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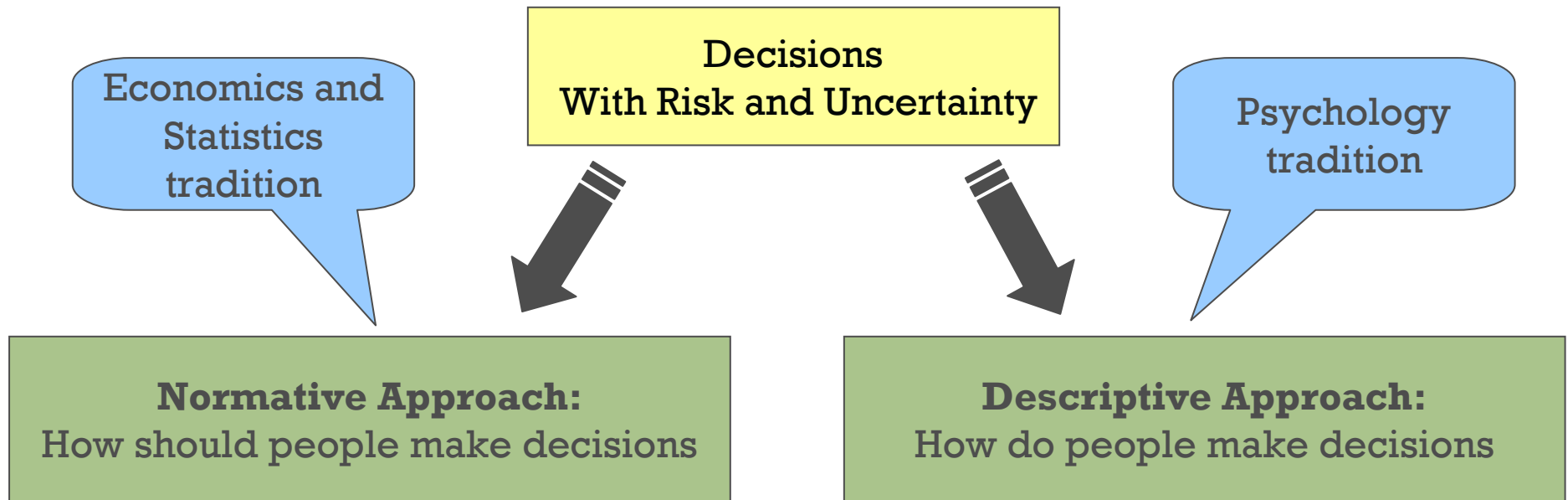
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**Some Behavioral Biases in Decision Making,
Investments, and Risk Taking**

Beauty Contest Game

- **Each person has to pick a number between 0 and 100**
- **The game host collects all the numbers and calculates the average**
- **The game host then computes $2/3$ of the average**
- **Whoever is nearest to $2/3$ of the average wins the prize**

Risk and Uncertainty: Two Thinking Styles



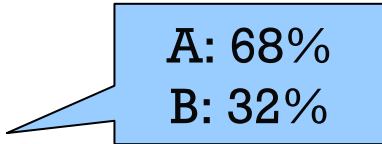
Focus at INSEAD:

1. **Effect of culture and institutions:** *How are the psychological biases affected?*
2. **A Prescriptive Approach:** *How to blend the Normative and the Descriptive?*

1. Frame-Dependence (Gains and Losses)

Example 1

You are the CEO of a Fortune 500 company faced with a difficult choice. Due to structural changes in the economy that seem irreversible, one of the divisions of your company is threatened with a partial, and possibly a complete, shutdown. This division currently employs 6000 workers. Your staff has identified two options. Option A entails a partial shutdown and the permanent layoff of some of the workers. Option B entails taking a gamble that will result in either 0 or 6000 jobs. Specifically, the two options are as follows:

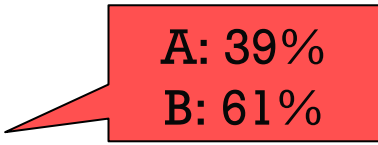


A: 68%
B: 32%

Version 1

Option A : exactly 2000 jobs saved.

Option B : 1/3 probability 6000 jobs saved and a 2/3 probability 0 jobs saved.



A: 39%
B: 61%

Version 2

Option A : exactly 4000 jobs lost.

Option B : 1/3 probability 0 jobs lost and a 2/3 probability 6000 jobs lost.

