ECO663

Week 3

Anomalies (part 2)

Heuristics (part 1)

Status Quo Bias

Example: Electric bill (Hartman, Doane and Woo (1991))

Preference over Reliability of Electric Supply (lower outrage) vs. Electric Bill

6 alternatives (various combination of reliability and bill) are presented.

Group 1: Status Quo = High Reliability + 30% higher price

Group 2: Status Quo = Low Reliability + 30% lower price

Consumer Rationality and the Status Quo
Author(s): Raymond S. Hartman, Michael J. Doane and Chi-Keung Woo
Source: *The Quarterly Journal of Economics*, Vol. 106, No. 1 (Feb., 1991), pp. 141-162

Result

Group 1:

- 60.2 % selected their status-quo (=high reliability, high price)
- 5.7% preferred low reliability option (currently actually experienced option)

Group 2:

- 58.3% selected their status-quo (=low reliability, low price)
- 5.8% preferred high reliability option

Preference is strongly influenced by existing status-quo characteristics. When status-quo changes, people switch to prefer the new "status-quo" more.

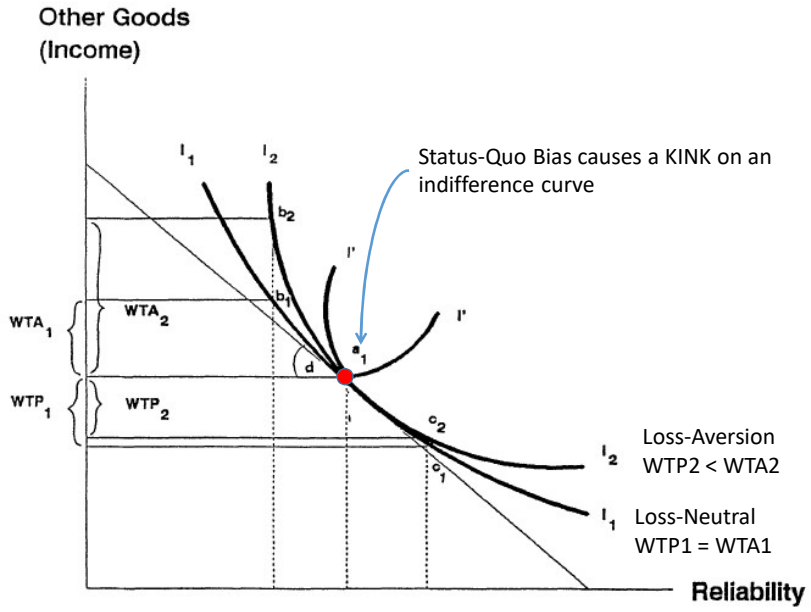


FIGURE I
Trade-offs Between Service Reliability and All Other Goods

Example: Patient Inertia

Patient Inertia and the Status Quo Bias: When an Inferior Option Is Preferred
Gaurav Suri, Gal Sheppes, Carey Schwartz and James J. Gross
Psychological Science 2013 24: 1763 originally published online 19 July 2013

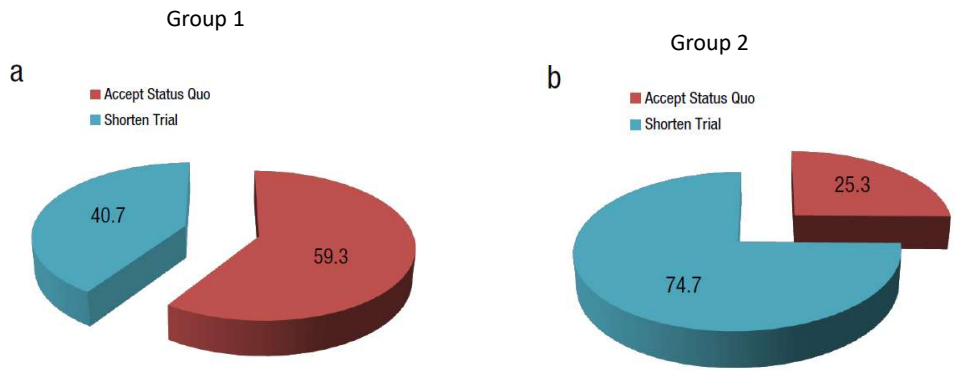
- Study 1: Press a button to shorten the waiting time till an electric shock experiment

