Economic Psychology
Individuals, Groups, Markets, State

Erich Kirchler

University of Vienna

Institute of Applied Psychology: Work, Education, Economy

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Areas of economic psychology

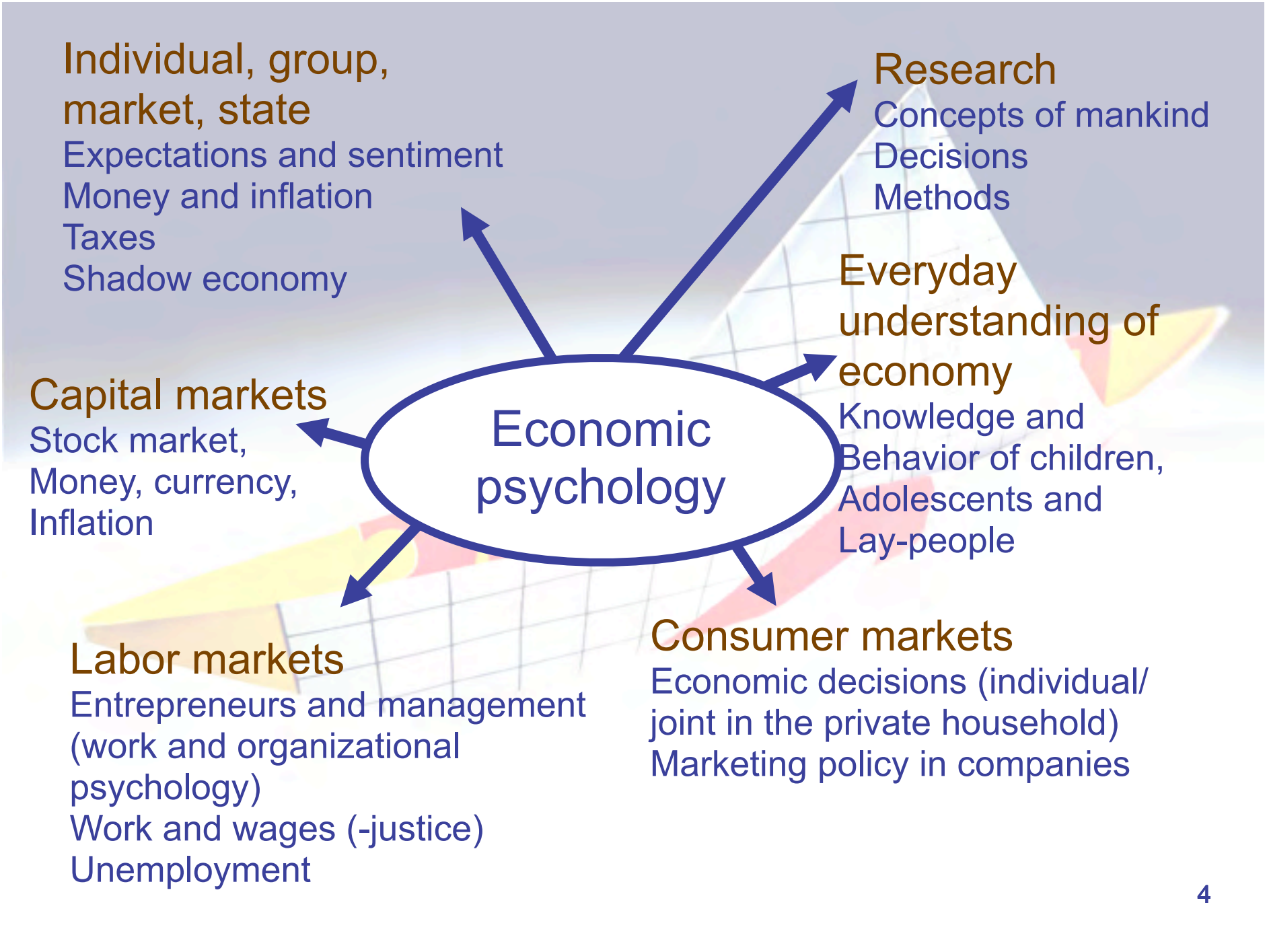
- Work psychology
- Organizational psychology
- Market and consumption psychology
- Economic psychology

Economic psychology is an interdisciplinary research field (psychology and economics)

Objective: Development and application of theoretical knowledge in the context of practical economic problems

Overview

- Contents and boundaries of economic psychology
- On the fragility of economic assumptions
- Everyday understanding of economics
- Markets:
- Economic decisions in the private household
- Marketing policies of companies
- Labor markets
- Financial markets: stock exchange
- Money, inflation and currency changeover/currency reform
- Shadow economy and tax behavior
- Wealth and well being


Individual, group, market, state
Expectations and sentiment
Money and inflation
Taxes
Shadow economy
Research
Concepts of mankind
Decisions
Methods
Everyday understanding of economy
Knowledge and
Behavior of children,
Adolescents and
Lay-people
Capital markets
Stock market,
Money, currency,
Inflation
Economic psychology
Labor markets
Entrepreneurs and management (work and organizational psychology)
Work and wages (-justice)
Unemployment
Consumer markets
Economic decisions (individual/ joint in the private household)
Marketing policy in companies

Contents and Boundaries of Economic Psychology

Chapter 1

Economics

Definitions:

- Economics is the science, „which studies human behaviour as a relationship between ends and scarce means which haver alternative uses” (Robbins, 1932).
- „Economics is the study of how men and society end up choosing with or without the use of money, to employ scarce productive resources which could have alternative uses, to produce various commodities and distribute them for consumption, now or in the future, among various people and groups in society” (Samuelson, 1980).

Economics

Assumptions:

Economists examine decisions
(James Duesenberry)

Decisions are problematic because

- from a set of alternatives one is chosen,
- while the remaining alternatives and their benefits have to be passed on.

→ opportunity costs

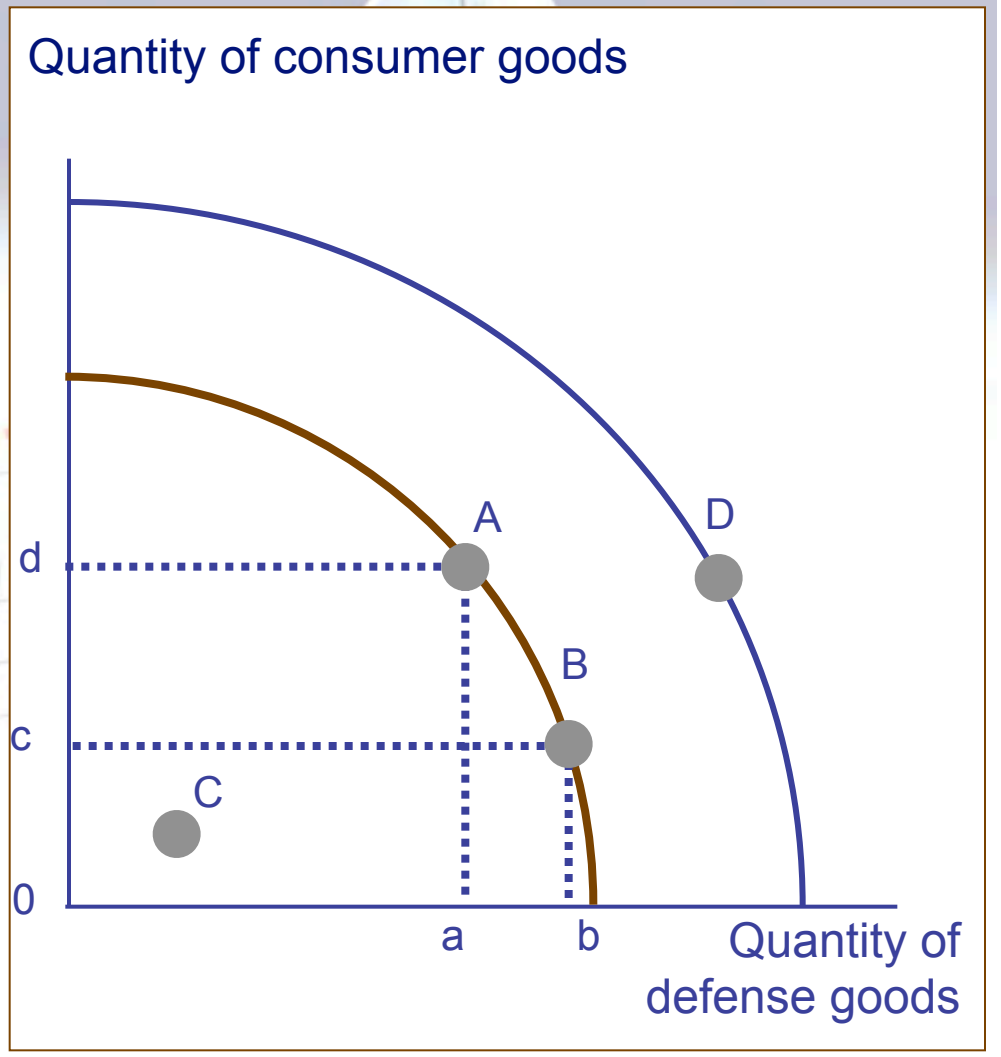
Economics

Opportunity costs

„commodity bundle" of an economy: Two goods (e.g. private consumption, weapons)

➡ Decision:
Which set-combination of goods should be produced given a certain amount of resources?

- Product transformation curve
  or
- Production possibility frontier



Economics

Goal: to act economically efficient

Maximization principle:

To achieve the maximum result with the given resources

Minimization or saving principle:

To achieve the maximum result with the minimum use of resources

Economics

Concept of man: **Homo Oeconomicus**

- Rationality (consistent behavior)
- Optimization

Economics

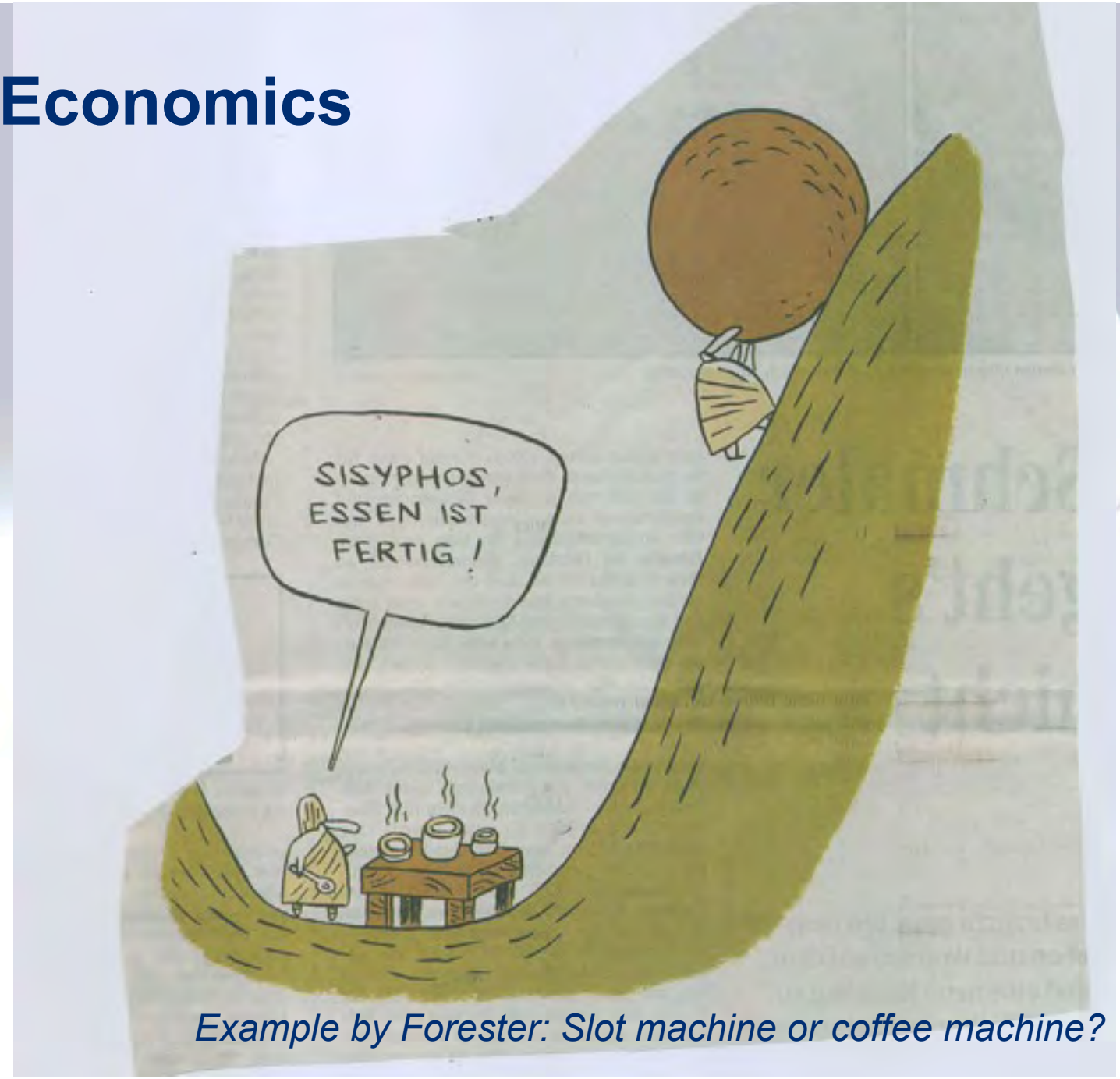
What is rationality? When does an individual or a group act rationally?

Rationality that is understood in the meaning of reason can be interpreted from

- the individual perspective
- the social and moral perspective
- the religious perspective or
- the medical perspective.

Depending on the perspective different behaviors can be more or less reasonable.

Economics



Example by Forester: Slot machine or coffee machine?

