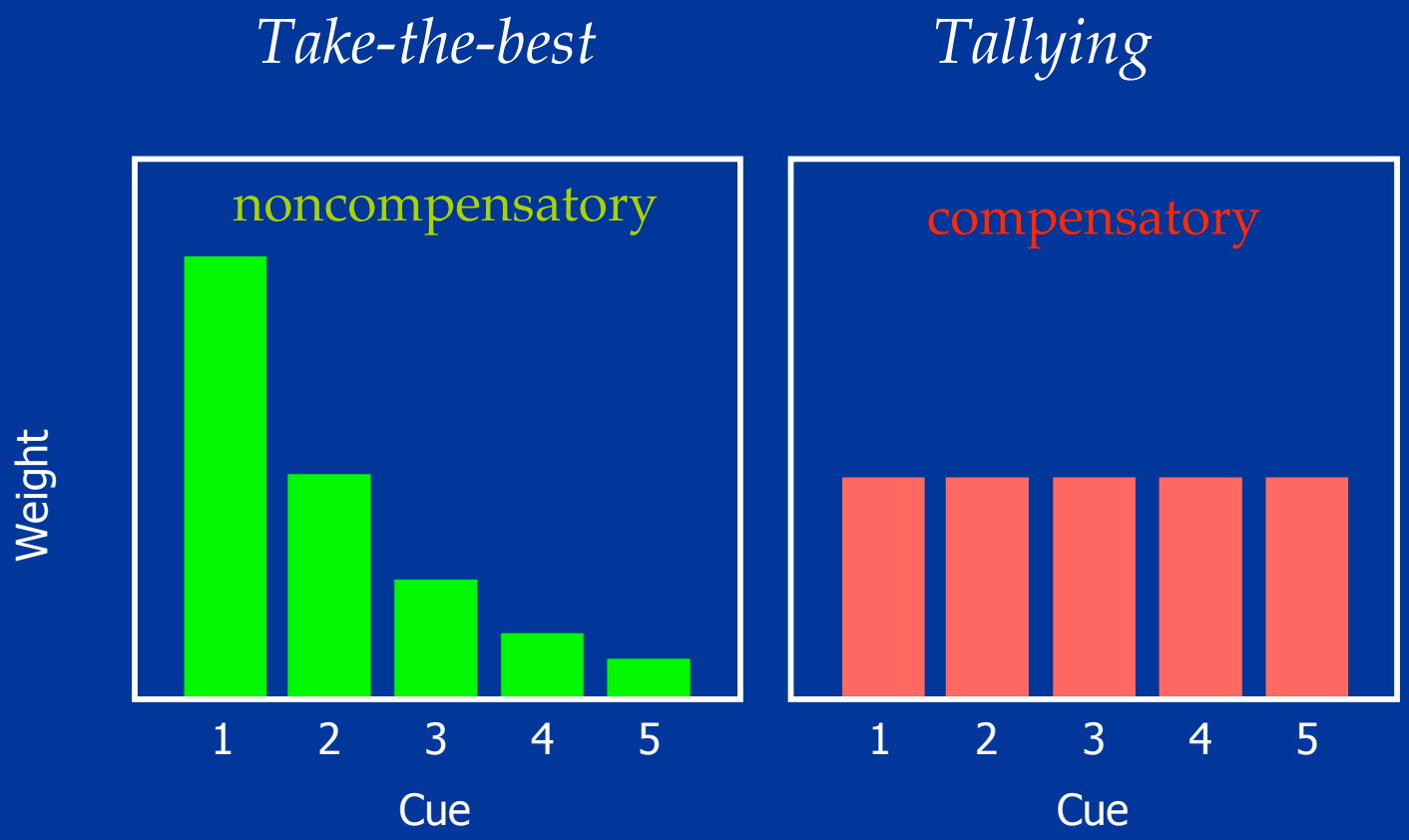
don't weight

Robust Inference with Cognitive Heuristics



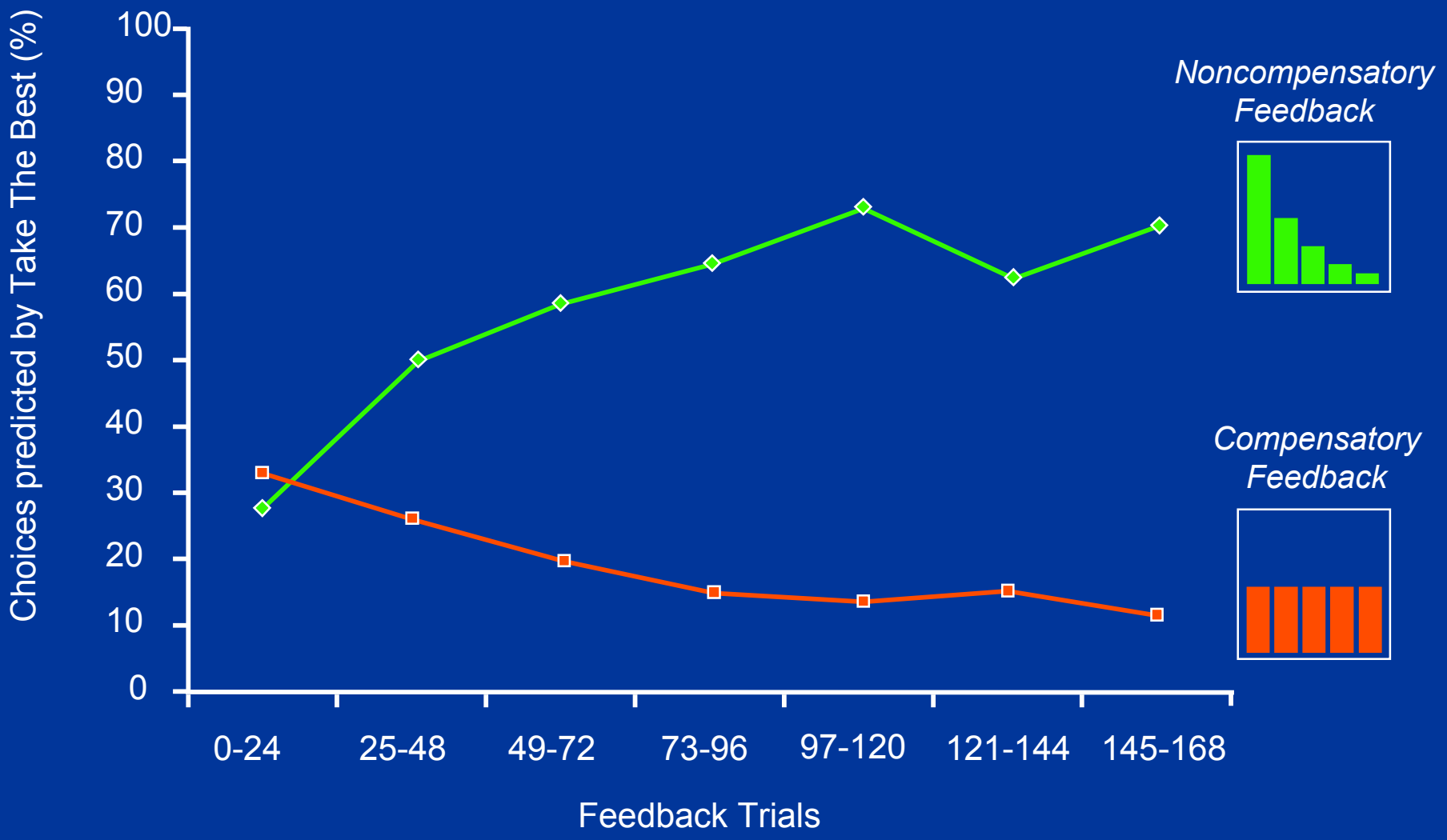
Czerlinski, Gigerenzer,
& Goldstein (1999)

Ecological Rationality of Heuristics



Martignon & Hoffrage (1999), In Gigerenzer et al., *Simple heuristics that make us smart*. Oxford University Press