1. Frame Dependence (Gains and Losses): Example 2

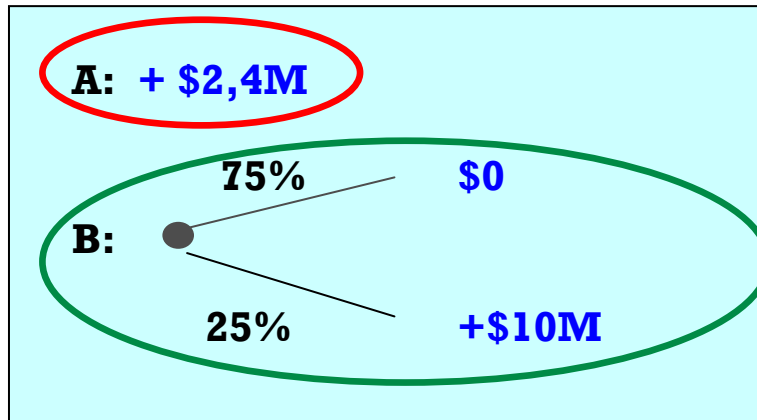
Imagine that you face the following pair of concurrent decisions

Decision 1

Decision 2

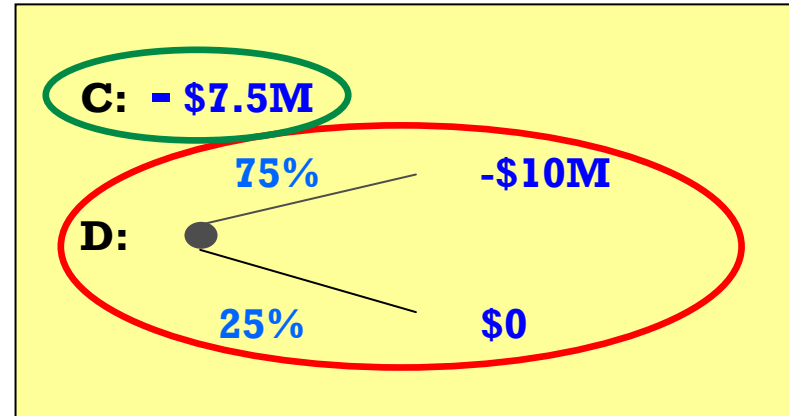
Choice:

**A
or
B?**



Choice:

**C
or
D?**



Most people choose A and D:

75%: -\$7.6M

25%: +\$2.4M

But, B and C is better by \$100K:

75%: -\$7.5M

25%: +2.5M

1. **Frame Dependence (Gains and Losses): Example 3**

Auction for US\$100

- **Call out bids in multiples of \$5**
- **The highest bidder will pay the amount and win the \$100**
- **The second-highest bidder must also pay the amount that he or she bids**

Frame-Dependence (Gains and Losses)

- **Investors often show the disposition effect: selling performing assets too soon and holding on to their losses too long**
- **Most investment clients will not sell anything at a loss and are likely to throw good money after bad money (escalation)**
- **Corporate executives find it difficult to terminate losing projects**
....

Risk Attitudes in Hong Kong, Singapore, and Taiwan: A Survey (sponsored by Citigroup): Sample

Respondents, by Country

Hong Kong	850
Singapore	872
Taiwan	869
Total	2591

Frame-Dependence (Gains and Losses): INSEAD-Citigroup Survey

In General:

In gains, individuals are risk averse and

In losses, individuals are risk seeking.

Key Finding (Survey):

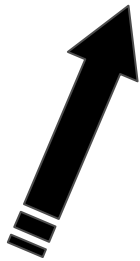
Across the three markets (HK, SG, TW),

In gains, investors in SG are most risk averse

In losses, investors in SG are most risk seeking

2. Risk Attitudes Across Domains

Are you likely to engage in a risky activity?



**What is the
risk involved ?**



**What is the
potential reward?**

Question:

**Is the risk-reward
tradeoff different in
different markets**

and

**across domains (e.g.,
social and financial) ?**

2. Risk Attitudes Across Domains: INSEAD-Citigroup Survey

Question 1: willingness to engage in different activities:

1. *Admitting that your tastes are different from those of your friends.*
2. *Disagreeing with your father on a major issue.*
3. *Approaching your boss for a raise.*
4. *Wearing provocative or unconventional clothes on occasion.*

5. *Investing 10% of your annual income in government bonds (treasury bills).*
6. *Investing 5% of your annual income in a conservative stock.*
7. *Investing 10% of your annual income in a moderate growth mutual fund.*
8. *Investing 5% of your annual income in a very speculative stock.*

Question 2: perception of risk involved in the activities

Question 3: perception of potential rewards in the activities

2. Risk Attitudes Across Domains: INSEAD-Citigroup Survey

Key Finding:

Across the three markets (HK, SG, TW),

given the same perceptions on the risk involved and the potential rewards involved in the activities,

investors in TW are least likely to take social risk,

investors in SG are least likely to take investment risk.