Economics

Rationality assumptions:

Completeness	(a > b; b = c; c > d; ...)
Transitivity	(if a > b and b > c, then a > c)
Reflexivity	(a = a)
Non-satiation	(a + 1 > a)
Continuity	(a, b) = (a – x, b + y)
Convexity	(Law of Saturation)

Rationality…

A person who has the goal to own more money behaves consistently(rationally) if he or she

€ 1.000 > 100;

€ 100 > 10 and consequentially € 1.000 > 10

Rationality…

A person behaves inconsistently if he or she is selecting a job applicant based on school grades and work experience and A < B; B < C, but A > C

Applicant A: grades M = 8.9; work experience = 1 Year

Applicant B: grades M = 8.0; work experience = 3 Years

Rationality…

A person behaves inconsistently if he or she is selecting a job applicant based on school grades and work experience and A < B; B < C, but A > C

Applicant B: grades M = 8.0; work experience = 3 Years

Applicant C: grades M = 7.8; work experience = 5 Years

Rationality…

A person behaves inconsistently if he or she is selecting a job applicant based on school grades and work experience and A < B; B < C, but A > C

Applicant A: grades M = 8.9; work experience = 1 Year

Applicant C: grades M = 7.8; work experience = 5 Years

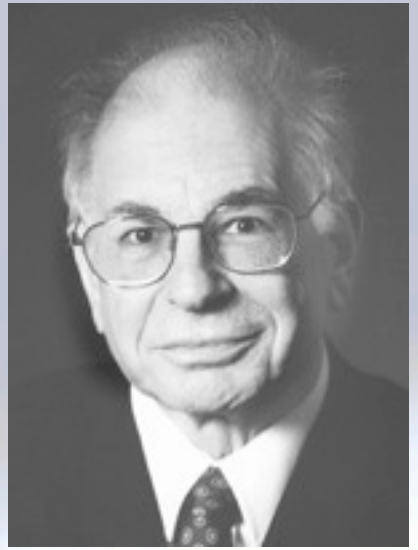
History of economic psychology

- Adam Smith (1776; „Wealth of Nations”)
- 1900: Thorsten Veblen, Wesley C. Mitchell, Gabriel Tarde, Hugo Münsterberg, ...
- 1950: George Katona (Consumer Sentiment Index), Günter Schmölders
- 1970: IAREP, SABE; Cognitive Psychology and Behavioral Economics

The critique of economics on the part of psychology began approximately as follows…

… Not the money, not the inflation rate and the unemployment rate behave and influence each other but people behave in a given economic world and change it by their behavior. Economic variables are aggregated data of individual behavior, in other words, the economy is mostly aggregated psychology ...

Short biographies of Daniel Kahneman and Amos Tversky



Daniel Kahneman (1934-)

Amos Tversky (1937-1996)

Daniel Kahneman, professor at Princeton University was awarded the Nobel Prize for Economics in 2002 - along with Vernon Smith, professor of economics and law at George Mason University . Together with Amos Tversky - who had already passed away at that time and could only be acknowledged by the prize committee - Daniel Kahneman succeeded in integrating knowledge of psychological judgment and decision –making research into economic science.

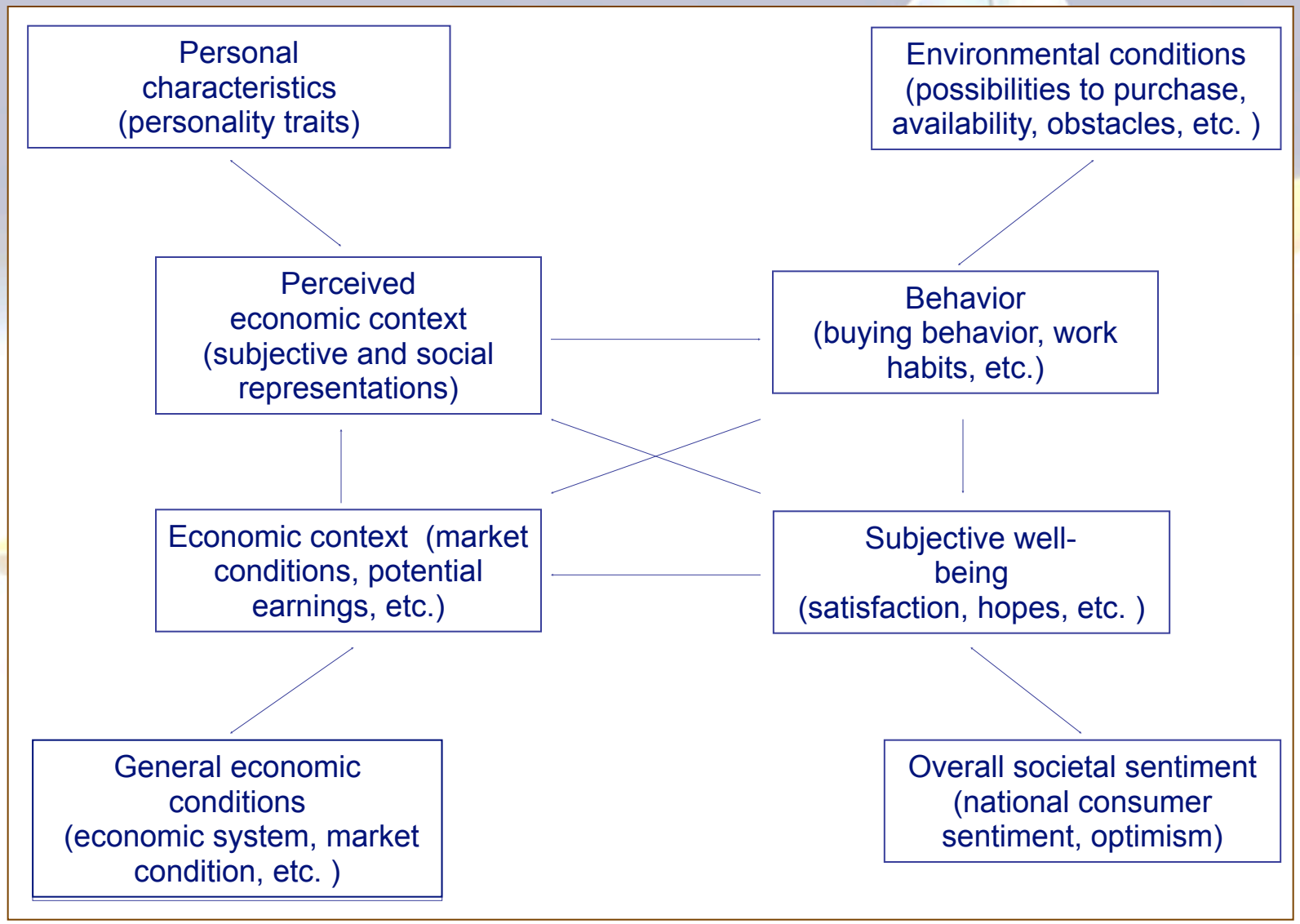
Daniel Kahneman was born in Tel Aviv in 1934. Kahneman received his B. Sc. with a major in psychology and a minor in mathematics from the Hebrew University of Jerusalem in 1954. In 1961 he received his PhD in Psychology at the University of California, Berkeley. Since 1993 Daniel Kahneman is a Senior Scholar at the Woodrow Wilson School of Public and International Affairs. He is also Professor of Psychology and Public Affairs Emeritus at the Woodrow Wilson School, the Eugene Higgins Professor of Psychology Emeritus at Princeton University, and a fellow of the Center for Rationality at the Hebrew University in Jerusalem.

Amos Tversky was born in Haifa, Israel in 1937. He received his doctorate from the University of Michigan, Ann Arbor in 1965. Tversky taught at Michigan, Harvard and Hebrew University, before moving to Stanford as a fellow at the Center for Advanced Study in the Behavioral Sciences in 1970. He joined the Stanford psychology faculty in 1978, where he stayed until his death less than two decades later.

Characteristics of economics	and psychology
Based on **few fundamental assumptions** of Gerry Becker (1976) called **"The Economic Approach":** - Utility maximization - Stable preferences - Market equilibrium All economic laws are derived from these assumptions.	Predominantly **inductive methods**, empirical theories at low levels. **Explanation of individual behavior**; Intention to describe details
Symbolic mathematical language and models	**Experimental and statistical methods, Scaling techniques**
Objective data	**Observational data and subjective data, also on emotions.**
Interest in **aggregate data** (macro variables)	Interest in **general and differential** laws of behavior
Assumptions on individual behavior serve to **predict phenomena** („as if" assumptions).	Assumptions about individual behavior must be **realistic** (description and prediction).
Psychological concepts are translated into economic terms to fit into the concept of rationality.	Usually **contextual, structural, and system variables are neglected**.

INSTALLATIONSPROGRAMM
Der Herr rechts hat den Herrn links offenbar downgeloadet. Aus: „Stern".

Areas of economic psychology



Decision Anomalies

Chapter 2

The standard theory of choices provides a set of conditions for rationality that may be necessary, but are hardly sufficient: they allow many foolish decisions to be called rational.

(Daniel Kahneman, 1994)

Psychology of risky decisions

Risk

Individuals and groups (organizations, institutions) often make decisions under risk

Risk 1 = events with possible negative outcome

or

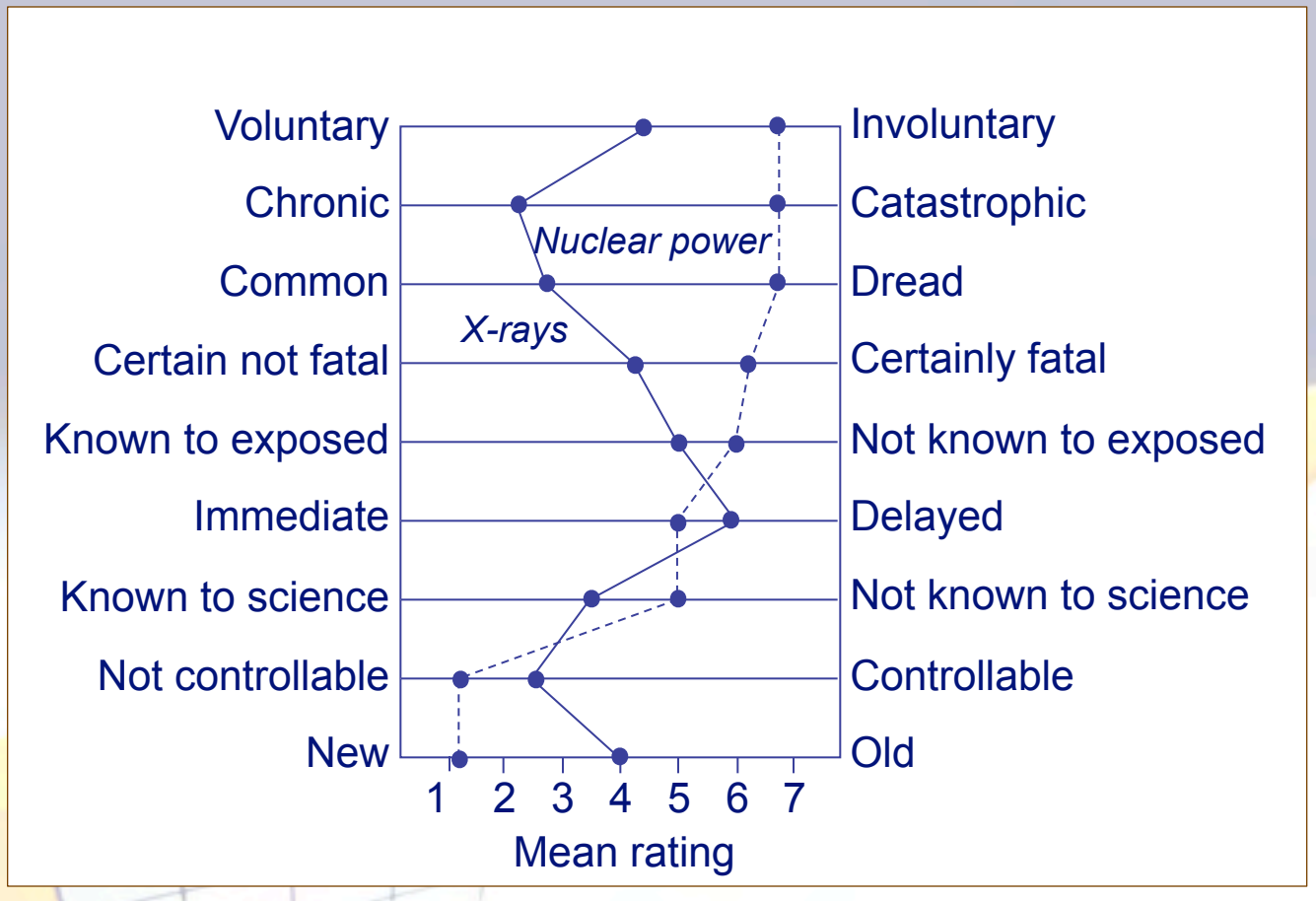
Risk 2 = consequences of decisions are good, neutral or bad and which consequences will occur can only be indicated with certain probability.

E.g.: We definitely know that we will die some day; but we only know the probability with which we die due to an unhealthy lifestyle (smoking, drinking,..).

Risk

To understand how individuals and groups make decisions, it is essential to understand the perception of risk, what people do in risky situations and how risk should be communicated.

Risk



Every risk and every threat has a special property profile, which determines how risks are perceived and accepted (Paul Slovic).

We need to have a concept of the risk or hazard in order to properly communiciate.

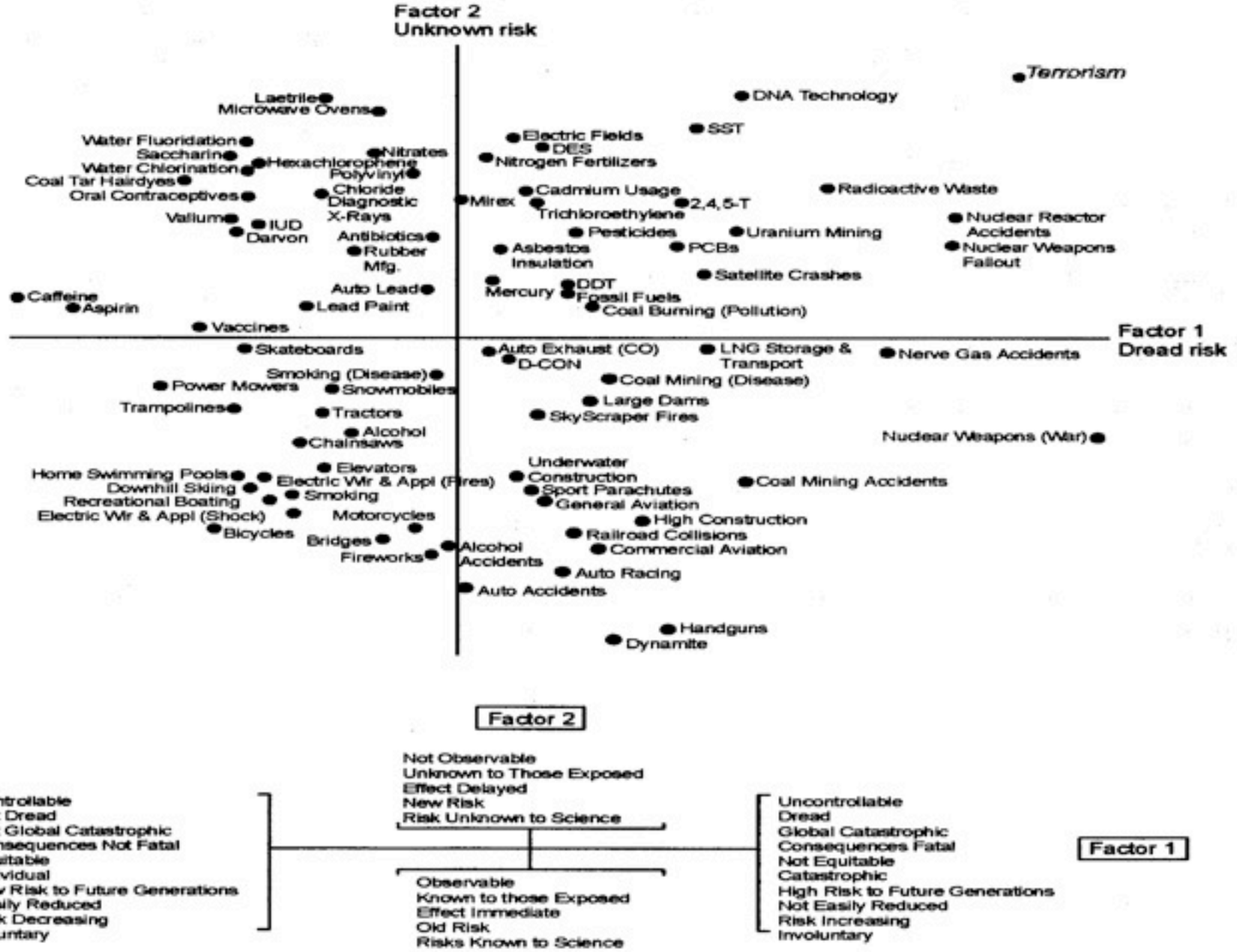


Figure 13.1. Location of 81 hazards on Factors 1 and 2 derived from the interrelationships among 15 risk characteristics. Each factor is made up of a combination of characteristics, as indicated by the lower diagram. Source: Slovic, et al. (1985).