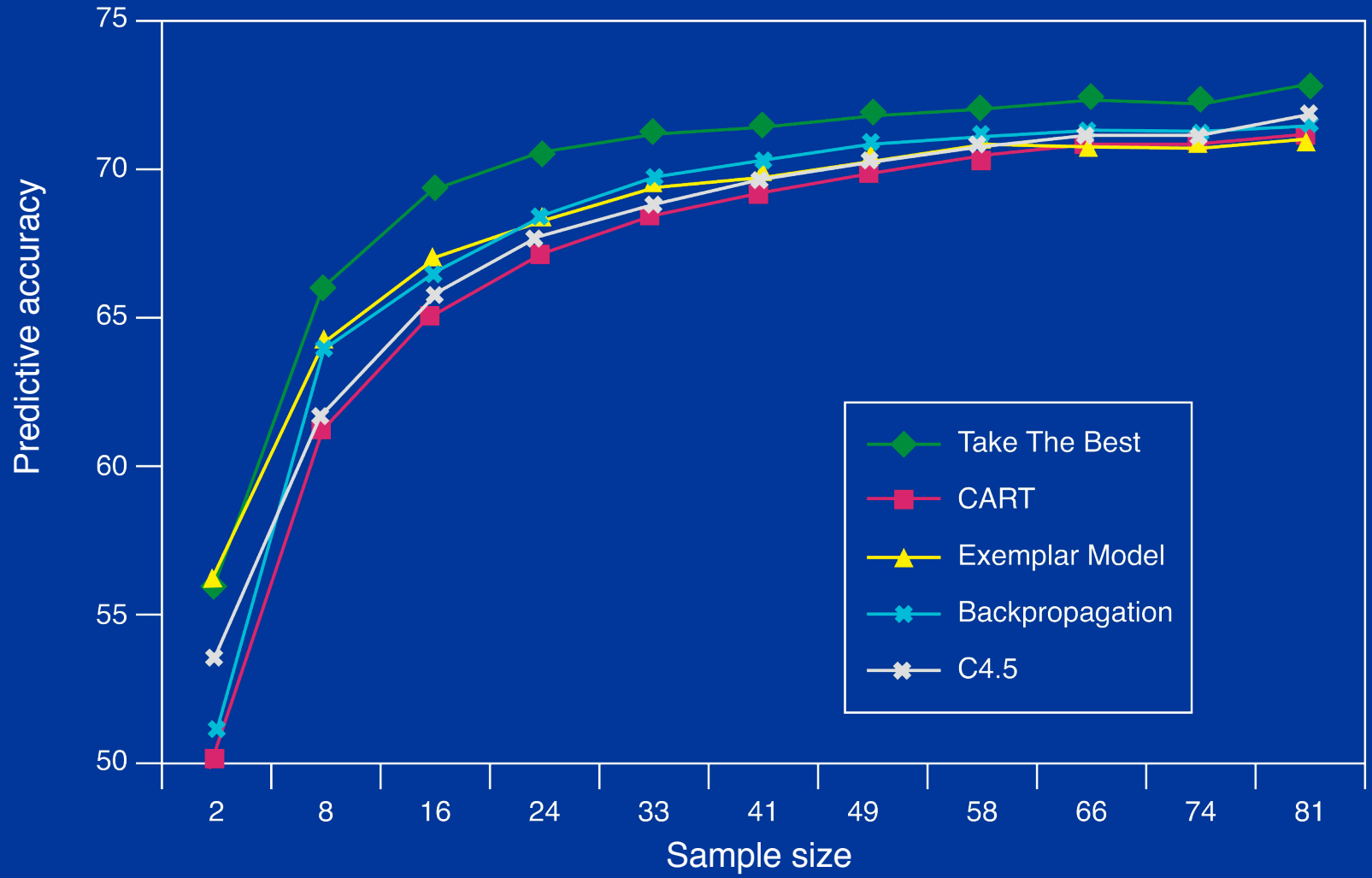
Unconscious selection of heuristics



Rieskamp & Otto 2006 *JEP:General*

Which city has the higher population?

