Other anomalies in beliefs

September 28, 2021

The Linda Problem

Linda is 31 years old, single, outspoken, and very bright. She majored in philosophy. As a student, she was deeply concerned with issues of discrimination and social justice, and also participated in anti-nuclear demonstrations. Which of the two alternatives below is more probable?

- Linda is a bank teller
- Linda is a bank teller and is active in the feminist movement

Charness, et al. (2010)

- **Baseline:** Subjects asked the same question you were just asked on a sheet of paper ($2 for answering)
- **Incentives:** Subjects asked the same question you were just asked on a sheet of paper ($4 for marking correct answer)
- **Pairs, no incentives:** Same as baseline, except subjects formed pairs to discuss the answer
- **Pairs, incentives:** Same as incentives, except subjects formed pairs to discuss the answer
- **Trios, no incentives:** Same as baseline, except subjects formed groups of three to discuss the answer
- **Trios, incentives:** Same as incentives, except subjects formed groups of three to discuss the answer

Results

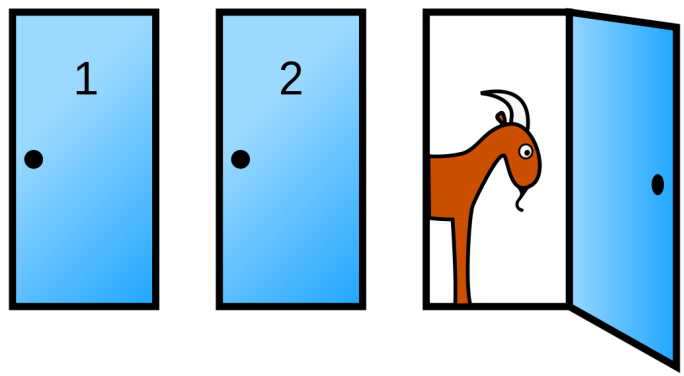
Table 1
Violations of the conjunction rule.

Study	Details	Incorrect answers/total sample	Error rate (percent)
Individuals			
T&K, 1983	UBC undergrads, no incentives	121/142	85.2
CKL, 2008	UCSB students, singles, no incentives	50/86	58.1
CKL, 2008	UCSB students, singles, incentives	31/94	33.0
CKL, 2008	UCSB students, total singles	**81/180**	**45.0**
Pairs			
CKL, 2008	UCSB students, in pairs, no incentives	27/56	48.2
CKL, 2008	UCSB students, in pairs, incentives	5/38	13.2
CKL, 2008	UCSB students, total in pairs	**32/94**	**34.0**
Trios			
CKL, 2008	UCSB students, in trios, no incentives	10/39	25.6
CKL, 2008	UCSB students, in trios, incentives	5/48	10.4
CKL, 2008	UCSB students, total in trios	**15/87**	**17.2**

Monty Hall Problem

Monty Hall Problem

Consider the problem just described to you...