Status Quo: not press a button

Alternative choice: press a button

Group 1: choice is made voluntarily by the participants

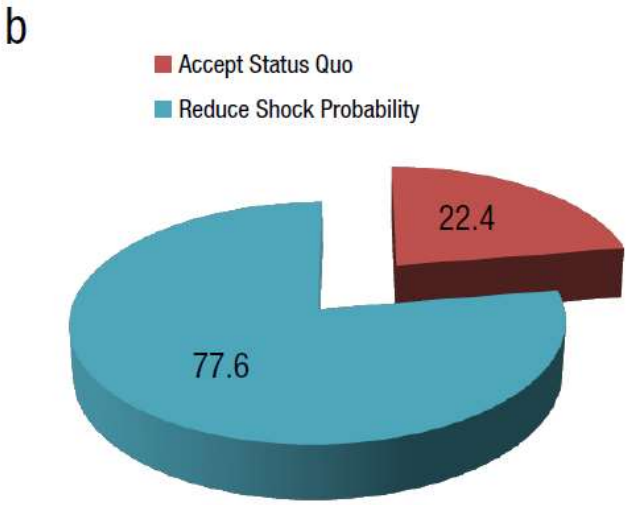
Group 2: participants are forced to make a choice



Study 3: Help participants to “experience” the new choice beforehand.

One such manipulation could be to require participants to press the button that reduced the shock probability early in the experiment. This would remove participants' resting-state inertia and thereby reduce their SQB. Support

b



However, this is frequently not possible. For example, it is difficult to mandate that people get flu vaccinations or get medical checkups on a regular basis. In such cases, it is important to provide individuals with sufficient support to overcome their inaction inertia (or other default state). Our findings from Study 3 suggest an effective way to do this would be to focus resources to induce individuals to try the recommended option once. After they have completed the activity for the first time, their psychological inertia (Gal, 2006) would make it easier for them to repeat the action. This suggests, for example, that it may be better to invest scarce resources to induce people to get the flu vaccine once, for the first time, rather than spend money on a broader campaign aimed both at potential first-time and repeat vaccine recipients. More broadly, efforts focusing on getting individuals to commence taking their medications as prescribed, go for their first medical checkup, or go for a first run may lead to the overcoming of patient inertia and the initiation of lasting compliance behavior.

Intertemporal Choice

- Which would you prefer?
- A: $2000 right now
- B: $2400 in a year from now

- Which would you prefer?
- C: $2000 in 10 years
- D: $2400 in 11 years

=>Time Inconsistency

- When the optimal decision at one point in time is no longer the optimal choice at another point in time

Discounting

- **Exponential** discounting(time consistent)

$$f(t) = \delta^t$$

- **Hyperbolic** discounting (time inconsistent)

$$g(t) = \frac{1}{(1+Kt)}$$

K: adversiveness of delay (captures exactly how inconsistent time preferences are)