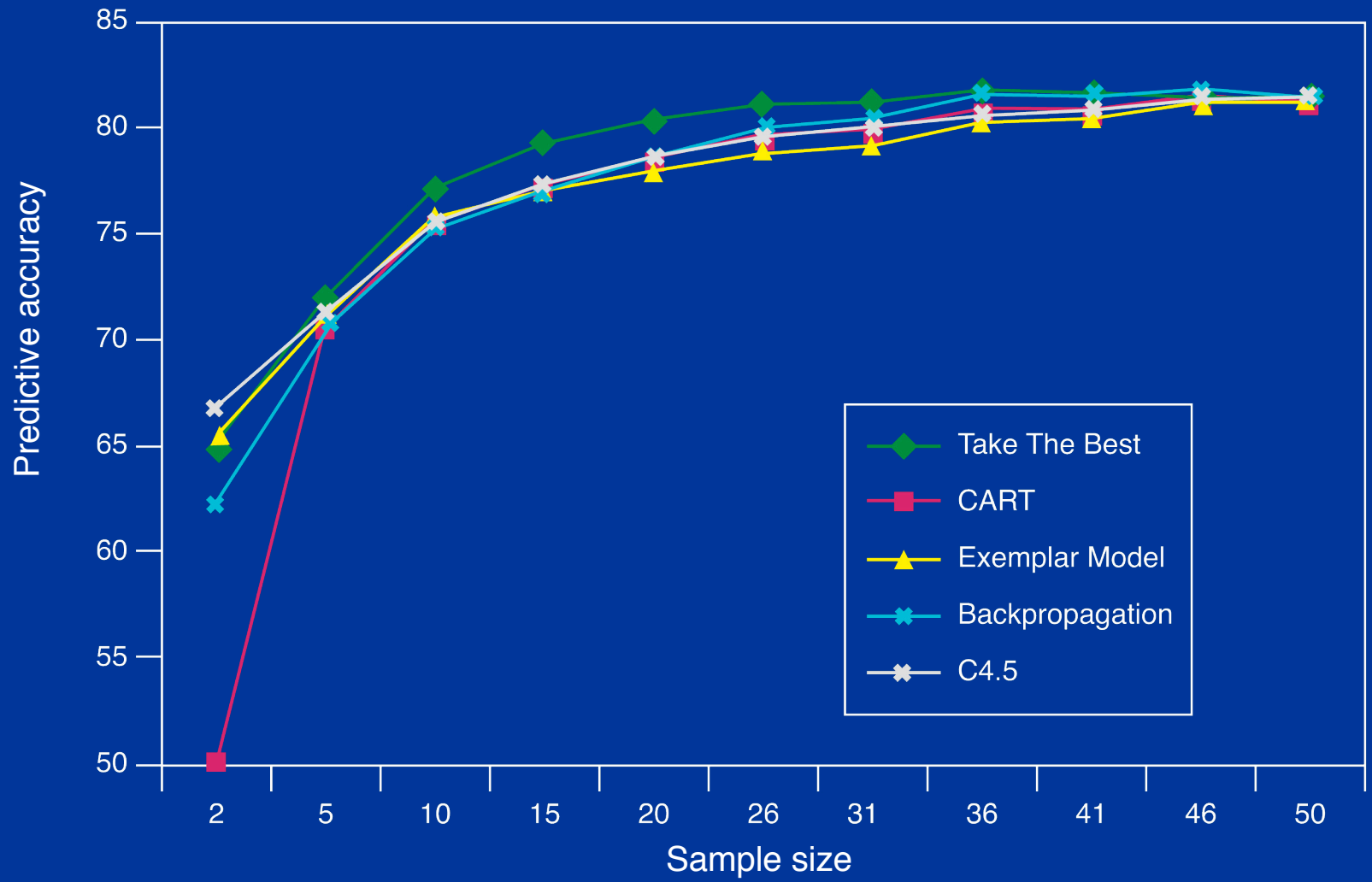
Cues: soccer team, university, state capital, intercity train line, exposition site etc