Risk

Two different systems of information processing in decision making:

Intuitive system:

Evolutionary old, based on experience, quickly leads to judgments, is automatic, natural and nonverbal

→ Risk as feelings

Analytical system:

Slow, deliberate, verbal and rational

→ Risk as a result of contemplations

Dual information processing

Characteristics of the experiential, affective system and the analytical system (Eppstein, 1994)

Experiential, affective system

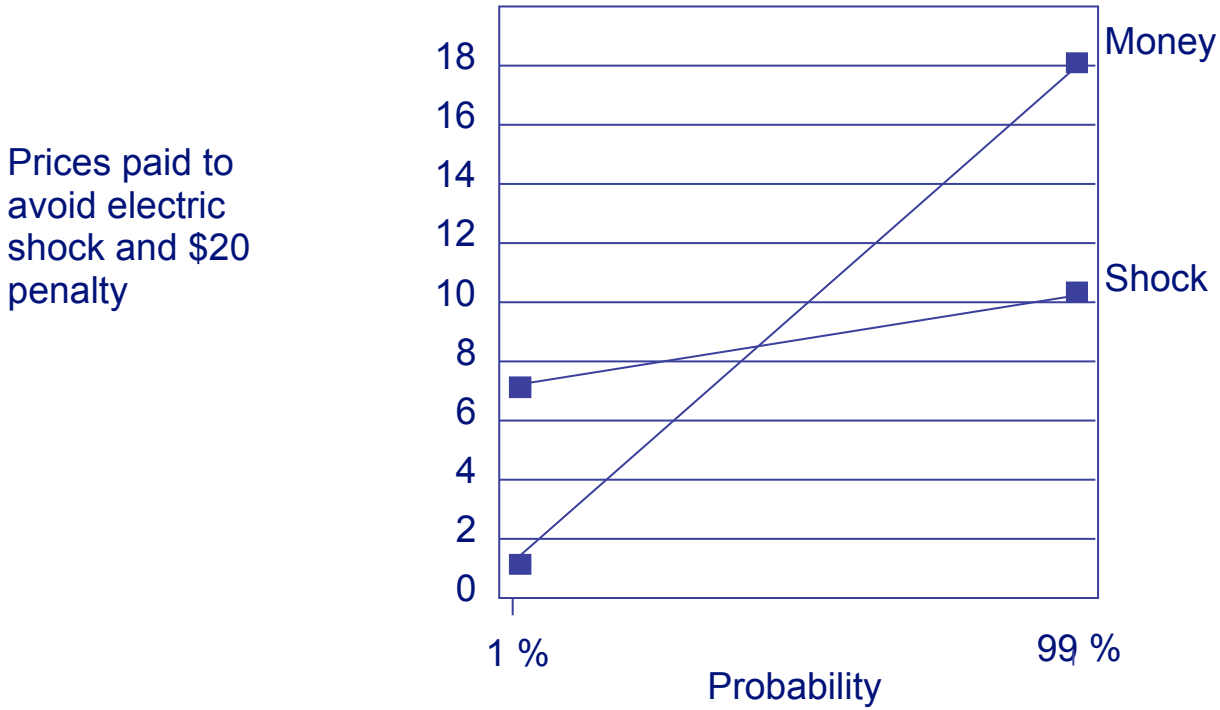
- Holistic, intuitive
- Affective, pleasure-/aversion oriented
- Associative links
- Behavior due to emotionally charged experiences
- Fast processing
- Directly action-oriented
- Self-evident, „experience is believing”

Analytical system

- Analytical, logical, reason-oriented
- Logical links
- Behavior due to deliberate weighing of advantages and disadvantages
- Reality is processed in abstract symbols, words and numbers
- Slow processing
- Indirectly action-oriented
- Justification of decisions and actions with logic and evidence

Risk and emotions

Emotions → **Probabilities are ignored or low probabilities are overestimated**

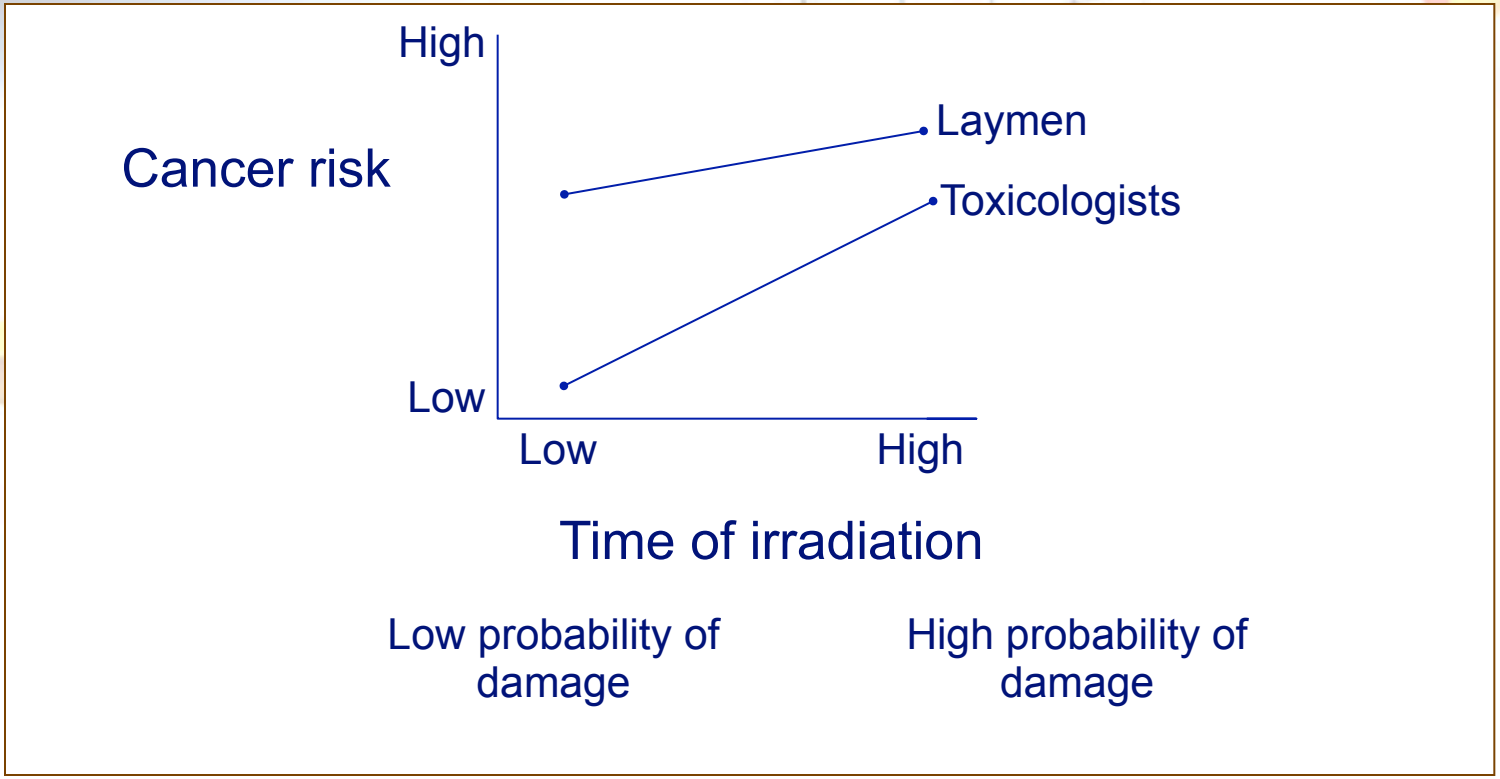


The willingness to pay to avoid electric shocks barely depends on the probability of being exposed to electric shocks (Rottenstreich & Hsee: Money, Kisses, and Electric Shock: On the Affective Psychology Risk. Psychological Science, 2001)

Risk and emotions

Carcinogenic effect of radiation

Many people cannot grasp the harmful effect of chemicals and radiation, since the risks are too shocking. The consequences are perceived disproportionately strong while the probability of their occurrence is not.



Risk and emotions

Affect heuristic: Feelings that are too intense prevent rational decisions; probabilities are ignored; the focus lies on the consequences of an alternative

Insurance brokers depict the dramatic impact of a potential disaster to customers and distract from the likelihood of its occurrence. Investment agents narrate the positive developments of an asset and hardly mention the risks involved, the probabilities of positive or negative events.

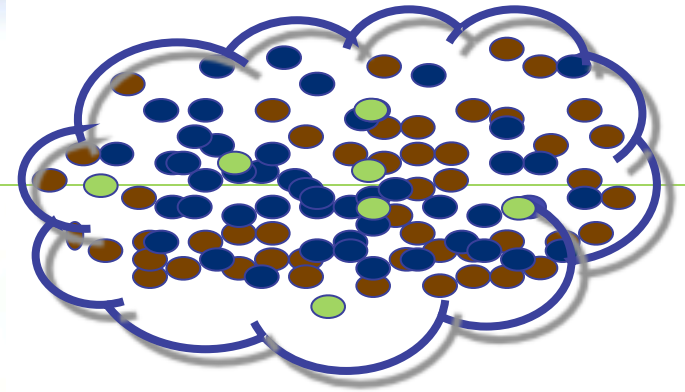
Certainty, risk, ambiguity

Choices are made under:

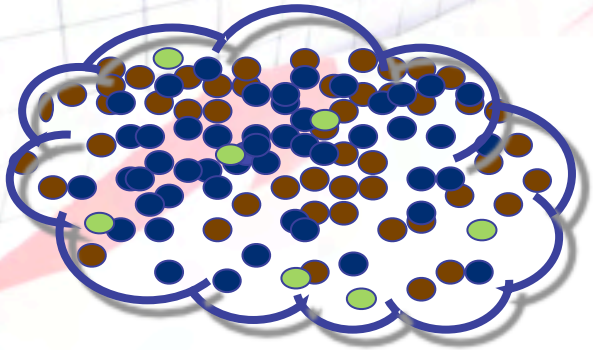
- Certainty — Consequences are known for certain
- Risk — Consequences occur with known probabilities
- Ambiguity — Consequences occur with unknown probabilities
- Uncertainty — Consequences are not known

Decisions under risk

(a) Alternative A offers:
Gain 44 €; p = .5;
Loss 55 €; p = .4;
Neither gain nor loss 0 €; p = .1



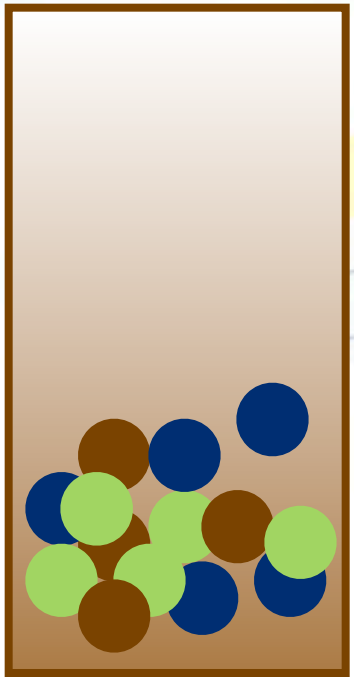
(b) Alternative B offers:
Gain 36 €; p = .5;
Loss 60 €; p = .3;
Neither gain nor loss 0 €; p = .2



The expected value is hardly calculated. Depending on whether a gain or a loss lies in the center of attention, decisions will be made in order to maximize the profit or to minimize the loss; alternative A or B will be chosen accordingly.

Ambiguity-aversion

- Decisions under certainty are preferred to decisions under risk and
- Risk is preferred to ambiguity



Ellsberg Paradox: Risk versus ambiguity

Urn with 90 balls
- 30 Brown balls
- 60 Blue or
- Green balls.

1a: Winnings if a brown ball is drawn
2a: Winnings if a blue ball is drawn

1b: Winnings if a brown or blue ball is drawn
2b: Winnings if a blue or green ball is drawn

Decision models

(a) Normative decision models
(b) Prescriptive decision models
(c) Descriptive decision models

Decision models

Decisions with an uncertain outcome are described in the

- Expected value theory,
- Expected utility theory and
- Subjective expected utility theory.

Decision models

Expected value theory

- In the 17th century Blaise Pascal and Pierre Fermat contemplated how one should play in the casino in order to maximize one's profit
- From the perspective of profit maximization only the possible gain as well as it's probability count

Expected value= gain x probability

Decision models

Expected utility- and subjective expected utility theory

Daniel Bernoulli challenged the expected value theory with the following example (St. Petersburg Paradox):

A coin is tossed repeatedly until “Tails” is tossed. A player receives 2^n ruble where n = 0,1,2,… denotes the number of tosses with outcome “Heads”.

If “Tails” occurs on the 1st toss, the payoff is 2^0 = 1 ruble;
If “Tails” occurs on the 3rd toss, the payoff is 2^3 = 8 ruble;
If “Tails” occurs on the 10th toss, the payoff is 2^{10} = 1024 ruble;

Expected value = payoff x probability

Since the expected value is infinitely high, all players should be willing to invest all their funds in the game. However, a maximum of a few rubles is usually invested.

Conclusion = not the expected value is important, but the utility of the gain.

However, marginal utility decreases with increasing gain. After all, utility is subjective and not objectively determinable.