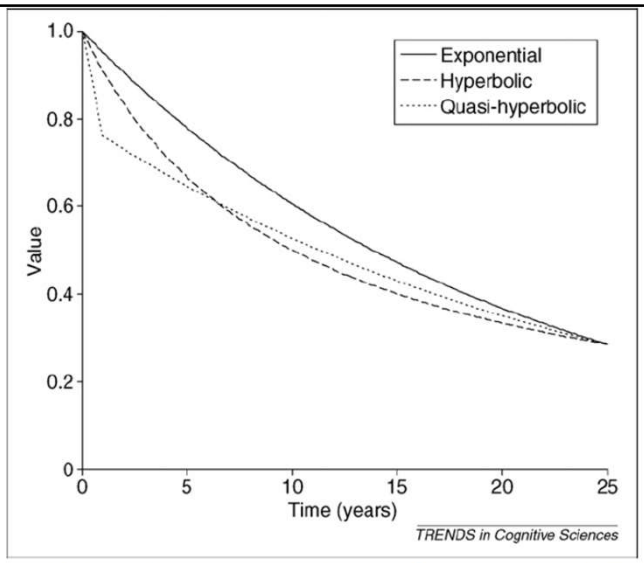
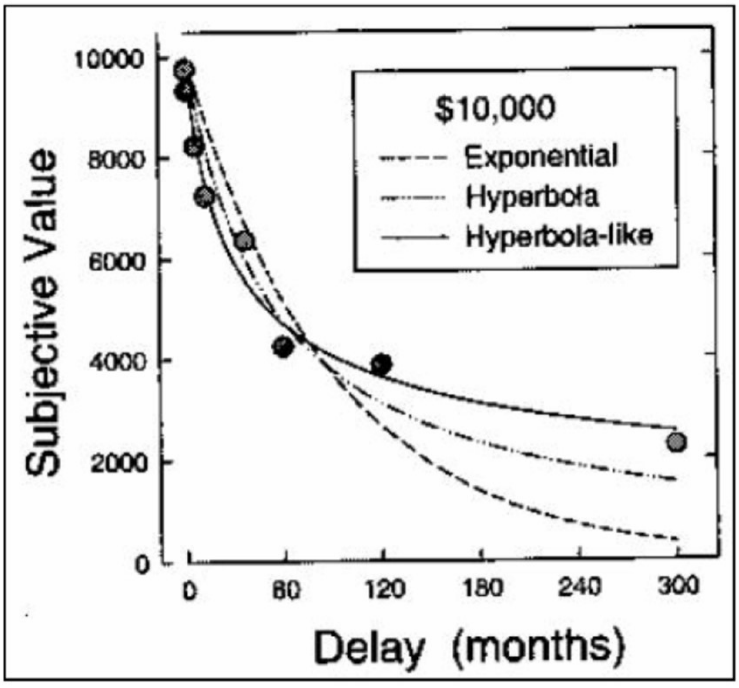


Figure 1. Discount functions. Exponential discounting assumes a constant rate of discounting, e.g. δ^t where δ is the discount rate (here, $\delta = 0.95$). Hyperbolic discounting is generally greater for short time periods than long periods, and can be described by a function of the form $1/(K * t + 1)$. Here, $K = 0.1$. Quasi-hyperbolic discounting is a piecewise function that follows a form similar to exponential discounting after the first discount period (i.e. the first year): $1, \beta\cdot\delta, \beta\cdot\delta^2, \ldots, \beta\cdot\delta^t$. (Here, $\beta = 0.792$ and $\delta = 0.96$.)



Why? Time Inconsistency

- We do not discount all time periods uniformly.

=> we do not apply a constant discount factor δ to all time periods.

- Rather, we have different factors for different time periods.
- We overweight time periods that are closer to the present relative to time periods that are further in the future.
- For example, we exhibit a higher discount rate between now and 1 year from now than over 7 years from now and 8 years from now.

=> Hyperbolic Discounting

Sunk Cost Fallacy

"To choose a course of action that builds on past investments that you *would not choose* if you were in exactly the same position but with a different history of investments."

Your choice:

- Maintain course: Keep investing your time, money and effort on a project in which you have already invested some time, money or effort.
- Change course: Pursue a new project.

Advice – Ignore the time, money and effort in the past when deciding what to do next.

- Ask yourself, "What would I do given my present situation if I had not already sunk money or time into a particular project or course of action."

Example

You has paid $90 for 1-day only nonrefundable ski lift and rental ticket beforehand.

When you arrived at the resort, it happened that the weather condition was terribly bad, cold, icy, windy…

What will you do?

(a) Stay and ski

(b) Give up and go home

- If you haven't paid for skiing, what would you do?

- Decide whether or not to invest **one million dollars** in a plane that eludes conventional radar.

Senario A

- A competitor had recently begun marketing a better version of the same plane.
- 90% the project has already completed (about 10 million dollars has already spent)

Q: Will you be willing to invest an additional one million dollars to complete the project?

- Decide whether or not to invest **one million dollars** in a plane that eludes conventional radar.

Scenario B

- A competitor had recently begun marketing a better version of the same plane.

Q: Will you be willing to invest one million dollars to complete the project?

The collapse of the dam resulted in the deaths of 11 people and 13,000 head of cattle. The dam cost about $100 million to build, and the federal government paid over $300 million in claims related to its failure. Total damage estimates have ranged up to $2 billion. The dam has not been rebuilt. Safety flaws had been uncovered during construction, but no action was taken.