Gigerenzer & Brighton 2009 *topiCS*

Professors' Salaries

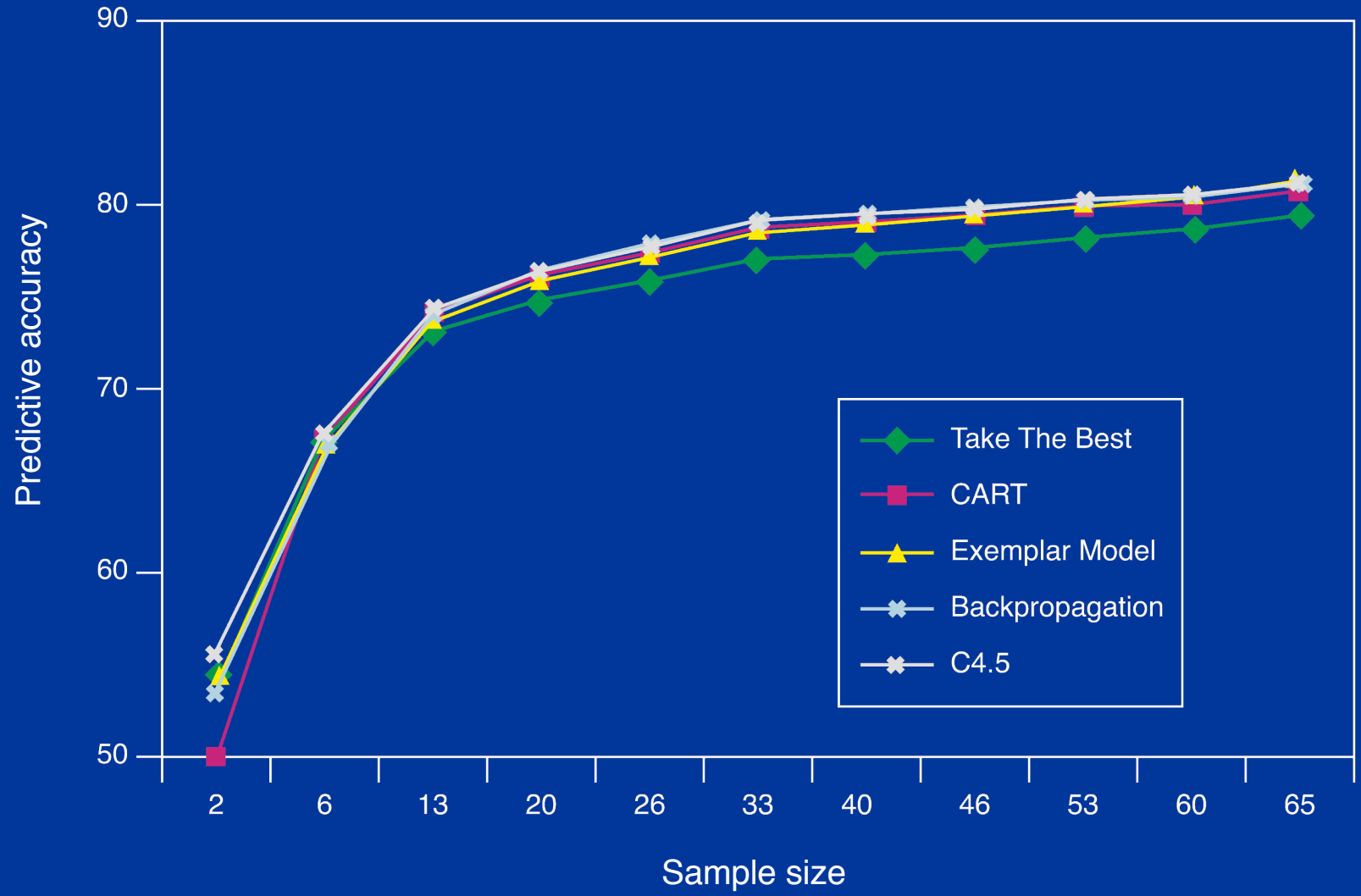
Cues: rank, gender, years in current rank, highest degree earned, years since highest degree earned



