

## Managerial Decision Making: Session 6

### Classic Heuristics: *Representativeness* (continued) and Availability

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### Representativeness—Review

- **Definition:** How likely event X belongs to set Y is judged on the basis of *how similar* X is to the stereotype of Y
- *Linda's description and occupation (X) seems to be the stereotype of "feminist bank teller" (Y) ?*

### Representativeness Biases

- **Local Representativeness**
  - We assume small and large samples have similar properties; we don't understand "random" is streaky
- **Gambler's Fallacy**
  - We think things should even out, even in the short run
- **Regression to the Mean**
  - We "misread" outliers as new trend, rather than considering what should be the "most likely" next observation
- **Non-Regressive Predictions**
  - We overuse (not so valuable) data 'because it is there'; we don't ask, like we should, "how predictive should this data be?"

### Causal thinking

- Suppose we wanted to estimate the conditional probability  $P(X | \text{Datum})$ . Let X = the event that Tom gets a job offer with Fidelity
- Three types of data:
  - D1 : Tom has a good first interview with Fidelity. A causal datum:  $D1 \rightarrow X$
  - D2: Tom goes to work for an investment firm. A diagnostic datum:  $X \rightarrow D2$
  - D3: Fidelity makes 5 offers to Chicago MBAs. An incidental datum
- What do decision makers typically use?

### causal thinking

- **Three types of data:**
  - D1 : Tom has a good first interview with Fidelity. A causal datum:  $D1 \rightarrow X$
  - D2: Tom goes to work for an investment firm. A diagnostic datum:  $X \rightarrow D2$
  - D3: Fidelity makes 5 offers to Chicago MBAs. An incidental datum
- **Key Points:**
  - Causal data have greater impact on judgments than diagnostic data
  - Incidental data are ignored if they lack a causal interpretation

### Causal thinking

- **Causal Data:** Heuristic and Bias
- When evidence has both causal and diagnostic significance, *people tend to overemphasize the causal impact for the future and underestimate the diagnostic implications about the past.*
  - *be less trusting of causal data!*

## Is there a "hot hand" in sports?

- "If I'm on, I find that confidence just builds . . . you feel nobody can stop you. It's important to hit that first one, especially if it's a swish. Then you hit another, and . . . You feel like you can do anything."

—World B. Free

CNN.com - Pro Basketball - Mobley's **hot hand** sends Hornets to ...

Stung again. Rockets extend Hornets' skid despite record-low quarter. Posted:

Sunday December 29, 2002 11:30 PM Updated: Monday December 30, 2002 12:53 AM. ...

www.cnn.com/basketball/news/2002/12/29/rockets\_hornets\_ap/ - 23k - [Cached](#) - [Similar pages](#)

Freshman's **hot hand** sparks ODU (Pilot Online/HamptonRoads.com)

Freshman's **hot hand** sparks ODU By HARRY MINIUM, The Virginian-Pilot © January

23, 2003 NORFOLK — They made a movie a few years back that Isaiah Hunter ...

www.pilotonline.com/sports/sp0123odu.html - 36k - [Cached](#) - [Similar pages](#)

To video

## Philadelphia 76ers, 1980-81

- Conditional probabilities . . . relevant?

**Table 2.1** Probability of Making a Shot Conditioned on the Outcome of Previous Shots for Nine Members of the 76ers

Player	$P(x ooo)$	$P(x oo)$	$P(x o)$	$P(x)$	$P(x x)$	$P(x xx)$	$P(x xxx)$	$r$
C. Richardson	.50	.47	.56	.50	.49	.50	.48	-.02
J. Erving	.52	.51	.51	.52	.53	.52	.48	.02
L. Hollins	.50	.49	.46	.46	.46	.46	.32	.00
M. Cheeks	.77	.60	.60	.56	.55	.54	.59	-.04
C. Jones	.50	.48	.47	.47	.45	.43	.27	-.02
A. Toney	.52	.53	.51	.46	.43	.40	.34	-.08
B. Jones	.61	.58	.58	.54	.53	.47	.53	-.05
S. Mix	.70	.56	.52	.52	.51	.48	.36	-.02
D. Dawkins	.88	.73	.71	.62	.57	.58	.51	-.14
Mean =	.56	.53	.54	.52	.51	.50	.46	-.04

NOTE:  $x$  = a hit;  $o$  = a miss.  $r$  = the correlation between the outcomes of consecutive shots

## Why does belief in the Hot Hand persist?

- "Theories" exist that confidence affects performance . . .
- A wider common-sense conviction that . . .
  - "Success breeds success"
  - "Failure breeds failure"
- True in some realms but not others
  - Which ones?

## Why does belief in the Hot Hand persist?

- Easy to find real conviction . . .
- Experts and their responses . . .
  - Red Auerbach, "Who is this guy? So he makes a study. I couldn't care less."
  - Bobby Knight, "there are so many variables involved in shooting the basketball that a paper like this really doesn't mean anything."