Summary: Sunk Costs

- It is a decision-making mistake to honor sunk costs.
- Why is it a fallacy to honor sunk costs?

The decision should be based on what might happen in the future, not on the "loss" of past investments.

Heuristic Judgment

Availability
Anchoring and Adjustment
Representativeness

Heuristics

Tversky and Kahneman (1974) proposed three major heuristics people use in making judgments & decisions

(Judgment under Uncertainty: Heuristics and Biases, Science, Vol. 185, No.4157, pp.1124-1131)

- Representativeness
- Availability
- Anchoring & adjustment

Kahneman and Tversky

http://nobelprize.org/nobel_prizes/economics/laureates/2002/kahneman-autobio.html

http://www.dangoldstein.com/dsn/archives/2005/07/amos_tversky_1.html

"Judgment under Uncertainty: Heuristics and Biases," Science,1974.

Heuristics

- People rely on a limited number of heuristic principles which reduce the complex tasks of assessing *probabilities* and *predicting values* to simpler judgmental operations.

Heuristic reasoning strategies ....

- .... are often fast and effective,
- .... place low demands on cognitive resources.
- .... but they can lead to severe and systematic errors

Availability Heuristics

- People assess the frequency of a class or the probability of an event by the ease with which instances or occurrences can be brought to mind.

e.g. What is the risk of cancer among middle-aged people?

<= recalling from family members, relatives, close friends…

Availability Heuristics

- If certain cases can be easily retrieved from memory, then we assume that they are more frequent.
- If it's more difficult to retrieve examples of something from memory, we assume that they are rare.

Availability

- Unusual or special examples
  - Tend to be more noticeable
  - Be more likely to be stored in memory
  - Be more "available"

⇒Plane crashes
⇒Terrorist attacks
⇒Swine flu

Use of Availability

- Advertising: the goal is to make your product more available
- Repeated exposure makes something more available, because many examples have been stored in memory

1. Retrievability of Instances

- Familiarity
- Salience

Experiment:

- In this experiment, you will be shown a list of names. You should attend to each name as it appears on the screen in preparation for a later memory test

Question:

Does the list contain more names of men than of women?

(15 male, 10 female)

Examples

- Which is a more likely cause of death in the United States: being killed by falling airplane parts or being killed by a shark?
  - In the United States, the chance of dying from falling airplane parts is 30 times greater than dying from a shark attack.
  - Because shark attacks receive more publicity, information about shark attacks is more readily available.

Which claims more lives in the United States: lightning or tornadoes?

- More Americans are killed annually by lightning than by tornadoes.
- Because tornadoes receive more publicity than occasional lightning strikes, the most common answer is tornadoes.

Which disease are the higher causes of death in Turkey?

Cancer vs. Accidents

Heart Disease vs. Diabetes

[Cancer 21.1%, Accidents 4.1%]

[Heart Disease 37.9%, Endocrine and Metabolic diseases including Diabetes, 6.0%]

Availability about causes of death estimates is determined by media coverage. Tend to overestimate the probability of rare events.

⇒Shark attacks are more on TV than hit by lightning.

⇒Hear news on death from traffic accidents, but not from cancer.

Risk and Insurance

Natural Disaster and Insurance Purchase (Howard Kunreuther)

- Large flood -> flood insurance
- Large earthquake -> earthquake insurance,
  protective actions

- Protective actions are designed to be adequate to the worst disaster actually experienced (individuals/government)

⇒Fukushima nuclear disaster

Tsunami hit the power plant was "bigger" than it was assumed when the design of the power plant was made.

=> Difficult to take preventive cares (tests for disease, stop smoking …) before actually "bad effect" is experienced.

2. Effectiveness of a search set

- We often form mental "search sets" to estimate how frequent are members of some class; the effectiveness of the search might not relate directly to the class frequency
  - Which are more prevalent?: Words that start with *r* or words where *r* is the 3rd letter?

3. Illusory Correlation

- Judgment of the frequency with which two events co-occur.
- The phenomenon of perceiving a relationship between variables even when no such relationship exists.

Examples…

- A worker is treated poorly by a person of a specific ethnicity. The worker then chooses to never work for a person of that ethnicity again, relating the person's behavior to his ethnicity.
- A woman is interviewing for jobs. She believes she gets a better response from potential employers when she wears a specific pair of earrings, so she wears those earrings to every interview.
- A student does well on a test when he uses his blue pencil. For all future tests he uses only his blue pencil.