Normative decision model

According to the model „homo oeconomicus” human beings strive to maximize their gains.

This means that

- Exact calculations can be made (information is processed adequately),
- There is no cooperation,
- Fairness and equity are not considered.

Economics: Subjective – Expected – Utility – Model (SEU)

Judgments and decisions
Rationality and utility maximization

- A person or group is aware of making a decision or judgment and the person or group is identifiable
- All alternatives are predetermined and known
- The consequences of all alternatives are known and can be evaluated
- Evaluation is based upon stable objectives
- Consequences occur with certain and known probabilities
- The relevance of information can be judged and if the information does not suffice
- Further information can be collected

Decisions: Psychology

- Actually, people are not always capable of processing complex information adequately („cognitive scrooge”)
- Complex decisions are „short cut” by heuristics (lack of motivation and time)
- It cannot always be assumed that decisions are made consistently and goals remain stable (framing effects, chances of loss or profit, etc.)

Decisions in game theory

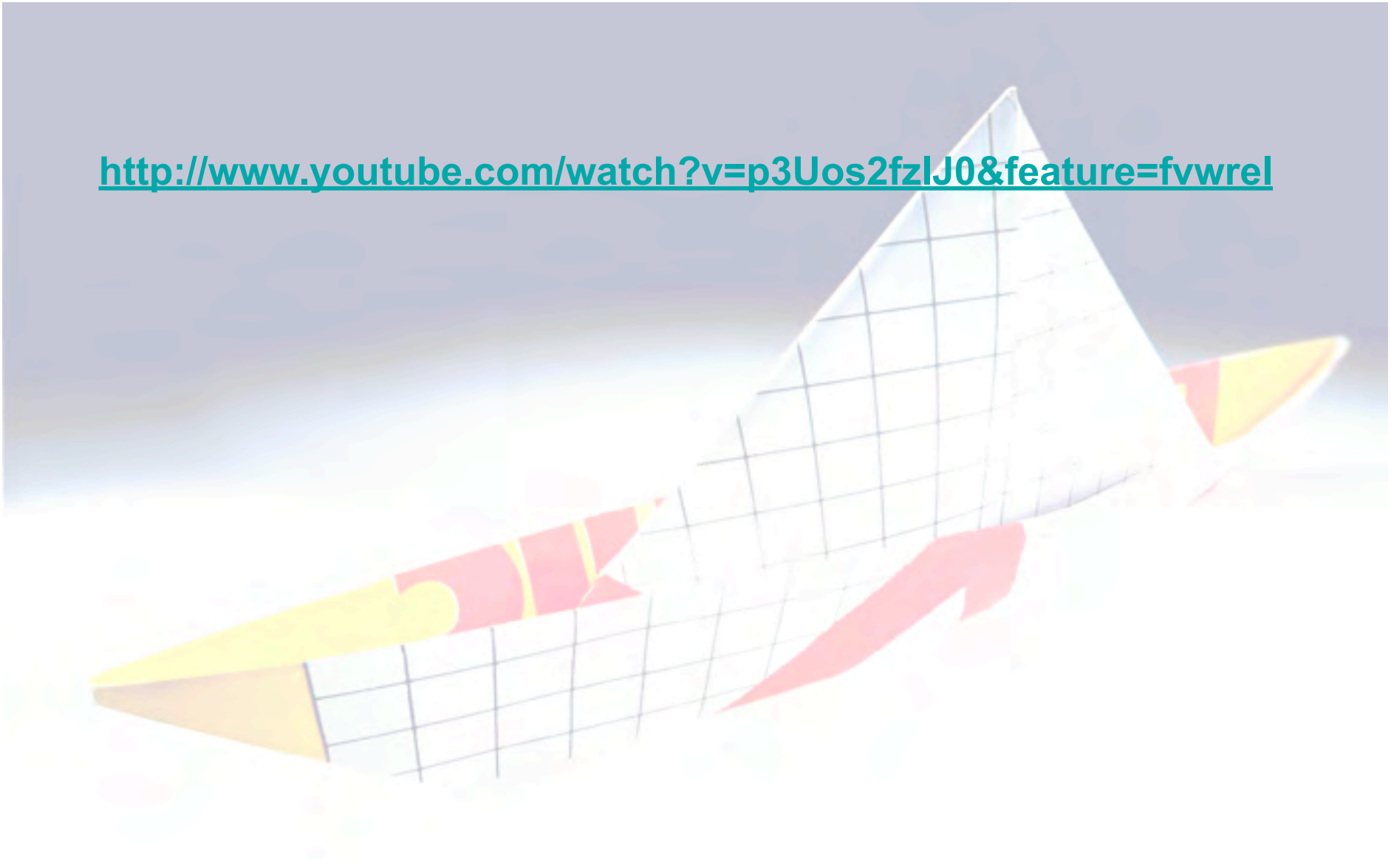
How do material gain, fairness and equity considerations influence decisions?

- Dictator game
- Ultimatum game

Dictatorial division of 100 € by individual A;

(acceptance or refusal by individual B)

Henrich, Boyd, Bowles, Camerer, Fehr, Gintis & McElreath (2001) conducted an ultimatum-experiment on 5 continents in15 small societies and tribes: the offer ranged from a minimum of 26% made by the Machiguenga in Peru up to a 58% made by the Lamelara in Indonesia. In Europe and Northamerica the average offer comes to approximately 44%.



http://www.youtube.com/watch?v=p3Uos2fzlJ0&feature=fvwrel

Decisions in game theory

- Strategic game

A \ B	+	-
+	2 / 2	7 / 7
-	7 / 7	7 / 7

\+ Prisoners cooperate; confess

\- Prisoners defect; deny

- Prisoner's dilemma

A \ B	+	-
+	2 / 2	0 / 10
-	10 / 0	5 / 5

\+ Prisoners cooperate; confess

\- Prisoners defect; deny

Successful strategies in the prisoner‘s dilemma (Axelrod, 2000)

Tit-for-tat strategy:

„What goes around comes around!”

Tit-for-tat-plus-one strategy:

To encourage the willingness to cooperate, a one-time betrayal by the partner is responded with cooperation. The partner is offered a second chance. Any further defection is answered with defection.

Decision anomalies

From Hamlet, Prince of Denmark by William Shakespeare (Act II, Scene 2)…

Hamlet: ...What a piece of work is man! How noble in reason! how infinite in faculties! in form and moving, how express and admirable! In action how like an angel! in apprehension, how like a god! The beauty of the world!...

- Limited information processing capacity
- Time limits and judgment heuristics
- Prospect-theory and framing effects
  - Endowment effect
  - Sunk costs
  - Mental accounting

Decision anomalies

Optical illusions

http://de.wikipedia.org/wiki/Optische_Täuschung;
http://de.wikipedia.org/wiki/Optische_Täuschung;
http://de.wikipedia.org/wiki/Unmögliche_Figur;
http://de.wikipedia.org/wiki/Optische_Täuschung;
http://www.ulkig.net/DE/schwarzer_punkt_11_DE.html;
http://www.ulkig.net/DE/tische_10_DE.html

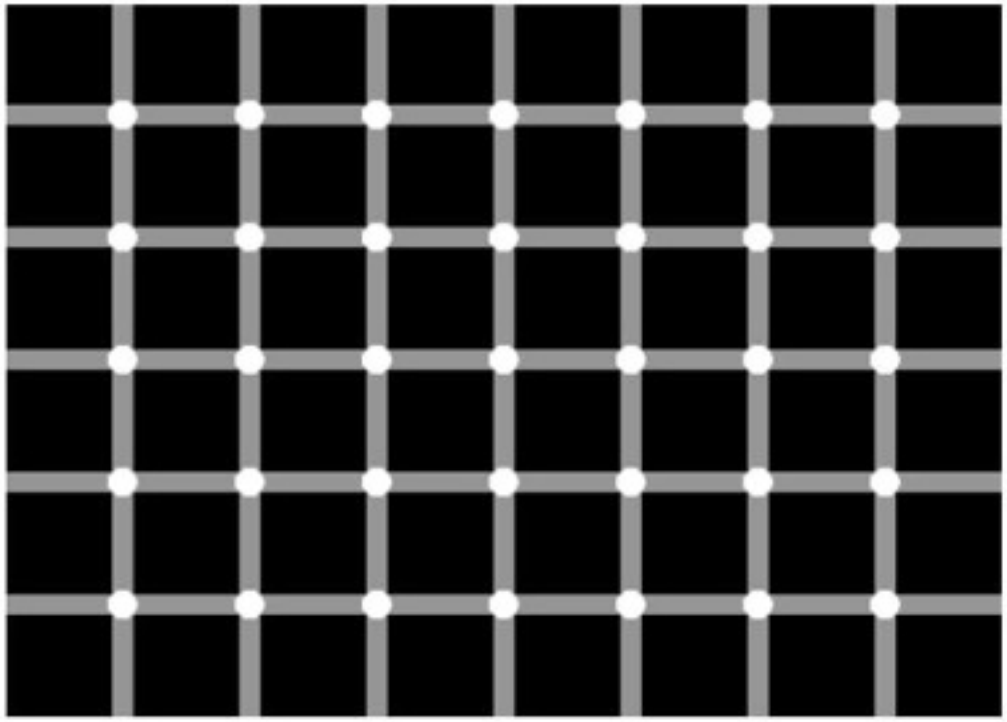
Decision anomalies

Limited information processing (1)

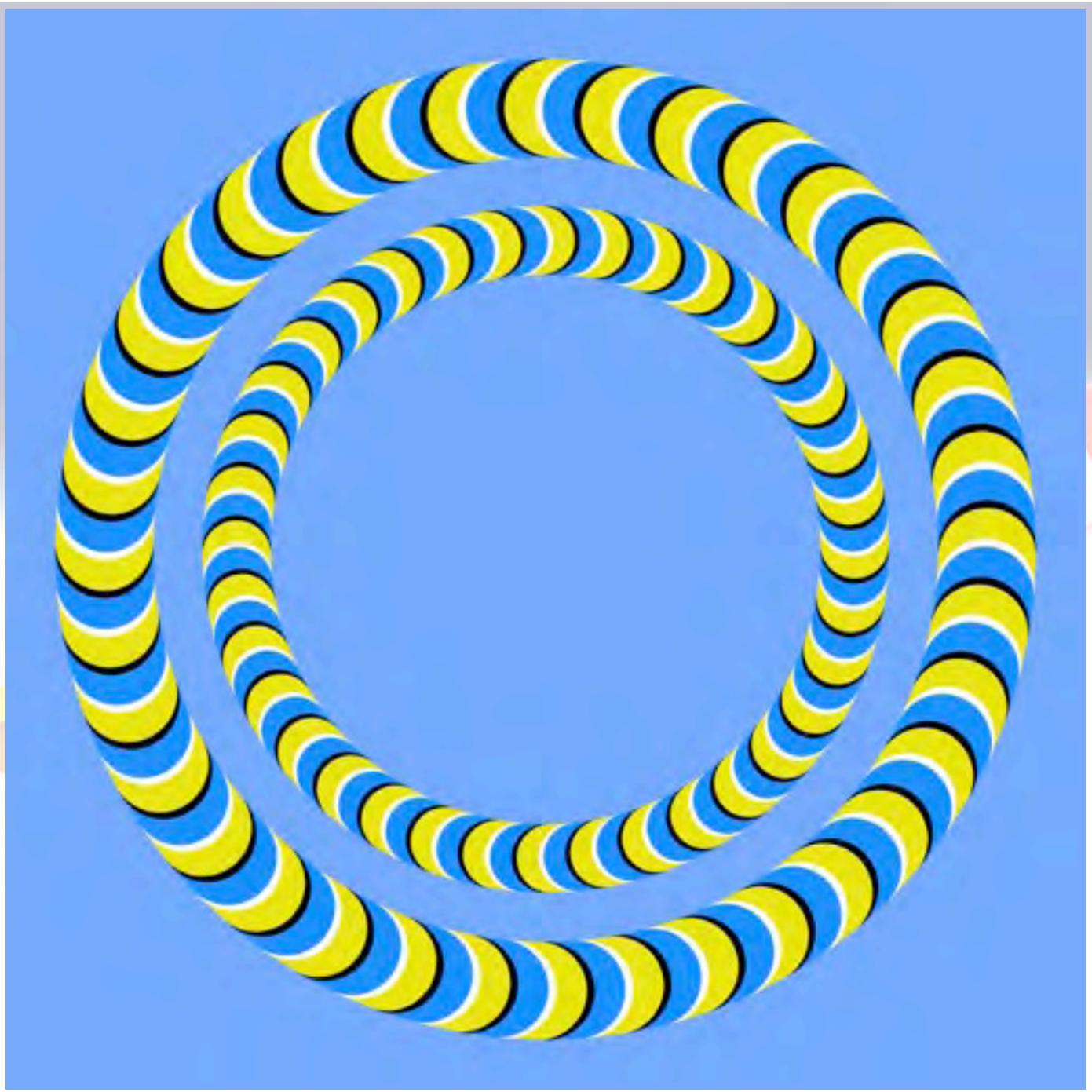
- Reality is constructed and interpreted subjectively
  - Estimation of the diameter of coins
  - Optical illusions