## Why does belief in the Hot Hand persist?

- Nature abhors a vacuum . . .
  - Spinoza (1677)
- World does not "play fair". We get messy data
  - Incomplete, random, unrepresentative, ambiguous, inconsistent, secondhand . . .
- We are looking for patterns that make causal sense . . .
  - Flawed rationality

### ***The Hot Hand: the main point***

- An alternate (and simpler?) explanation . . .
  - Randomness simply looks streakier than we think it does
  - We attribute “the hot hand” to confidence or ???, but evidence simply suggests that is misattribution

### ***In-class Quiz***

- Consider a typical front page from *The New York Times*
- *What percentage of the words on a typical front page have “n” as the next to last letter? Simply guess.*
  - Write down a % from 0 to 100 \_\_\_\_\_

### ***In-class Quiz***

- Consider a typical front page from *The New York Times*
- *What percentage of the words on a typical front page have “ing” as the last 3 letters? Simply guess.*
  - Write down a % from 0 to 100 \_\_\_\_\_

### ***letters of the alphabet***

- **Quiz:** Consider all words with 3 or more letters. Is the letter R (or, K, L, N, V) more likely to appear in the first position or the third?
- *My estimate of the ratio of these 1<sup>st</sup> to 3<sup>rd</sup> positions is \_\_\_\_\_.*
- **Answer:** 105 of 152 subjects judged the first position to be more likely for a majority of the letters
- *The median estimated ratio was 2:1 for each of the 5 letters.*
- A Storage Bias . . .

### ***“Why you looking here?”***

### ***Tuck 2002 cell phone ownership***

- **Yesterday's Quiz:** *Do you own a cellular phone?*
  - Answered “YES” or “NO”
- Let ? = “What is the percentage of Tuck students who own cellular phones?”
  - Actual Ownership:  $N=51$  53% of Tuckies
- **Those who answered “NO”:**
  - $N=24$  Prob (? | “NO”) = 28.7%
- **Those who answered “YES”:**
  - $N=24$  Prob (? | “YES”) = 47.1%
- Yes, this *is* a statistically significant difference

Quiz:

- How many deaths worldwide each year from “being killed by shark”?
- How many deaths worldwide each year from “being killed by falling airplane parts”?
- 30x more from “airplane parts”

***from a former student***

## Risks From Falling Jet Parts Are High

[illegible]

### Quiz:

- *How many homicides in the US each year?*
- *How many suicides in the US each year?*
- *2x more by suicide*

### **Classic Heuristic #2: Availability**

- **Definition:** when judging how likely something is, the probability is estimated by the ease with which instances or associations can be brought to mind.
- **Bias:** can occur when “availability” (ease of recall) and true frequency diverge

## Availability Biases

- 1. A pollster who asks a sample of American adults to estimate the percentage of the work force who are currently unemployed.
- They finds an “egocentric” bias, i.e. currently unemployed workers tend to overestimate the rate of unemployment, but currently employed workers tend to underestimate it.
- Why?
- *Sampling bias . . . Others?*

### **Availability biases**

- 2. A Notre Dame alumnus confides to a friend, “Did you ever notice how many Notre Dame alumni become famous or important? Look anywhere—politics, sports, Hollywood, big business, the arts, even crooks! I couldn’t guess the exact figures, but I bet we Irish have far more than our share on just about any list in Who’s Who.”
- Why?
- *Sampling and Storage biases . . .*

### what share do you do?

- Couples were asked what share of certain activities each partner does, e.g., dishes, cooking starting fights . .
- Results:
  - Total shares add up to more than 100%
- Basketball team members were asked:
  - a. What was the turning point of the game?
  - b. Our team won/lost because . . .
- Results
  - a. 119 “own team”, 13 “both teams”, 16 “other team” answers
  - b. 144 of 158 picked an action by own team

### vividness

- Volvo example:
- Borgida and Nisbett (1977)—testimonials vs. survey data.

THE POWER OF VIVID TESTIMONIALS		
Condition	Recommended Courses	Nonrecommended Courses
Facet-to-facet	4.73	.50
No evaluation (control)	3.33	1.39
Base rate	4.11	.94

- The Legal Significance of Guacamole
  - Why was guacamole of decision-making value?

### Why does belief in the Hot Hand persist?

- What stands out at a Basketball game?
- Streaks . . .!!!!!!
- B-Ballers DO shoot in streaks!!!!, but not more so that the laws of chance predict!!!!
  - Lute Olsen’s justification (proof of hot hand!) of his player making six 3-pointers in a row . .
  - But, we remember more of them, they are more easily AVAILABLE to us

### Believing in myth . . .

- Adoption increases a couple’s fertility
- More babies are born when the moon is full . . .
- More people believe in ESP than evolution

### Availability : Why is it a Bias? How do I “fix” it?

- What is most available may or may not be representative of all the information
  - Ask: How might it be un-representative?
  - Ask: Is the information I *have* the info I really *want*?
- Retrievability: What is most memorable is not the same as what is most accurate or valuable
  - Ask: How might it be un-representative?

### availability—themes?

- Definition: when judging how likely something is, the probability is estimated by the ease with which instances can be brought to mind.
- Fixes?

### **Future MDM agenda**

- **Next week: another classic heuristic AND social heuristics**
  - Read the book *Influence*
  - *Again, there will be a paper to read after the class.*
- **There are three papers to read now that we have talked about Representativeness and Availability.**
  - *In the course packet.*

### **Plan for Week 4:**

- **Survey #4 . . .**
  - Expect one on Wednesday . . .
- **Post-class readings: after today, please read the 3 papers assigned. They are high quality.**

### **Long-term reminders . . .**

- **For those with final-exam-phobia, another option is to write a paper on a decision-making disaster**
  - See syllabus . . .
  - Other options too . . .
- **For the Bad Statistics Contest, I have one entry . . .**

### **MDM: Key Concepts so far**