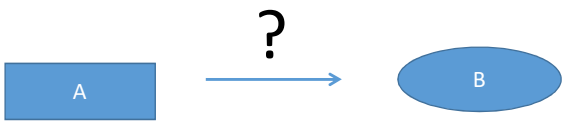
Problem with "Causation"

- Statistic/Econometric analysis do not prove any "causation".

e.g. Cause – Effect ?

A: The number of hours a kid play "violent" video games.

B: Crime committed by a kid.



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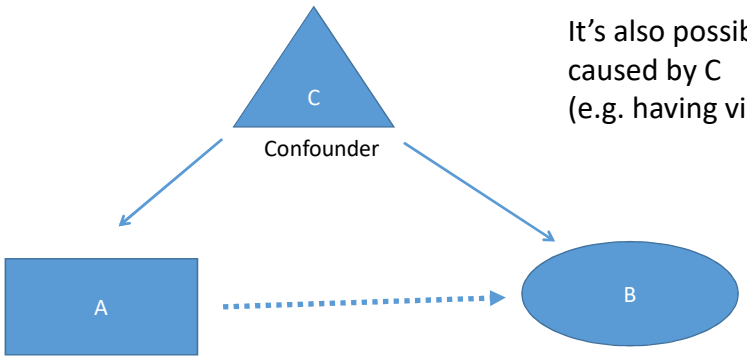


It’s also possible that A and B are caused by C
(e.g. having violent characteristics).

Other example: Causality

Anchoring and Adjustment

- People make estimates by starting from an initial value that is adjusted to yield the final answer.
- The initial value (=starting point) may be suggested by the formulation of the problem (sometimes not at all related to the main problem.)

Types of "Anchoring and Adjustment"

1. Insufficient Adjustment
2. Biases in the evaluation of conjunctive and disjunctive events
3. Anchoring in the assessment of subjective probability distributions

1. Insufficient Adjustment

- A cognitive process whereby decision makers first focus on the anchor and then make a series of dynamic adjustments toward their final estimate.
- Because these adjustments are insufficient, the final answer is biased toward the anchor.

Classic Example Anchoring and Adjustment

Ask 50% of the class to close their eyes.

In a moment we will switch the group that has their eyes open.

Condition 1: Anchoring and Adjustment Experiment

- Is the total number of African nations in the UN greater or less than 12 nations? Write down "yes" or "no."
- Now write down your best guess as to the total number of African nations in the UN.

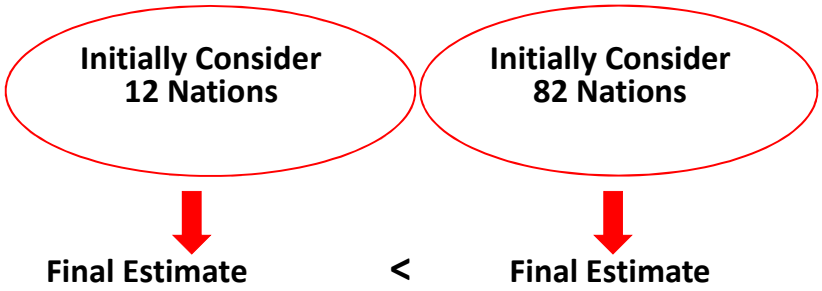
Switch Roles

- If you previously had your eyes open, close them now.
- If you previously had your eyes closed, open them now.

Condition 2: Anchoring and Adjustment Experiment

- Is the total number of African nations in the UN greater or less than 82 nations? Write down "yes" or "no."

- Now write down your best guess as to the total number of African nations in the UN.



Final estimate is biased towards the "anchor" (the number in the first question)

53 African nations in the UN in 2008.

Anchoring & Adjustment Heuristic

Step 1: Consider an initial estimate of the quantity you are trying to judge. (People often know that this initial estimate isn't perfectly accurate.)

Step 2: Adjust the initial estimate in the direction that corrects for assumed sources of error.

=> Insufficient Adjustment

- *Result*: Final judgment is overly influenced by the anchor,
  i.e., the initial anchor biases the final estimate.