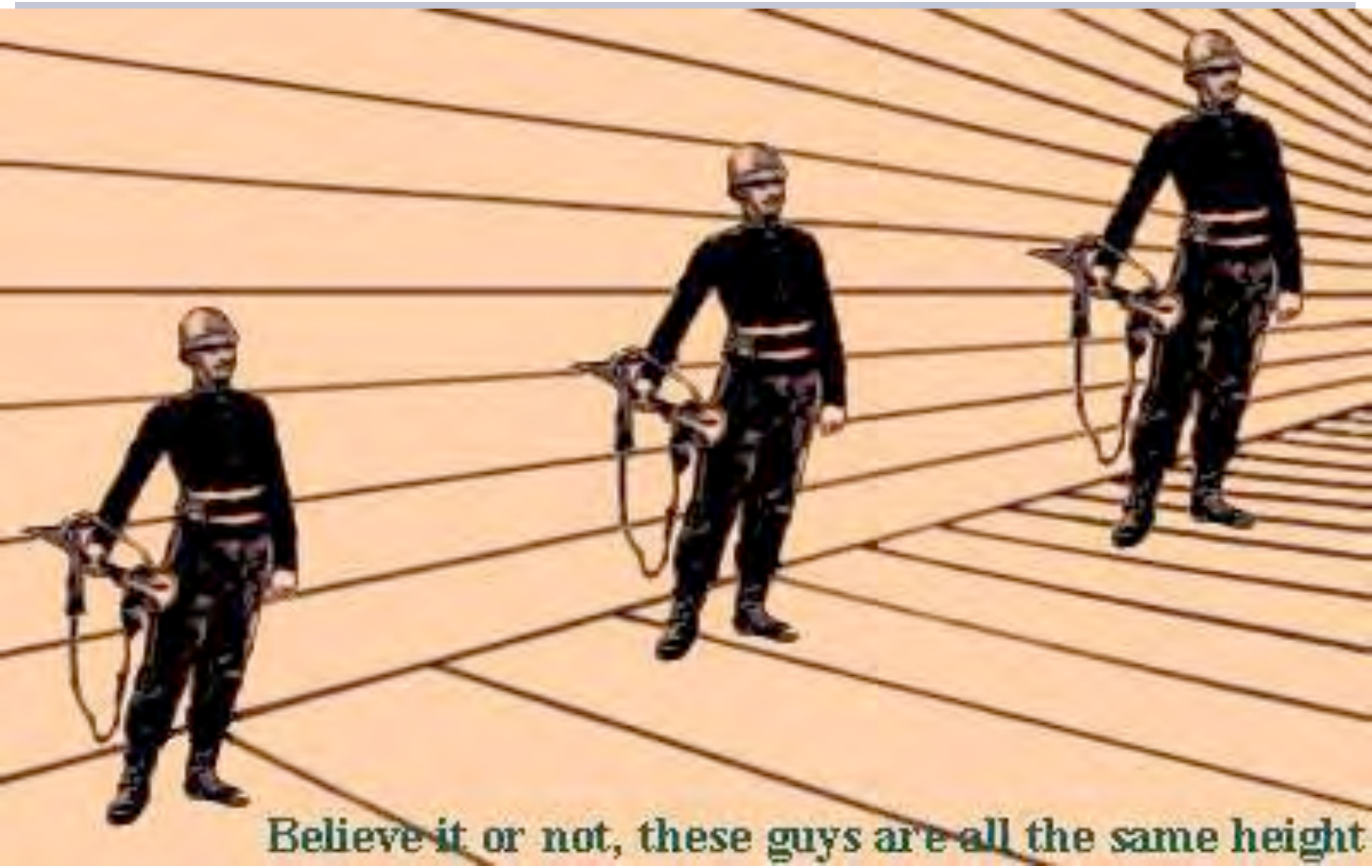
Decision anomalies

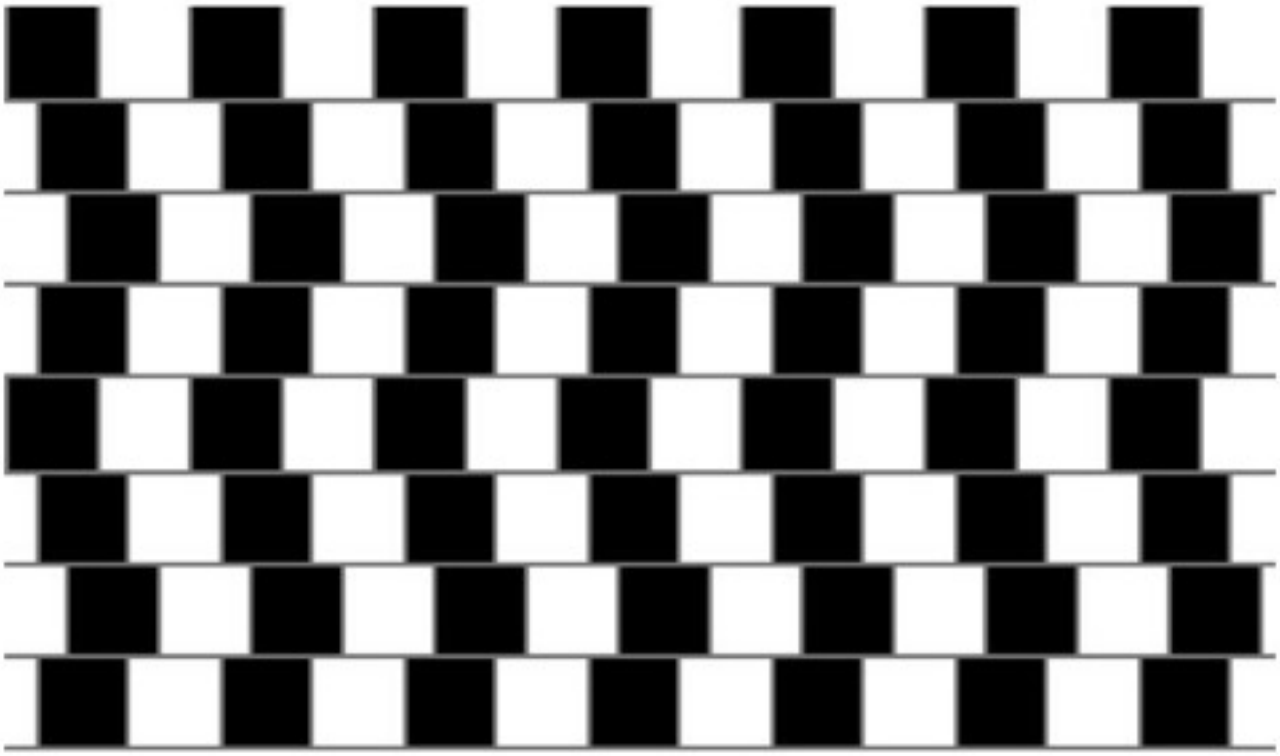
Optical illusion



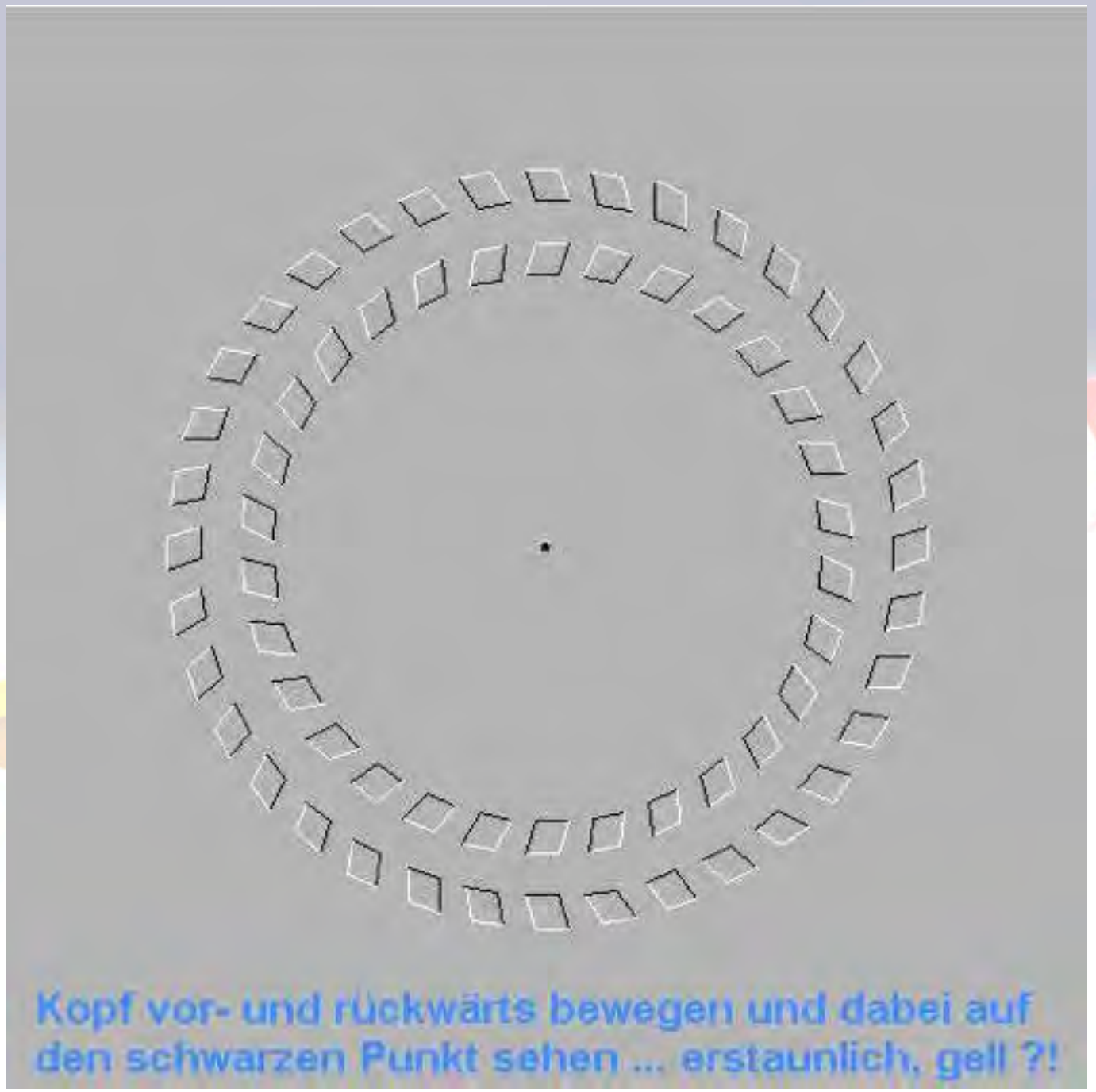
Count the black dots! :o)



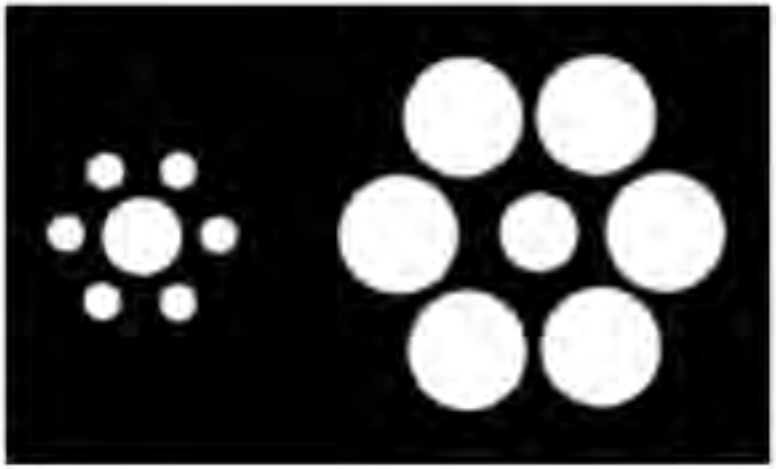

Believe it or not, these guys are all the same height



Are the horizontal lines parallel or do they slope?

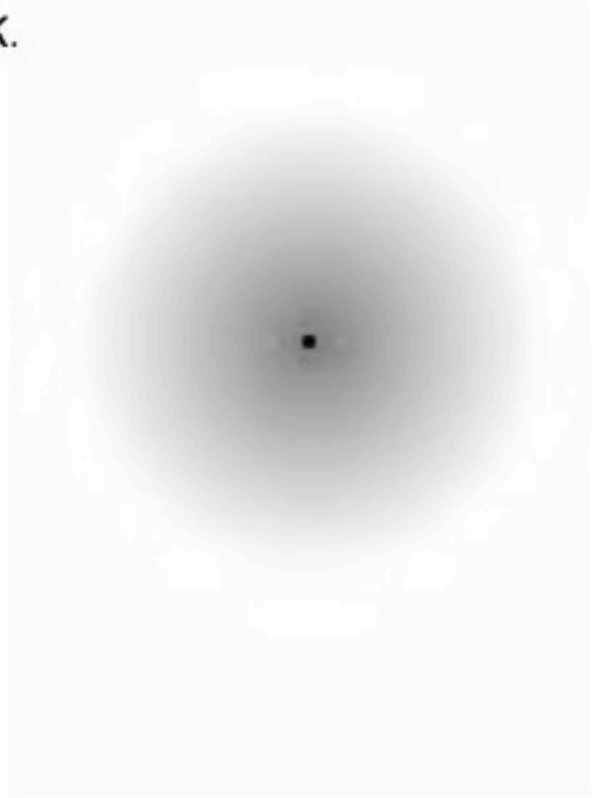

Kopf vor- und rückwärts bewegen und dabei auf
den schwarzen Punkt sehen ... erstaunlich, gell ?!

Is the left center circle bigger?

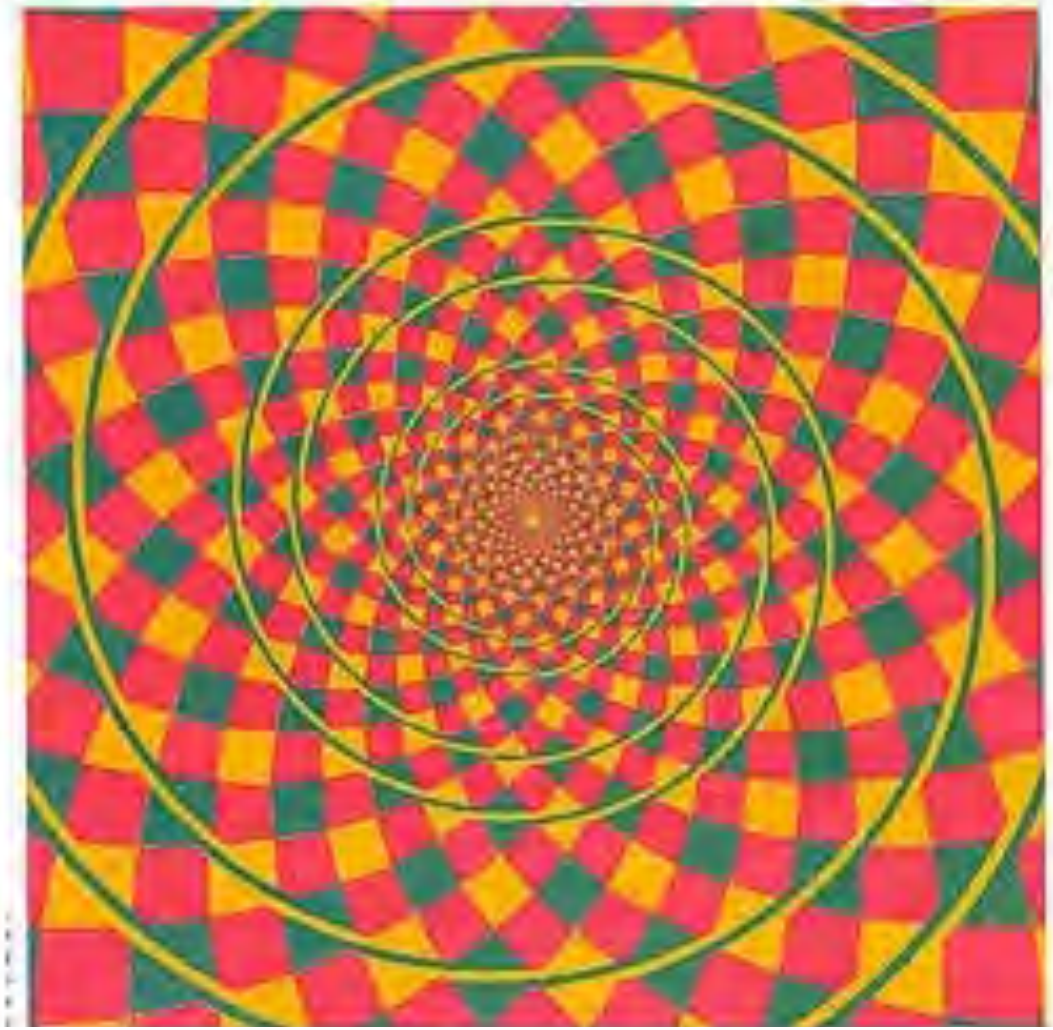


No, they're both the same size

Keep staring at the black dot. After a while the gray haze around it will appear to shrink.