3. Anchoring Bias

Example 1

Version 1

Do you believe that two years from now the Euro/US\$ exchange rate will be above or below 0.6 Euro per US\$?

(Please circle your response below.)

Above

Below

What is your best estimate of the exchange rate two years from now?

Version 2

Do you believe that two years from now the Euro/US\$ exchange rate will be above or below

1.6 Euro per US\$?

(Please circle your response below.)

Above

Below

What is your best estimate of the exchange rate two years from now?

3. Anchoring Bias

Example 1

Anchor of \$0.6

Anchor of \$1.6

Mean

0.70

1.49

Largest

1.80

2.20

75% Percentile

0.75

1.79

Median

0.70

1.41

25% Percentile

0.50

1.23

Smallest

0.40

0.75

3. Anchoring Bias

Example 2

Mean:
40,425 m \approx
40 billion

Median:
1000 m \approx
1 billion

Version 1

What is your best guess of the annual U.S. egg production (in millions)?

Mean:
180
billion

Median:
100
billion

Version 2

What is your best guess of the annual U.S. egg production (in billions)?

3. Anchoring Bias

Example 3

Version 1

Provide an estimate of

$8 \times 7 \times 6 \times 5 \times 4 \times 3 \times 2 \times 1$ _____

Version 2

Provide an estimate of

$1 \times 2 \times 3 \times 4 \times 5 \times 6 \times 7 \times 8$ _____

3. Anchoring Bias Example 4

- **What are the last three digits of your home phone number?**
- **Add 400 to your answer in (1).**
- **Do you think Attila the Hun was defeated in Europe before or after (XYZ+400) A.D. ?**
- **In what year would you guess Attila the Hun was actually defeated?**

*** From “*Winning Decisions*,” by Russo and Schoemaker (2002)**

3. Anchoring Bias

Example 4

**Last Three Digits of Phone Number
plus 400**

**Average Estimate of the Year
of Attila's Defeat**

400 to 599	629
600 to 799	680
800 to 999	789
1000 to 1199	885
1200 to 1399	988

3. Anchoring Bias

Example 5

Version 1

You are to estimate the total number of member countries in the United Nations. To make your estimate, I would suggest that you start with a value of **95**. First decide whether this value is too high or too low – and then move upwards or downwards from this value to what you feel is the true value.

Your final estimate as to the total number of member countries in the United Nations _____

Version 2

You are to estimate the total number of member countries in the United Nations. To make your estimate, I would suggest that you start with a value of **300**. First decide whether this value is too high or too low – and then move upwards or downwards from this value to what you feel is the true value.

Your final estimate as to the total number of member countries in the United Nations _____

3. Anchoring Bias

Example 5- Part II

Find a partner sitting nearby who has finished the above questions. Obtain this person's response to the total number of member countries in the United Nations. Do not discuss.

My partner's answer to total number of member countries in the United Nations is: _____.

In light of your partner's response, you may want to revise your estimate of the total number of member countries in the United Nations. Your goal is to be as accurate as possible in this final estimate.

My final estimate is _____ member countries in the United Nations.

3. Anchoring Bias

Example 5

Responses for Anchor of 95:

Initial Estimate	Partner's Estimate	Revised Estimate
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Responses for Anchor of 300:

Initial Estimate	Partner's Estimate	Revised Estimate
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3. Anchoring Bias

Example 5

True Value = 191

Anchor of 95

Anchor of 300

Initial Estimate

129

233

Partner's Estimate

200

148

Revised Estimate

134

203

**Average of Initial and
Partner's Estimates**

165

191

3. Anchoring Bias

Example 5

Errors in Estimates

Anchor of 95

Anchor of 300

Initial Estimate

-62

+42

Revised Estimate

-57

+12

**Average of Initial and
Partner's Estimates**

-26

0

3. **Anchoring Bias**

Often observed in:

- **Sales forecasting**
- **Budgeting**
- **Earnings estimates by analysts**
(Positive surprises tend to be followed by positive surprises and negative surprises tend to be followed by negative surprises, for example)

4. Overconfidence Bias

For each of the following ten items, provide a low and high guess such that you are 90 percent sure the correct answer falls between the two. Your challenge is to be neither too narrow (ie overconfident) nor too wide (ie underconfident). If you successfully meet this challenge you should have 10 percent misses – that is, exactly one miss.