- Housing price example

Suggested price of this house is 1,000,000 TL. How much are you willing to pay?

Suggested price of this house is 500,000 TL. How much are you willing to pay?

- The same house will appear more valuable if its listing price is high than if it is low.

Example: Environmental Evaluation Study

Q1: Would you be willing to pay $5 to save 50,000 offshore pacific coast seabirds from small offshore oil spills?

Q2: How much are you willing to pay to save 50,000 offshore pacific coast seabirds from small offshore oil spills?

Estimate of mean WTP from Q1: $20.

Estimate of mean WTP from Q2: $64.

ORGANIZATIONAL BEHAVIOR AND HUMAN DECISION PROCESSES 39, 84–97 (1987)

Experts, Amateurs, and Real Estate: An Anchoring-and-Adjustment Perspective on Property Pricing Decisions

GREGORY B. NORTHCRAFT AND MARGARET A. NEALE

- Actual price of a house: $74,900

Anchors: List Price
Low-$65900 (-12%)
Moderately Low - $71900 (-4%)
Moderately High - $77900 (+4%)
High-$83900 (+12%)

Amateur vs. Experts
(Undergraduate students vs. Real Estate Agents)

Amateur Responses

TABLE 1
RESULTS FOR EXPERIMENT 1, HYPOTHESIS 1: MEAN ESTIMATES OF AMATEUR SUBJECTS (n = 48)

	Appraisal value	Listing price	Purchase price	Lowest offer
Listing price				
$ 65,900	$ 63,571	$ 69,414	$ 63,571	$ 62,571
71,900	67,452	72,328	67,581	66,928
77,900	70,423	75,776	70,069	70,107
83,900	72,196	78,014	69,500	69,785

Actual price of a house: $74,900

Experts Responses

TABLE 2
RESULTS FOR EXPERIMENT 1, HYPOTHESIS 1: MEAN ESTIMATES OF EXPERT SUBJECTS (n = 21)

	Appraisal value	Listing price	Purchase price	Lowest offer
Listing price				
$ 65,900	$ 67,811	$ 69,966	$ 66,755	$ 65,000
83,900	75,190	76,380	73,000	72,590

Actual price of a house: $74,900

Journal of Marketing Research
Vol. XXXV (February 1998), 71–81

An Anchoring and Adjustment Model of Purchase Quantity Decisions

BRIAN WANSINK, ROBERT J. KENT, and STEPHEN J. HOCH*

Study 1: Multiple-unit pricing

Product	Form of Price Expression	Percentage Change in Unit Sales: Single unit	Percentage Change in Unit Sales: Multiple unit	p-Value
Bathroom Tissue	1/50¢ versus 4/$2.00	+57	+97	.02
Candy	1/50¢ versus 2/$1.00	+24	+25	n.s.
Cereal (Breakfast)	1/$1.99 versus 2/$3.98	+133	+137	n.s.
Cookies	1/$1.67 versus 2/$3.34	+306	+372	.01
Frozen Dinners	1/$2.49 versus 2/$5.00	+33	+70	.003
Frozen Dinners	1/$2.50 versus 2/$5.00	+133	+195	.0001
Frozen Entrees	1/$1.25 versus 2/$2.50	+133	+156	.02
Paper Towels	1/75¢ versus 2/$1.50	+403	+565	.001
Soap (3-Bar Packs)	1/$1.99 versus 2/$3.98	+48	+30	n.s.
Soft Drinks (2 Liters	1/$1.49 versus 2/$3.00	+33	+66	.01
Soup (Canned)	1/$1.33 versus 3/$4.00	+200	+248	.01
Soup (Canned)	1/50¢ versus 2/$1.00	+108	+112	n.s.
Tuna (Canned)	1/65¢ versus 2/$1.30	+36	+66	.004
		+125%	+165%	.0001

The quantity listed in multiple-unit pricing (4/$2.00) provides an anchor, 4.