The star is located exactly half way between the pyramid base and its top



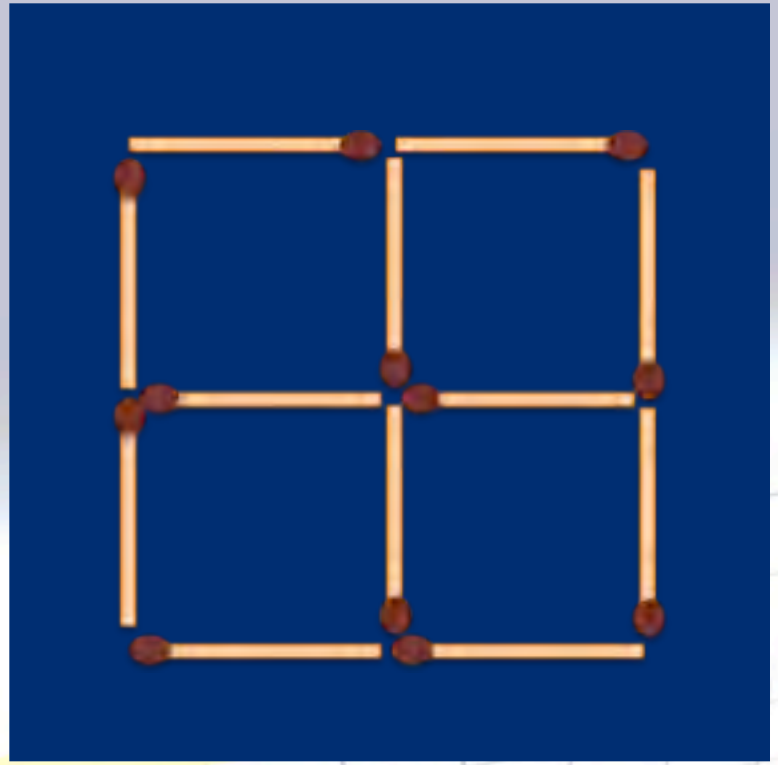
What do you see? An infinite spiral?
Look closer. Actually, you are seeing several circles.

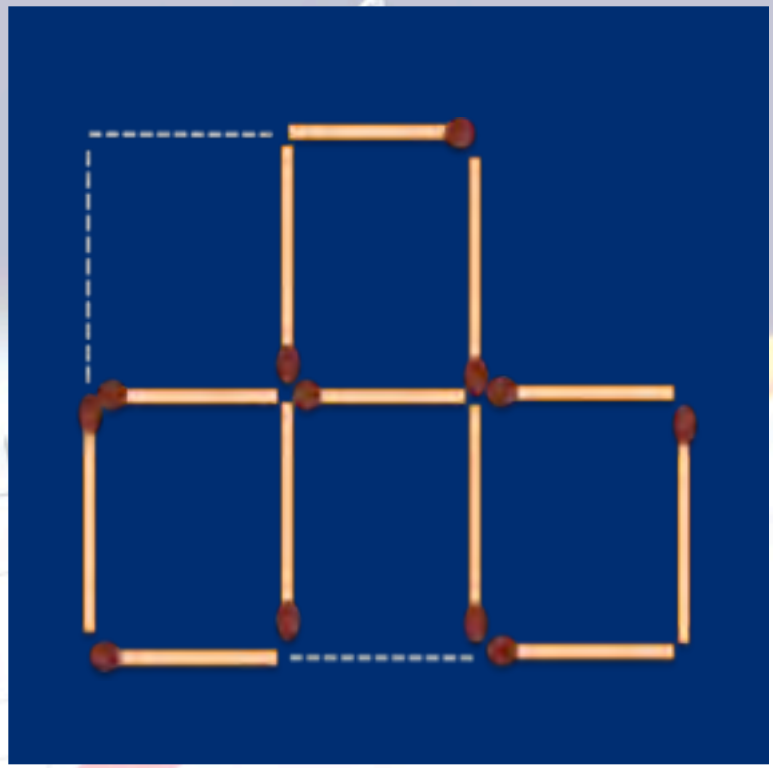
How many Fs do you see in the text below?

FINISHED FILES ARE THE RE-
SULT OF YEARS OF SCIENTIF-
IC STUDY COMBINED WITH THE
EXPERIENCE OF YEARS.

Können wir System 1 vertrauen?

Stare at the black lightbulb for at least 30 seconds





Move three matches so there are three equal-sized fields

Difficulties in processing information

1. Imagine You are playing lotto „6 out of 45”. Which of the two series A or B is more likely to land a hit?

A: 5 10 17 21 25 38
B: 6 7 8 15 28 30

2. A total of 100 students is attending an event at the university. Out of these 20 are studying business administration, with a specialization in marketing; 80 are enrolled in psychology. During the session a mobile phone is rings. A student takes her briefcase and the jacket of her fashionable pants suit and leaves the room. Is the person:

A: More likely to be a student of business administration?
B: More likely to be a student of psychology?
C: Both alternatives have the same probability?

3. In Milan, there are 1.000 Ferraris and 99.000 cars of other brands. 90 percent of the Ferraris are red while only 30 percent of the other cars are red. You are standing at an intersection and see a red car passing with excessive speed. What is the probability that this car is a Ferrari?

A: Approximately 3 percent
B: Approximately 0.03 percent
C: Approximately 10 percent

4. Check if the following statement is true: If an employee is works over the weekend, he gets a free day during week.
Each of the following cards contains information about four employees. On one side it states whether the employee worked over the weekend and on the other side if he got a day off during the week. You are now free to turn cards in order to see the other side. Which and how many cards do you have to turn to verify the statement?

A: Worked over the weekend
B: Got a day off
C: Did not work over the weekend
D: Did not get a day off

5. A police officer stops you because you are driving too fast. Since it is Christmas time, he is especially friendly, smiles at you and offers you two options:
Which one do you choose?

A: You pay the fine of 30€ now,
B: The officer tosses a coin; heads: you have to pay a 60€ fine ; tails: you do not have to pay a fine

6. Check if the following statement is true: If on one side of a card there is a „D”, then there is a „3” on the other side.
Each of the following cards has a letter and a number on its opposite sides. Which and how many cards do you have to turn to verify the statement?

A: D
B: E
C: 3
D: 4

7. As You enter a store the storeowner approaches you and informs you that you are the 1000th customer of this store. Therefore you can choose between two gifts:

A: You get a gift voucher in the amount of € 30
B: The storeowner tosses a coin; tails: you get € 60; heads: you do not get a gift voucher

8. You are invited to a quiz show and have the choice between a blue, a yellow and a red envelope. Two envelopes are empty, in one there is a voucher for a trip for two people to the Caribbean . You are about to choose the yellow envelope, when the game host shows you that the red envelope is empty and offers you to choose again. What do you do?

A: Continue choosing the yellow envelope.
B: Switch to the blue envelope.

9. Mr. Smith buys two lottery tickets. Thereupon he wins 25€ in one lottery and 50€ in the other. Mr. Thatcher also buys a ticket and wins 75€. Who is more pleased?

A: Mr. Smith
B: Mr. Thatcher
C: Both are equally pleased

10. Ms. Wagner discovers that someone has damaged her parked car. The repair will cost € 200. The same day, Ms. Wagner wins 25€ in the lottery. Ms. Berger also discovers a damage on her car which will cost € 175 to repair. Who is more upset?

A: Ms. Wagner
B: Ms. Berger
C: Both are equally upset

Decision anomalies

Limited information processing (2)

Exponential growth

Life: Seconds 10^9 ; Sunshine-time remaining 10^{17}

Folding of paper: 0.1 mm

Firmness	0.1 mm	
Folded 5 times =	1.6 mm	
Folded 10 times =	51.2 mm	
Folded 15 times =	1638.4 mm	[1.6 m]
Folded 20 times =	52428.8 mm	[52.4 m]
Folded 25 times =	1677721.6 mm	[1677.7 m]
Folded 30 times =	{above 100 km}	

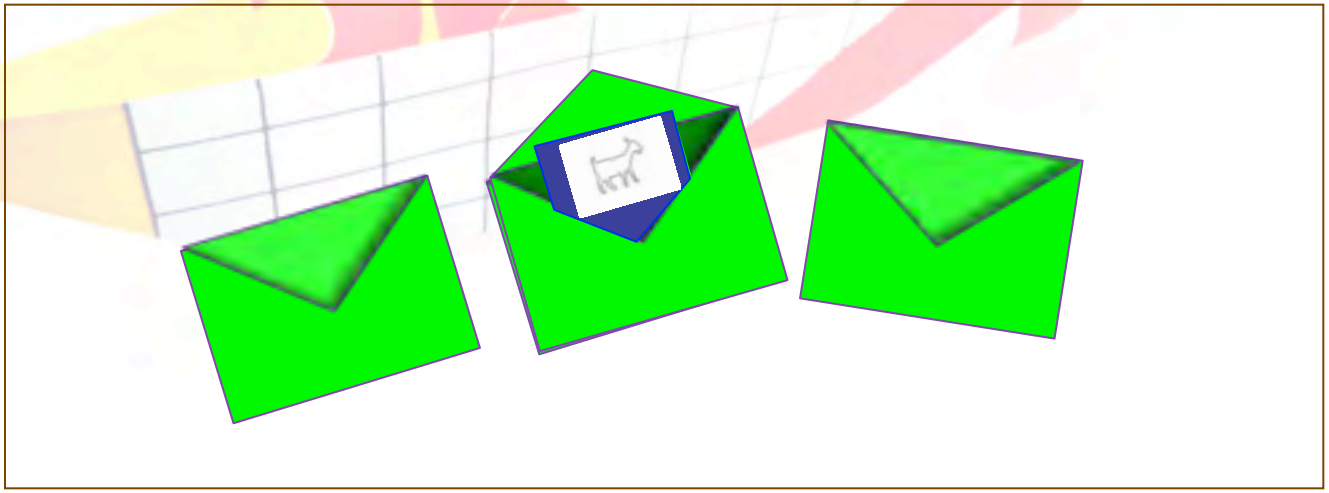
Example: Environmental policy

Decision anomalies

Limited information processing (3)

Probabilities
(Monty Hall Dilemma; goat problem)

http://www.mathematik.uniosnabrueck.de/staff/phpages/koch/ziegen/node2.html
http://www.stat.sc.edu/~west/javahtml/LetsMakeaDeal.html



Entscheidungsanomalien

Limitierte Informationsverarbeitung

Nicht-lineares Wachstum, bedingte Wahrscheinlichkeiten (Monty Hall Dilemma; Ziegenproblem) und Melioration

http://www.mathematik.uniosnabrueck.de/staff/phpages/koch/ziegen/node2.html

http://www.stat.sc.edu/~west/javahtml/LetsMakeaDeal.html

Decision anomalies
Limited information processing (4)

Melioration

Fundamental Law of Effect (operant conditioning):
The probability of the behavior that receives the most reinforcement increases.

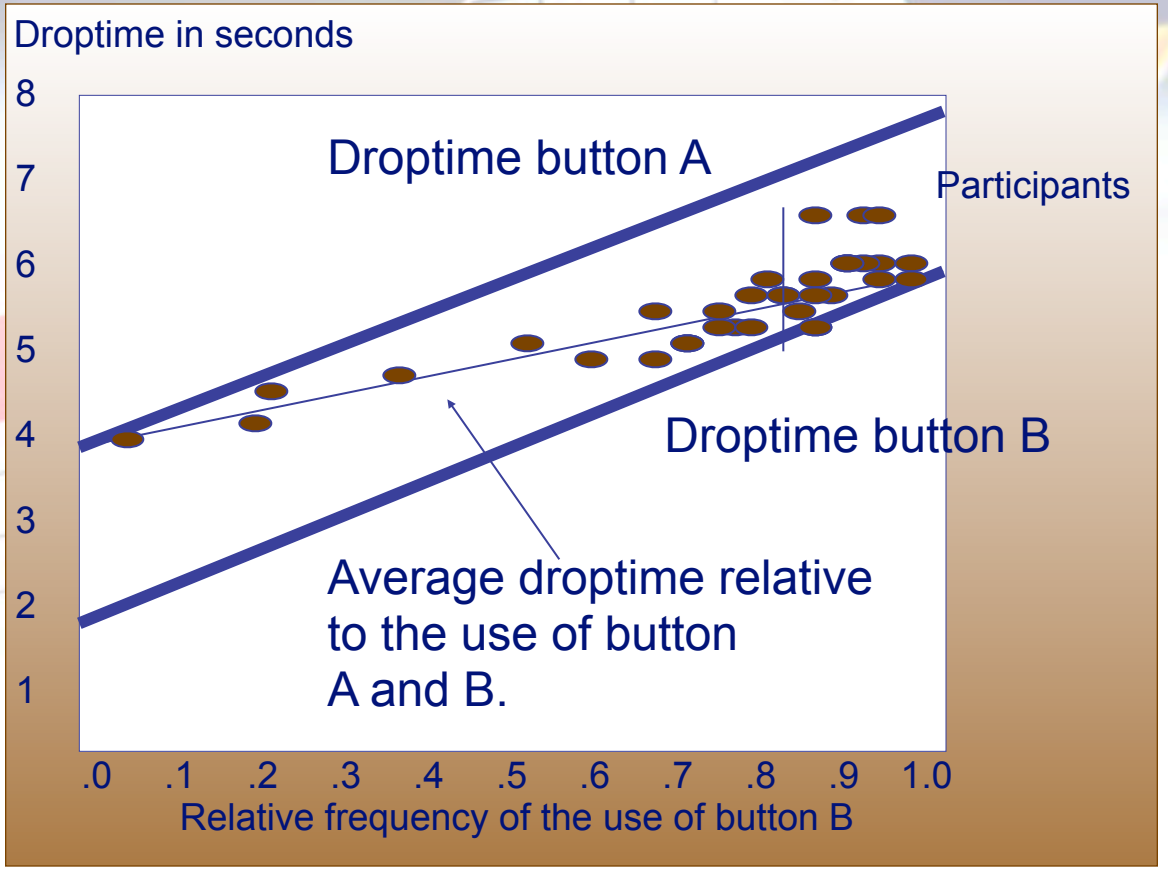
Relative Law of Effect (matching law):
The ratio of the choice of different behavioral alternatives is proportional to the subjective value of the reinforcement of these alternatives and inversely proportional to the time that passes between behavior and reinforcement