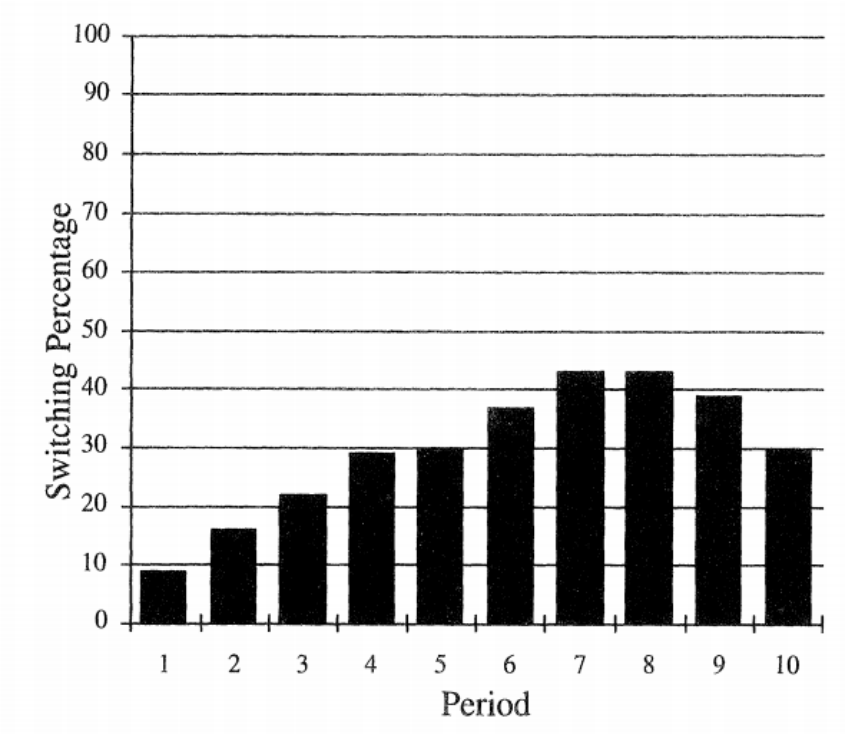


- **Do you switch to door 2?**

Friedman (1998)

- In Run1, 104 subjects play a computerized version of the Monty Hall problem
- 10 rounds, play by choosing cards (one prize card, two non-prize cards)
- 40 cents for turning over prize card, 10 cents for turning over non-prize card

Friedman (1998)



- Results:
  Overall switch rate: **28.7%**

- Possible explanations:
  - Principle of insufficient reason
  - Escalation of commitment ("no flip-flopping")

Run 2

After the initial 10 rounds, each subject participates in one *or more* of four additional treatments:

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- One subject excluded because of prior knowledge of the task

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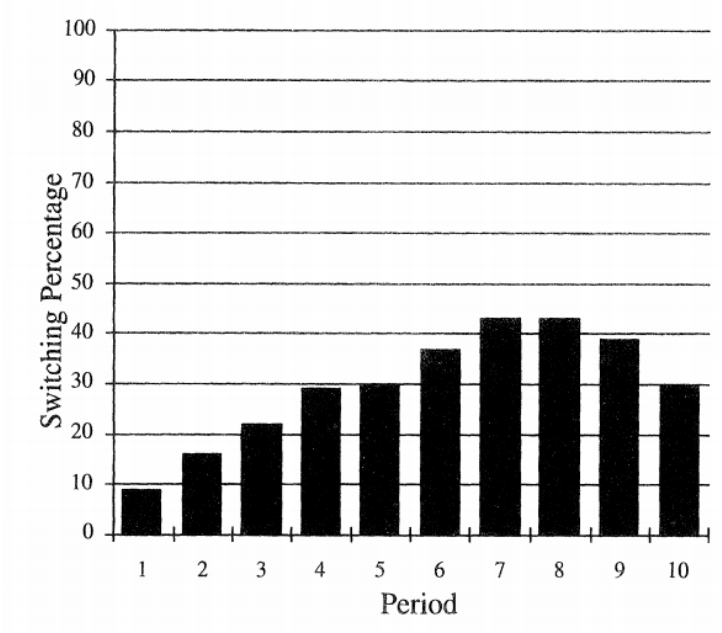

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Run 2:

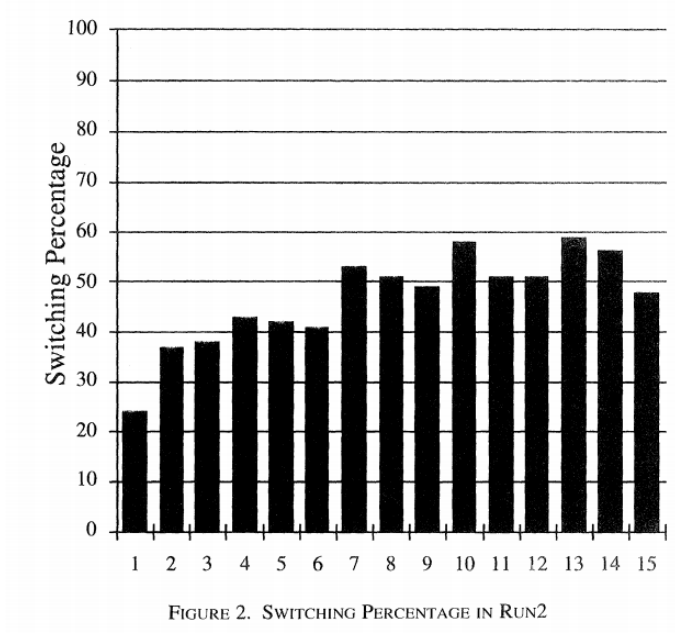

FIGURE 2. SWITCHING PERCENTAGE IN RUN2

46% switch rate

Treatment effects

TABLE 2—SWITCH RATES BY TREATMENT

		Nobs	Percent All periods	Percent Periods 1–7	Percent Periods 8–15
0	Overall	1,407	46.0	39.8	52.6
	(*p*-value)				(0.000)
1	*Intense*	791	43.9	37.9	51.3
	Not *Intense*	616	48.7	42.7	54.0
	(*p*-value)		(0.968)	(0.915)	(0.782)
2	*Track*	647	48.0	41.9	54.8
	No *Track*	760	43.4	36.9	49.8
	(*p*-value)		(0.048)	(0.101)	(0.113)
3	*Advice*	804	47.4	40.6	55.0
	No *Advice*	603	44.1	38.7	49.5
	(*p*-value)		(0.122)	(0.327)	(0.087)
4	*Compare*	647	50.3	40.2	59.4
	No *Compare*	760	42.4	39.5	46.0
	(*p*-value)		(0.001)	(0.458)	(0.000)

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  Ingredients

  1. A common and useful rule of thumb, e.g. no flip-flopping or principle of insufficient reason
  2. A laboratory environment that invokes the rule of thumb when it is inappropriate, e.g. where flip-flopping is optimal
  3. Subjects inexperienced in the laboratory environment
  4. Standard laboratory procedures
  5. Standard statistical techniques and standard rhetoric

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- "Optical illusions arising from misleading visual cues are interesting but do not imply the need to modify the theory of optics. Likewise, irrational choices arising from incomplete information do not imply the need to modify standard choice theory."

The principle of restricted choice

- Ana and Bob walk into a restaurant
- Bob always orders a hamburger
- Ana is equally likely to get one of ten items, one of which is a hamburger
- An order for a hamburger is placed
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- Upon observation of an action, the odds shift in the direction of the model that is more likely ("restricted") to produce that action

The principle of restricted choice

Posterior odds in favor of B = Likelihood ratio $\times$ Prior odds in favor of B

- Likelihood ratio $\approx$ the degree to which B is more likely to produce observed information than A
- Applications: Monty Hall, coin flip paradox, hot hand fallacy

The Hot Hand in Basketball: On the Misperception of Random Sequences

THOMAS GILOVICH

Cornell University

AND

ROBERT VALLONE AND AMOS TVERSKY

Stanford University

We investigate the origin and the validity of common beliefs regarding "the hot hand" and "streak shooting" in the game of basketball. Basketball players and fans alike tend to believe that a player's chance of hitting a shot are greater following a hit than following a miss on the previous shot. However, detailed analyses of the shooting records of the Philadelphia 76ers provided no evidence for a positive correlation between the outcomes of successive shots. The same conclusions emerged from free-throw records of the Boston Celtics, and from a controlled shooting experiment with the men and women of Cornell's varsity teams. The outcomes of previous shots influenced Cornell players' predictions but not their performance. The belief in the hot hand and the "detection" of streaks in random sequences is attributed to a general misconception of chance according to which even short random sequences are thought to be highly representative of their generating process.

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- Overall,
  $P(H|\text{Preceded by H}) = (1/2) * (1/3) + (1/2)(1/2) = 5/12$