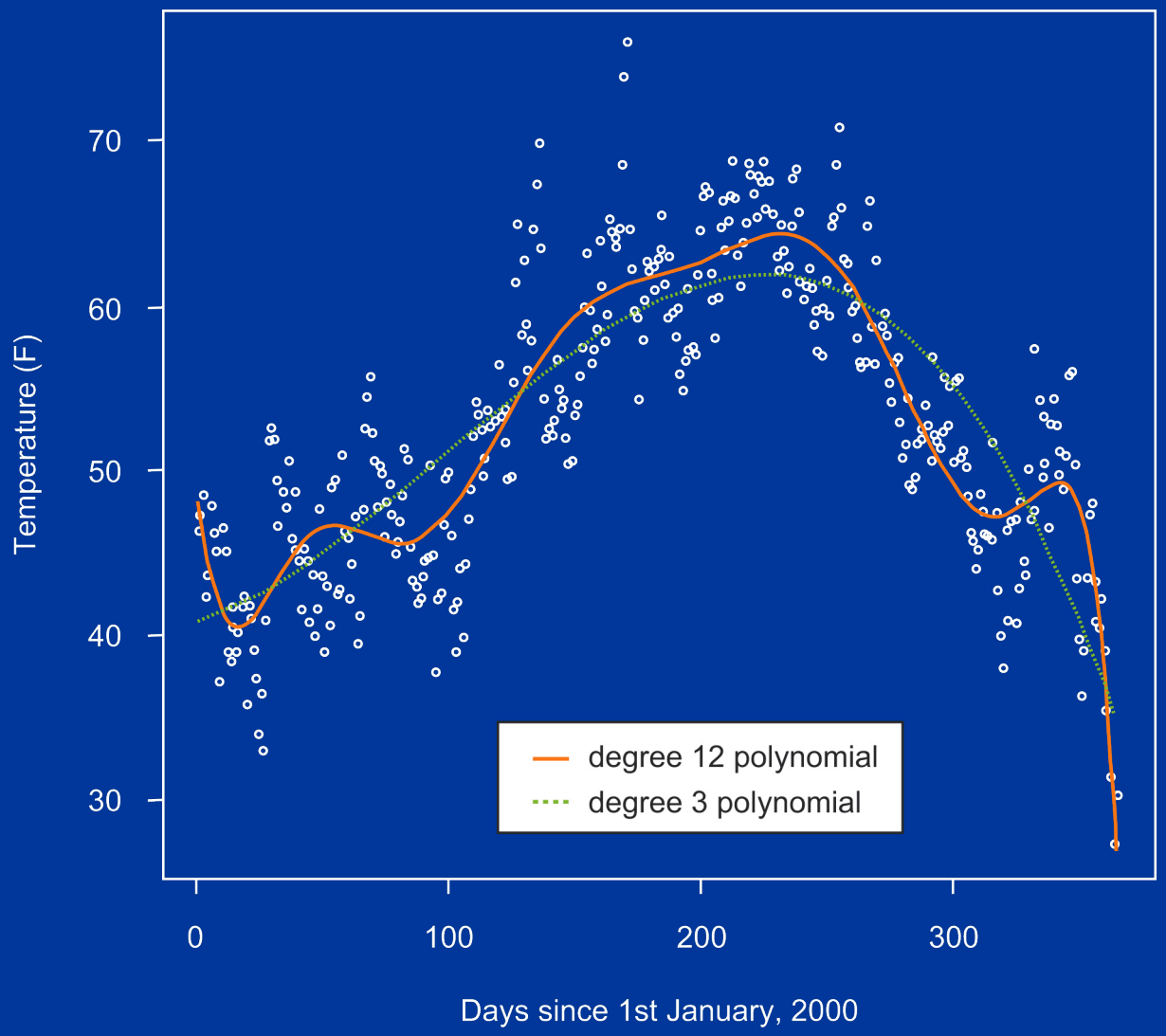
Brighton 2007

Rent per acre in Minnesota