Decision anomalies

Limited information processing (4)

Melioration-Principle

People prefer current melioration to long-term melioration and act inconsistently (Herrenstein, 1992)



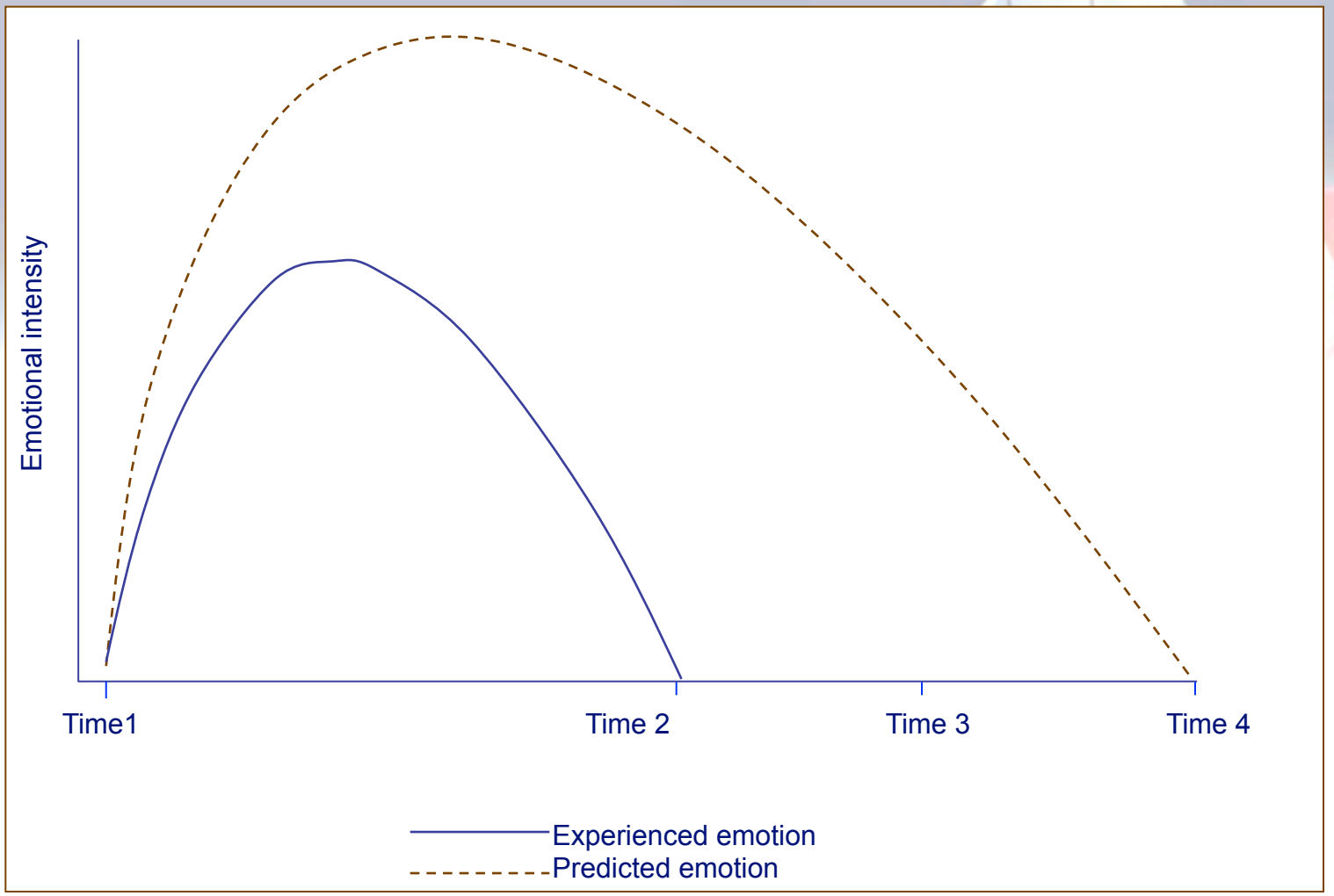
Decision anomalies

Limited information processing (5)

Emotions

- Regret: Decisions are made in a way that neither the consequences nor the decision process are regretted.
- Affective forecasting:
  - Impact bias: duration of emotions is overestimated
  - Projection bias: Current feelings are also assumed to be the dominant sentiments in the future.

Hypothetical time course of predicted and experienced emotions (Wilson & Gilbert, 2003)



Decision anomalies

Limited information processing (6)

Distortions and rationalizations

- Better-than-average effect: exaggerated optimism in comparison to others.
- Overconfidence bias: Overconfidence, which expresses itself in a systematic overestimation regarding one's own knowledge and evaluations. Occurs mainly when problems of medium to high levels of difficulty have to be solved.

Overconfidence: Result of hubris in the foreign exchange market (T. Oberlechner)

- Self-assessment of foreign exchange traders on a scale of 1-7: average M = 5.06
- ¾ of the dealers (73.6%) see themselves as more successful than other dealers
- 1 / 20 (4.5%) of the dealers see themselves as less successful than other dealers
- Ratio “above average” to “below average” traders: 13.6 : 1

Decision anomalies

Limited information processing (7)

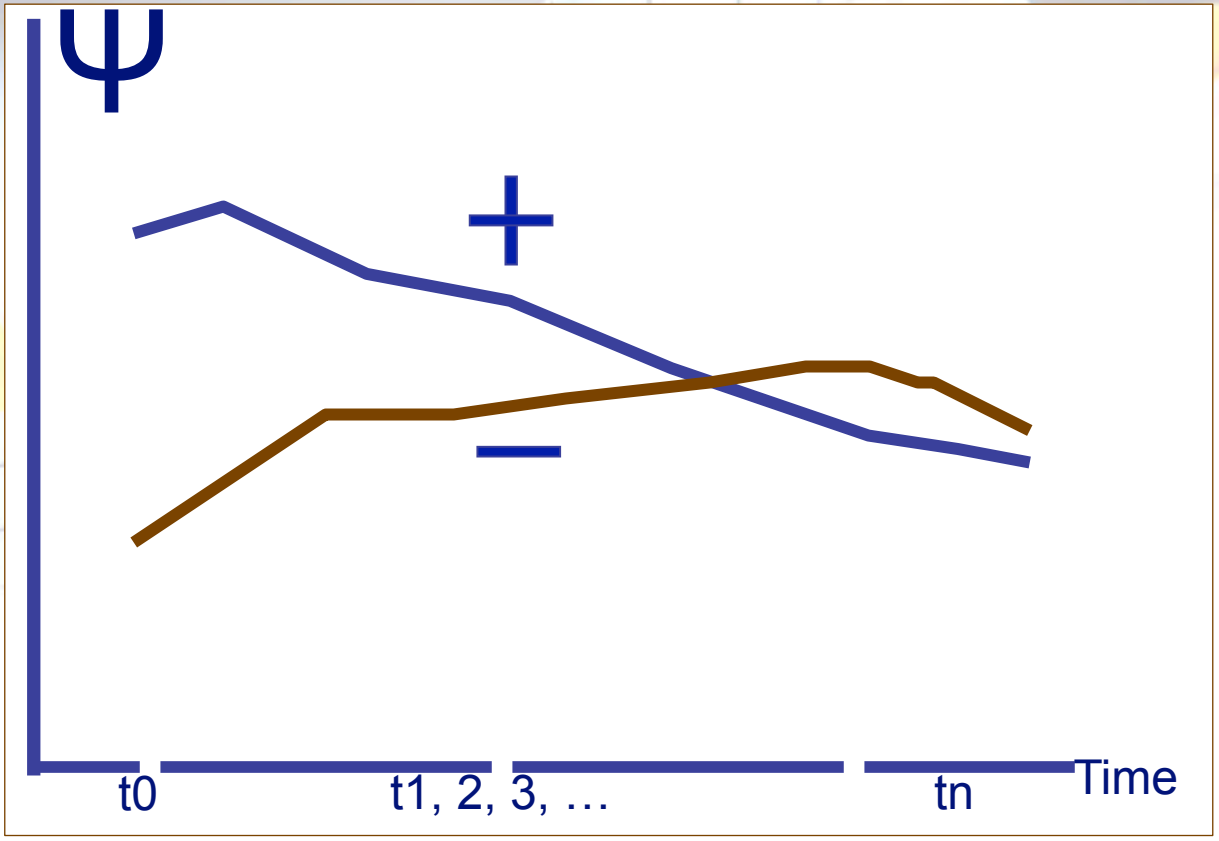
Prediction error and hindsight bias

„Peak-end rule”: Only peaks and ends are evaluated

Hindsight bias (knew it all along bias): In retrospect people overestimate what they knew about the outcome of an event. Cause of distorted memory: bad memory and self-esteem serving adjustment of estimates.

Credit use and investment decisions

- Preview
- Experience during the repayment
- Review



Decision anomalies

Limited information processing (8)

Home bias

Portfolio theory demonstrates that the asset allocation, i.e. the distribution of investment in different (statistically independent of each other) asset classes, increases the yield while holding the risk constant. For this reason, theoretically, it would be sensible to distribute the amount invested on a number of national markets. In practice, however, one can observe that investors invest their assets disproportionately on the respective home market. This effect is called “home bias”. The effect was first described by French and Poterba (1991) and Tesar and Werner (1995).

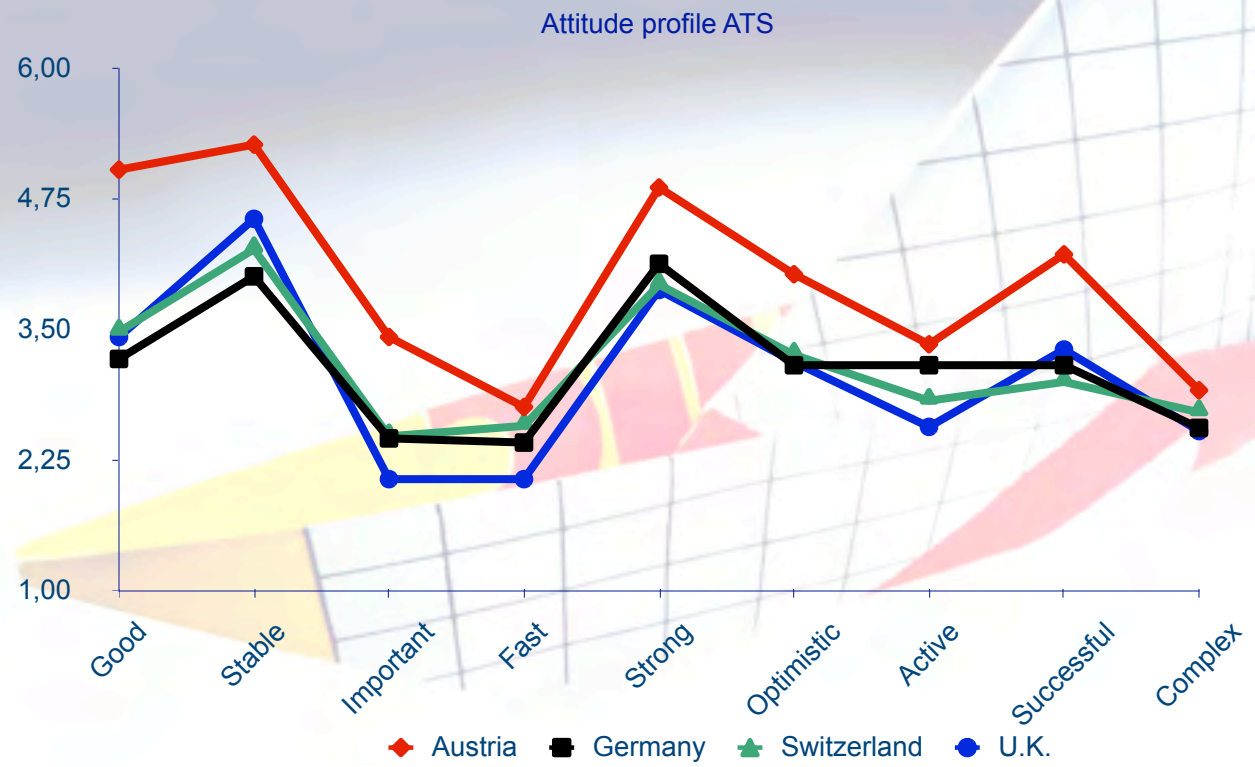
Reasons: The reasons for the home bias are essentially the following three aspects:

Transaction Costs: An investment abroad is associated with higher transaction costs. Lack of information: While the investor is informed about the companies on the domestic market relatively well and can assess the opportunities and risks, he lacks this information for investments in foreign markets

Exchange rate risk: Because the yield is determined by the exchange rate in addition to the return of the investment itself, an investment in the same currency region appears less risky.