Study 2: Quantity Limits

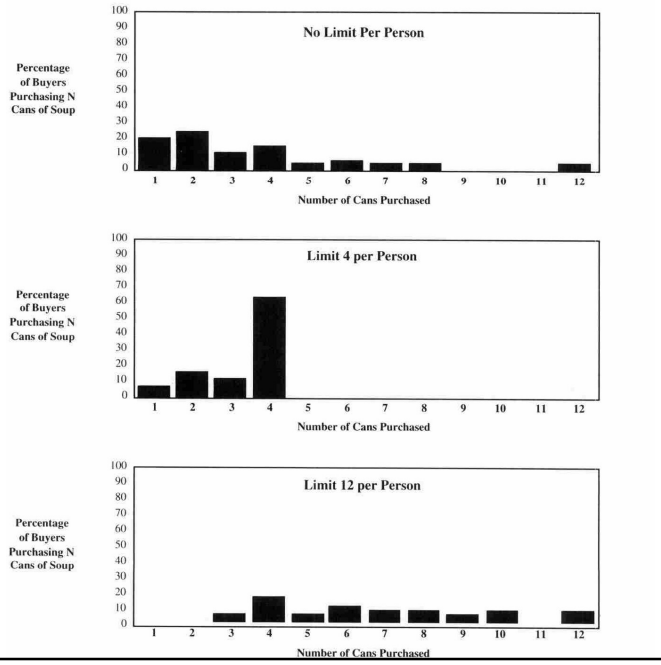
THE IMPACT OF PURCHASE QUANTITY LIMITS ON SUPERMARKET SALES

Measure	Quantity Limit Level: No Limit	Limit 4	Limit 12
Purchase Quantity per Buyer	3.3[a]	3.5[a]	7.0[b]
Purchase Incidence	7%	10%	9%
Total Units Sold	73[a]	106[a]	188[b]

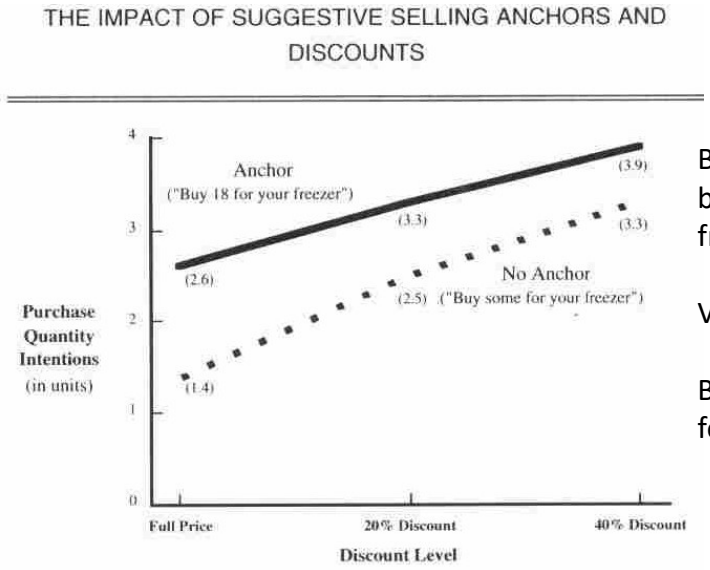
Quantity limit itself serves as an anchor. The larger the limit is (12 vs. 4), the larger the increase in the amount of purchase.

Figure 2

HOW PURCHASE QUANTITY LIMITS INFLUENCE CANNED SOUP PURCHASES



Study 3: Suggestive Selling



Buy 18 Snickers bars for your freezer?

Vs.

Buy Snickers bars for your freezer?

Example: Impacts of absurd anchors

- Example: Suppose a biased or unreliable news source tells you that something extreme will happen, e.g, next year 50% of retail banks will fail.
  - You don't trust this news source, so you adjust the estimate from 50% to something you think is more realistic, but your adjustment will typically be too small.
- Example: People anchor on their own opinions and values and then adjust to take into account other people's differences (anchoring on ourselves).
- Consequence: We tend to expect others to be more like ourselves than they are.

More examples..

- Gandhi example

1st group:

- Gandhi was more than 144 years old when he died. Correct or not. If not, how old was he?

2nd group:

- Gandhi was 35 years old when he died. Correct or not. If not, how old was he?

- Whatever information is available, even if the quantity of the information is slight, its quality is poor, and it is completely unrealistic, absurd or even a lie, your judgment is affected.
- Our thoughts and our behavior are influenced, much more than we know or want, by the environment of the moment.

- People adjust less when their mental resources are depleted, either because their memory is loaded with digits or because they are slightly drunk.