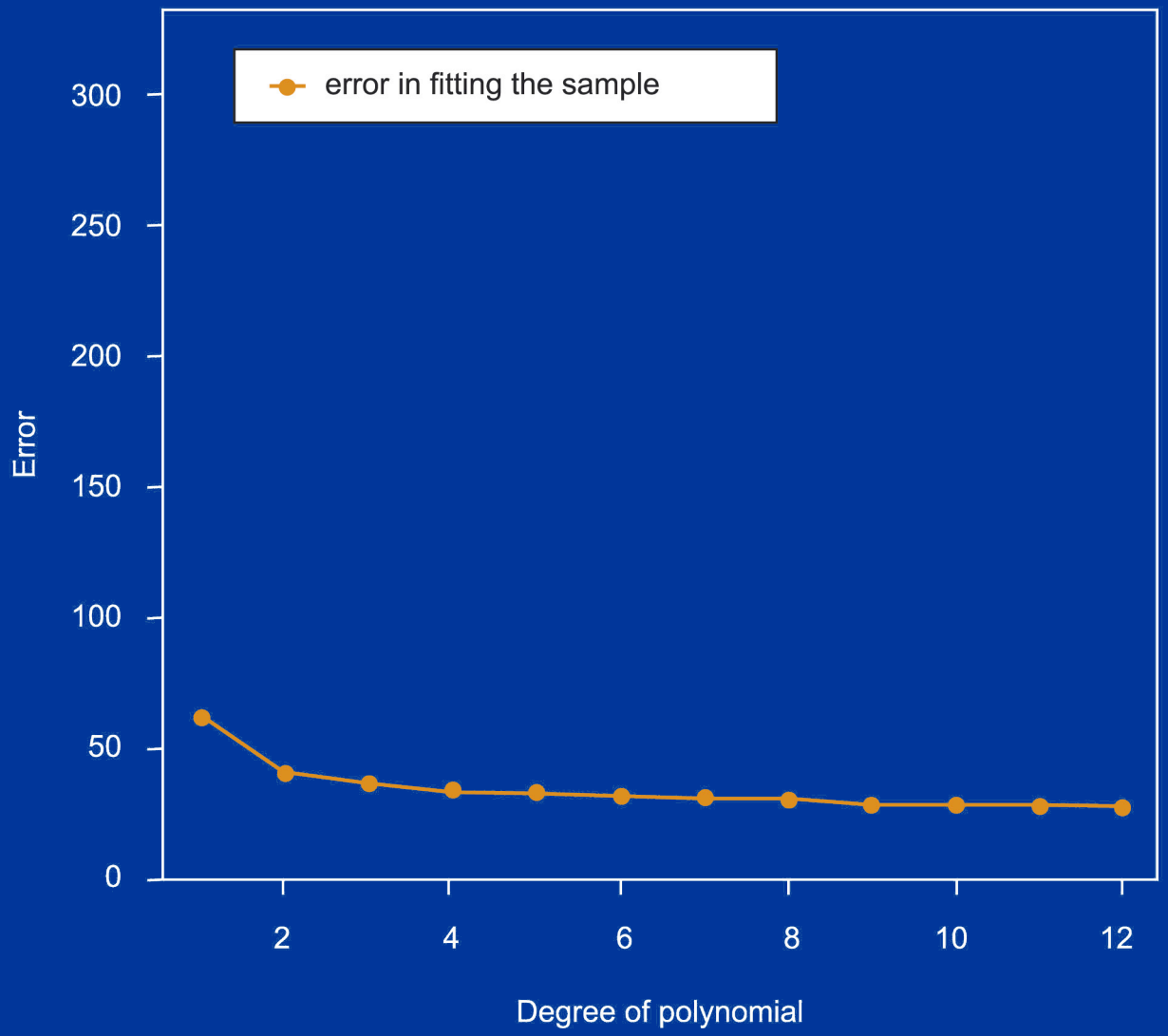
Cues: density of diary cows, proportion of pasture land, etc