- | | 90% Confidence Range | |
|---|-----------------------------|--------------------------|
| | <u>Low Guess</u> | <u>High Guess</u> |
| 1. What is the weight of an empty Airbus A340-600 (in kilograms or tons?) | | |
| 2. In what year did John Steinbeck win the Nobel Prize for literature? | | |
| 3. What is the distance (in kilometers or miles) from the Earth to the Moon? | | |
| 4. What is the air distance (in kilometers or miles) from Madrid to Baghdad? | | |
| 5. In what year was the construction of the Roman Colosseum completed? | | |
| 6. What is the height (in meters or feet) of the Aswan High Dam? | | |
| 7. In what year did Magellan's crew complete the first naval circumnavigation of the globe? | | |
| 8. In what year was Mohandas K. Gandhi born? | | |
| 9. What is the surface area (in square kilometres or miles) of the Mediterranean Sea? | | |
| 10. What is the gestation period of the great blue whale? | | |

* *“Winning Decisions,”* by Russo and Schoemaker (2002)

4. Overconfidence Bias (Investors)

- **Overconfident in their abilities to pick winners**
- **Overconfident in assessing potential movements in the markets: setting low guesses too high and high guesses too low**



- **Insufficient diversification**
- **Too much trading**

INSEAD-Citigroup Survey:

Compared to reported levels in the U.S., investors in all three markets (HK, SG, TW) were more overconfident.

Across the three markets, Investors in SG were most overconfident, followed by HK, and then TW.

5. Regret

Example 1

Flu Epidemic:	Expected to kill 10 out of 10,000 children
Vaccination against the Epidemic:	Risk of death, 5 out of 10,000 children

Would you get your child vaccinated?

Example 2

Andre owns shares in Company A. During the past year, Andre considered switching to Shares in Company B, but decided against it. He now finds that he would have been better off by \$5M if he had switched to the stock of Company B.

Vanessa owned shares in Company B. During the past year, she switched to shares in Company A. She now finds that she would have been better off by \$5M if she had kept her stock in Company B.

Who would feel worse, Andre or Vanessa?

5. Regret

Commission Regret: Bad outcome resulting from an action

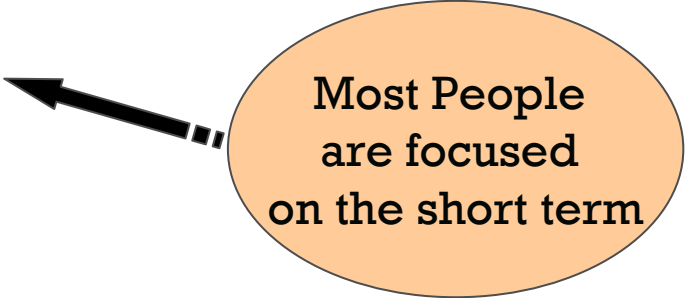
Omission Regret: Bad outcome resulting from inaction

Short Term:

Commission Regret > Omission Regret

Long Term:

Omission Regret > Commission Regret



Most People
are focused
on the short term

5. Regret

Three Investors: A, B, and C. Each had an investment worth USD 10,000

Investor A: Investment was in stocks
Switches from Stocks into Fixed Deposit
Based on his/her own judgment

Investor B: Investment was in stocks
Switches from Stocks into Fixed Deposit
Based on a financial advisor's recommendation

Investor C: Investment was in Fixed Deposit
Considers switching from FD into stocks, but doesn't do so
Based on his/her own judgment

Subsequently, the stock market went up by 25%.

All three investors (A, B, and C) held FDs during this period and would have been equally better off holding stocks.

Who would have the most regret?

5. Regret

- | | |
|--|---|
| A) Stocks to FD – based on own judgment: | <u>Commission Regret</u> |
| B) Stocks to FD - based of financial advisor's judgment: | <u>Advisor-Based Commission Regret</u> |
| C) Considers Stocks, but stays in FD - own judgment: | <u>Omission Regret</u> |

Conventional Wisdom (existing U.S. studies):

- (i) Commission Regret > Omission Regret**
- (ii) Commission Regret > Advisor-Based Commission Regret > Omission Regret**

INSEAD-Citigroup Survey (HK, SG, TW): Key Finding

- (1) In all three markets, difference between Commission Regret and Omission Regret is much less than what has been typically reported for the U.S.

In HK, there is no significant difference between the two, whereas in SG and TW Commission Regret is only slightly higher than Omission Regret.

- (2) Advisor-based Commission Regret is the greatest type of great in all three markets, and between the three markets, it is highest in HK

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