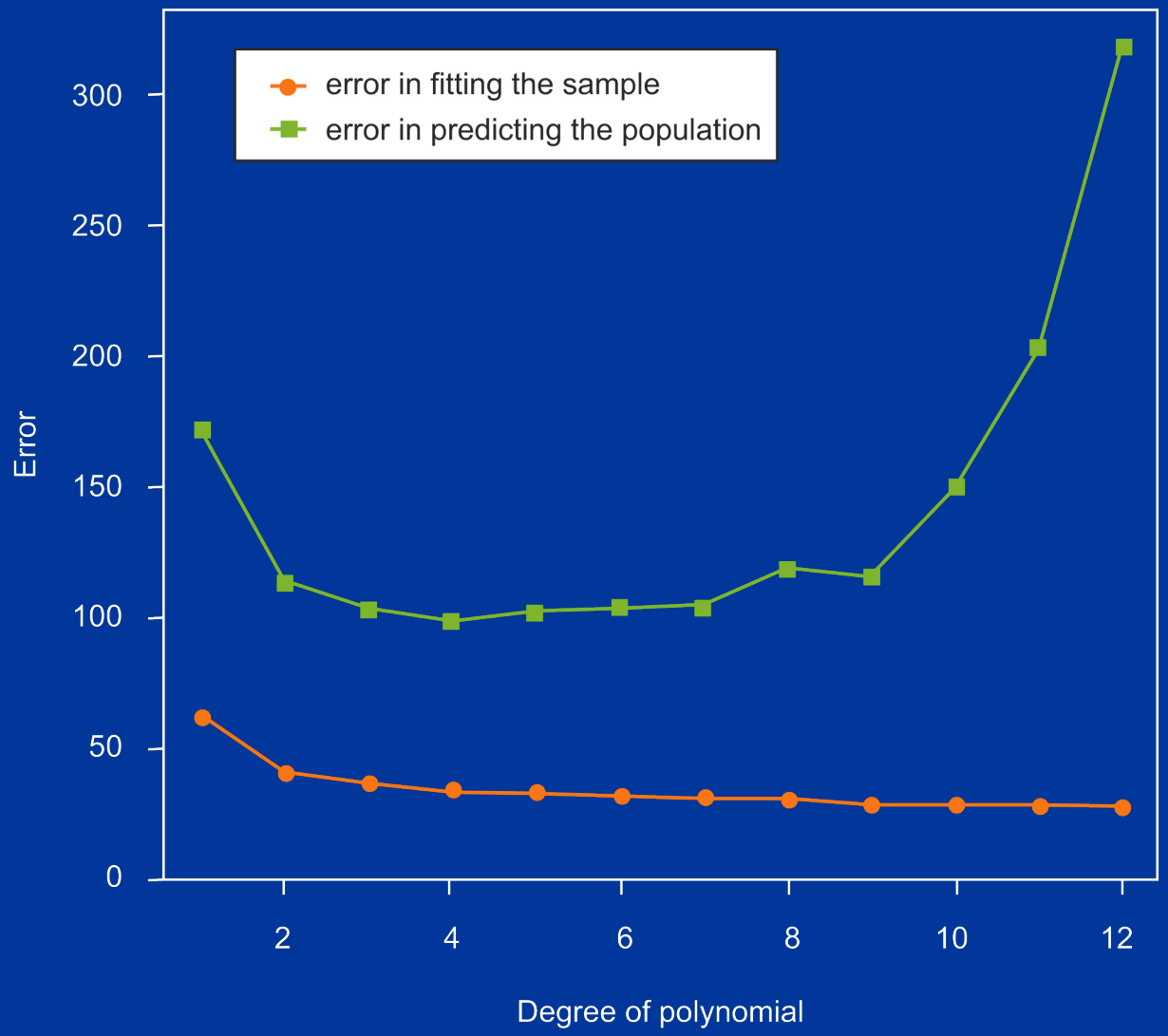
Temperature in London 2000



More-Is-Better in Fitting



Less-Is-More in Prediction



Gut Feelings

1. Quick in consciousness; underlying process not in awareness; guides action.

2. Underlying process: Fast and frugal heuristics.

3. Heuristics can outperform optimization techniques, because they exploit
(i) evolved mental capacities and
(ii) environmental structures.

4. More time, information, and computation is not always better.

More …

Gerd Gigerenzer
Gut Feelings: Short Cuts To Better Decision Making
Penguin 2008