Attitudes and expectations

Foreign currency traders of small trading locations assess their home currency systematically more positive than other currency dealers:



Positive attitudes towards currency are associated with the expectation of future increase in value (T. Oberlechner)

Hindsight-effect: („I knew it all along-effect")

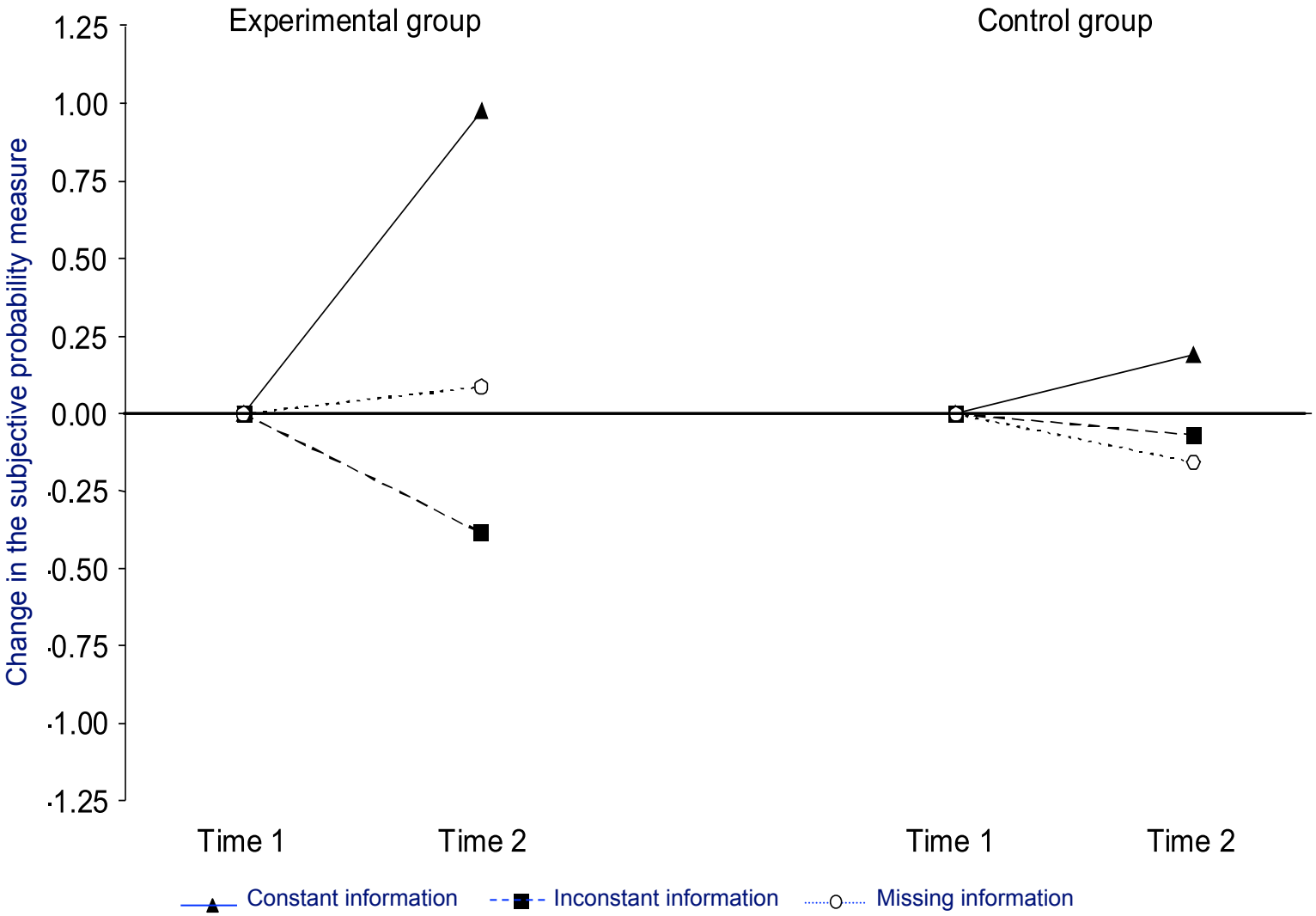
Fischhoff (1975):

Participants read a text about the war (1814) between the British and the Gurkhas (Indian hill tribe) and one of four potential outcomes of the war:

VG 1: British won the war
VG 2: Gurkhas won the war
VG 3: Armistice Agreement with Peace
VG 4: Ceasefire agreement without peace
KG 0: Four possible outcomes

Each group ascribed the highest probability to the outcome which had been described as the actual war outcome in their text.

Hindsight bias as a function of the point in time of the prognosis and the recollection, information on trends and economic developments that had occurred after the currency conversion in 1999 and had not occurred. The values were standardized so that the prognoses each have a value of = 0 and the memories can be directly related to them (from Hoelzl, Kirchler, & Rodler, 2002, p. 440).



Decision anomalies

Limited information processing

Backward induction

- Cooperation in finite games (fairness does not pay in the ultimatum game and in the experimental labor market)
- 2/3 of the mean of numbers between 0 and 100

Heuristics

- Availability heuristic
- Representativeness heuristic
- Anchoring and adjustment

Time limitation and judgmental heuristics

- Heuristics are decision making aids in complex decision situations under time pressure
- Heuristics are “rules of thumb” with the advantage of making decisions based on some key-facts

Availability heuristic

When estimating the frequency or probability of occurrence of one or several events, the judgments are based on the ease with which individual information can be retrieved from or generated by memory.

Availability heuristic

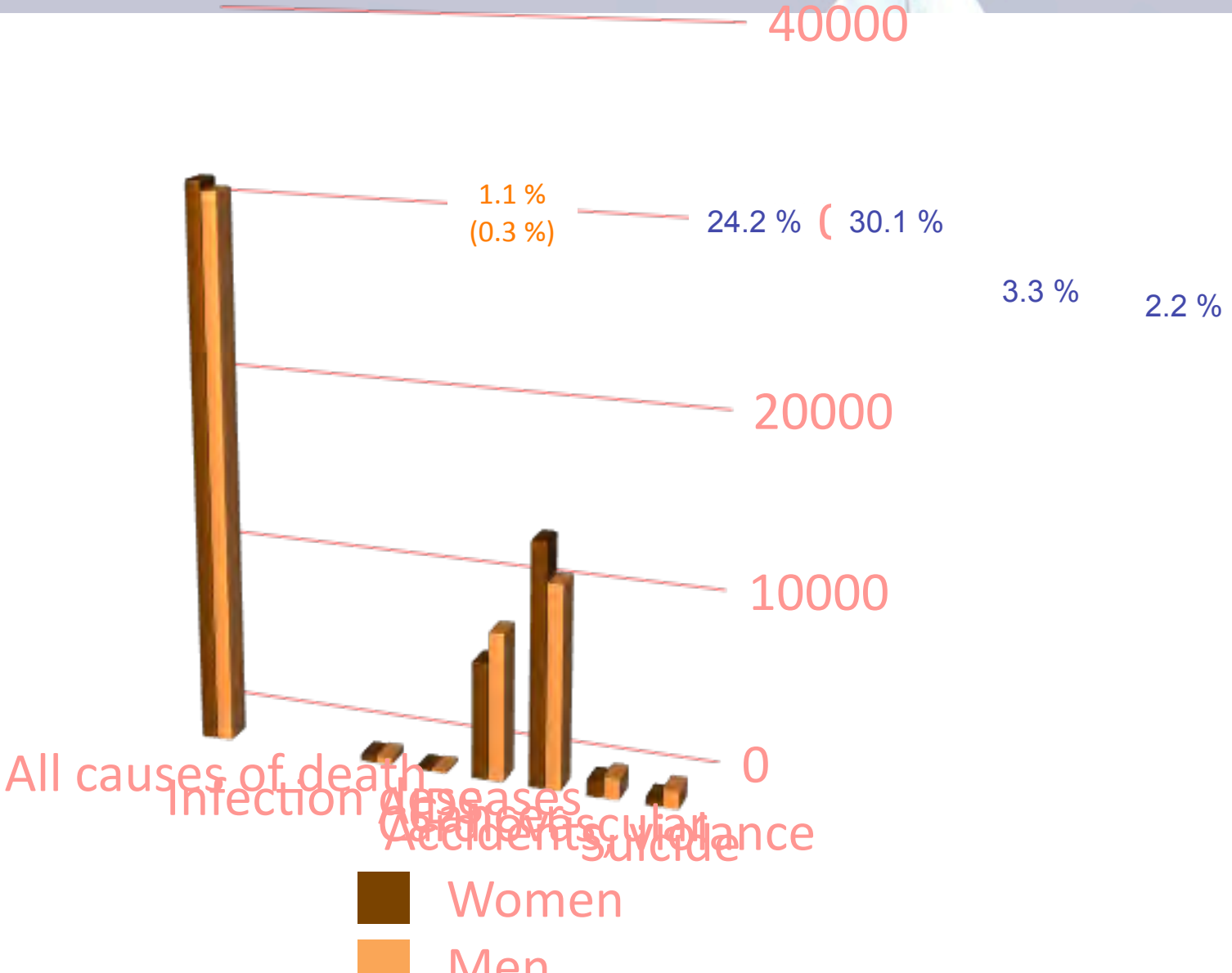
List 1

Franz Hofer
Josef Kranz
Madlene Olbright
Hermann Brandler
Agatha Christie
Bertha von Suttner
Friedrich Müller
Johannes Binder
Maria Callas
Catherine Deneuve
Romy Schneider
Mario Dermatt
Gerhard Fritz
Wolfgang Mairhofer
Sharon Stone
Isabel Allende
Elizabeth Taylor
Sebastian Knapp
Bernhard Ortner
Leonhard Werda
Marilyn Monroe
Editha Gruberowa
Ingeborg Bachmann
Elfriede Jelinek
Werner Molner
Claudia Schiffer
Gerhard Grün
Agnes Baltsa
Josef Huber
Georg Kette
Karl Wagner
Christine Nöstlinger
Annemarie Moser Pröll
Gerhard Thaler
Horst Schuler
Claudia Cardinale
Hermann Hinterhuber
Wolfgang Oberlechner
Uschi Glas

List 2

Berta Huber
Thomas Klestil
Arnold Schwarzenegger
Jasmin Grandl
Billy Wilder
Hermine Foreer
Rosa Mair
Toni Sailer
Tony Blair
Rita Gruber
Maria Turner
Konrad Adenauer
Max Frisch
Frieda Dermatt
Ida Rederlechner
Sabine Miksit
Wolfgang A. Mozart
Friedrich Dürnmatt
Berta Zuegg
Linda Mayer
Antonia Jankoschek
Erika Binder
Jacqueline Moser
Friedrich von Schiller
Helmuth Kohl
Johann Sebastian Bach
Karin Wagner
Kathrin Lindner
Frank Zappa
Franz Josef Strauss
Theresia Stoll
Herta Obermair
Bill Clinton
Franz Klammer
Johann W. von Goethe
Ida Hertz
Robert Stolz
Veronika Zepke
Jack Nicholson

Causes of death in Switzerland, 1998



Availability heuristic (2)

Example:

Is the letter „k” more often the first or the third letter of a word?

→ Subjective estimation: „k” more often the first letter
Objective frequency: „k” 3 times more ofte the third letter.

Availability heuristic (3)

Grouping of 10 people to

- *Subgroups of 2 people*
- *Subgroups of 3 people*
- *Subgroups of 8 people*

$$n! / (n-r) * r!$$

$10! / (10-2)! * 2! = 10*9*8*...*1 / (8*7*...*1) * 2*1 = 45$
$10! / (10-3)! * 3! = 10*9*8*...*1 / (7*6*...*1) * 3*2*1 = 120$
$10! / (10-8)! * 8! = 10*9*8*...*1 / (2*1) * 8*7*...*1 = 45$

Availibility heuristic (4)

Mood congruency – hypothesis: A person recalls events better, if he or she is in the same mood as he or she was at the time of the experience.

Mood congruency: Recall of word lists in a positive or negative mood (Bower, 1981)

Mood = Information – Heuristic: 20 Cents Experiment (Schwarz & Clore, 1983)

Representativeness heuristic

Match or similarity between

- A sample and a population,
- One element and a class or category
- An action and an acting person
- An effect and a cause.

In general terms: Correspondence between

- Results and model
- Element and prototype.

Representativeness heuristic (1)

Often people ignore the composition of a sample and main characteristics of the population in their judgments and decisions.
Example: 100 people: 70 lawyers, 30 engineers

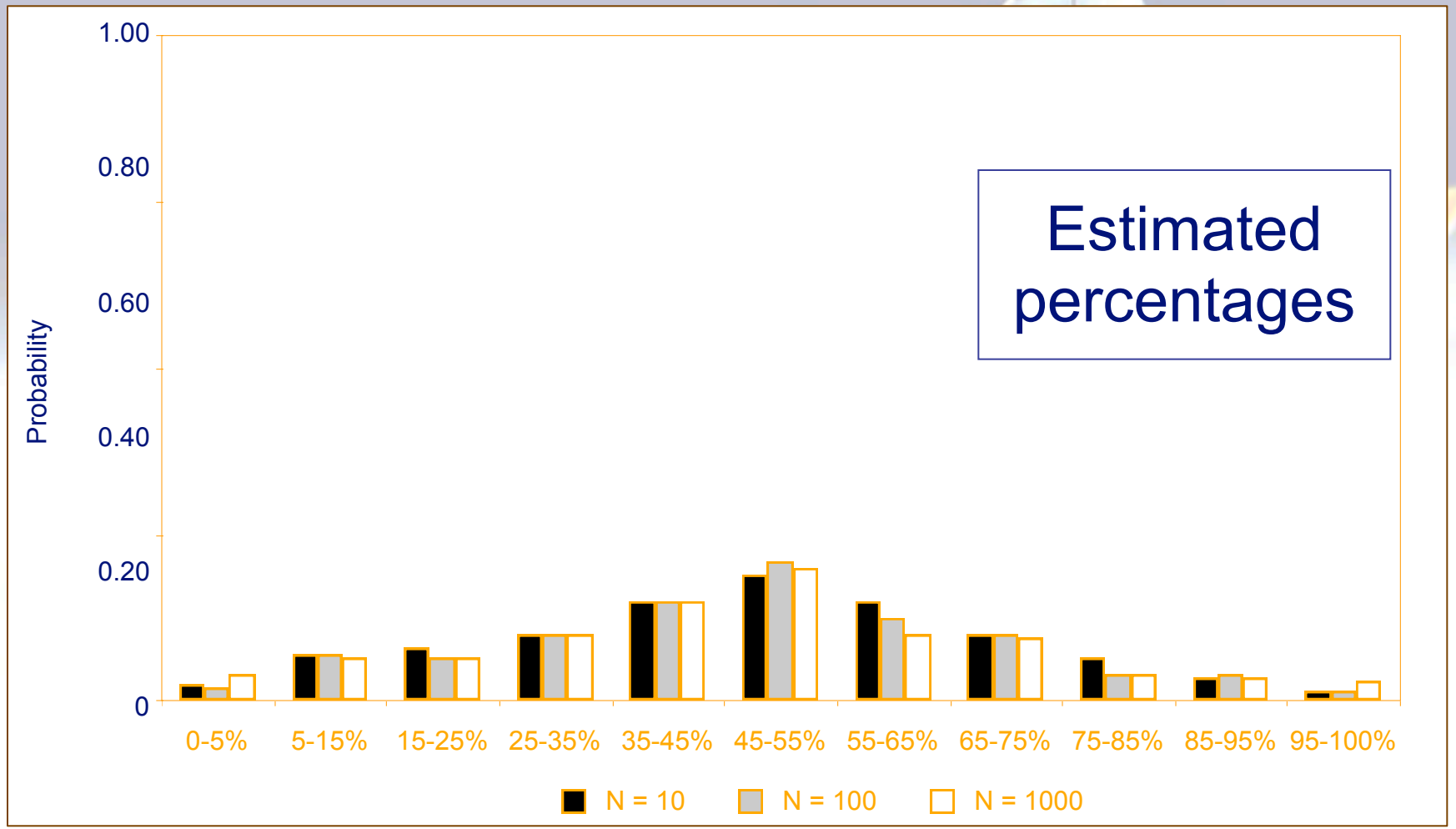
P engineer, if person X
Married
2 children
34 years old
High skills and high
Commitment to the profession
Hobby: airplanes

Answer: engineer, because aircraft is described as a hobby

P engineer, if person X
Married
2 children
34 years old
High skills and high
Commitment to the profession

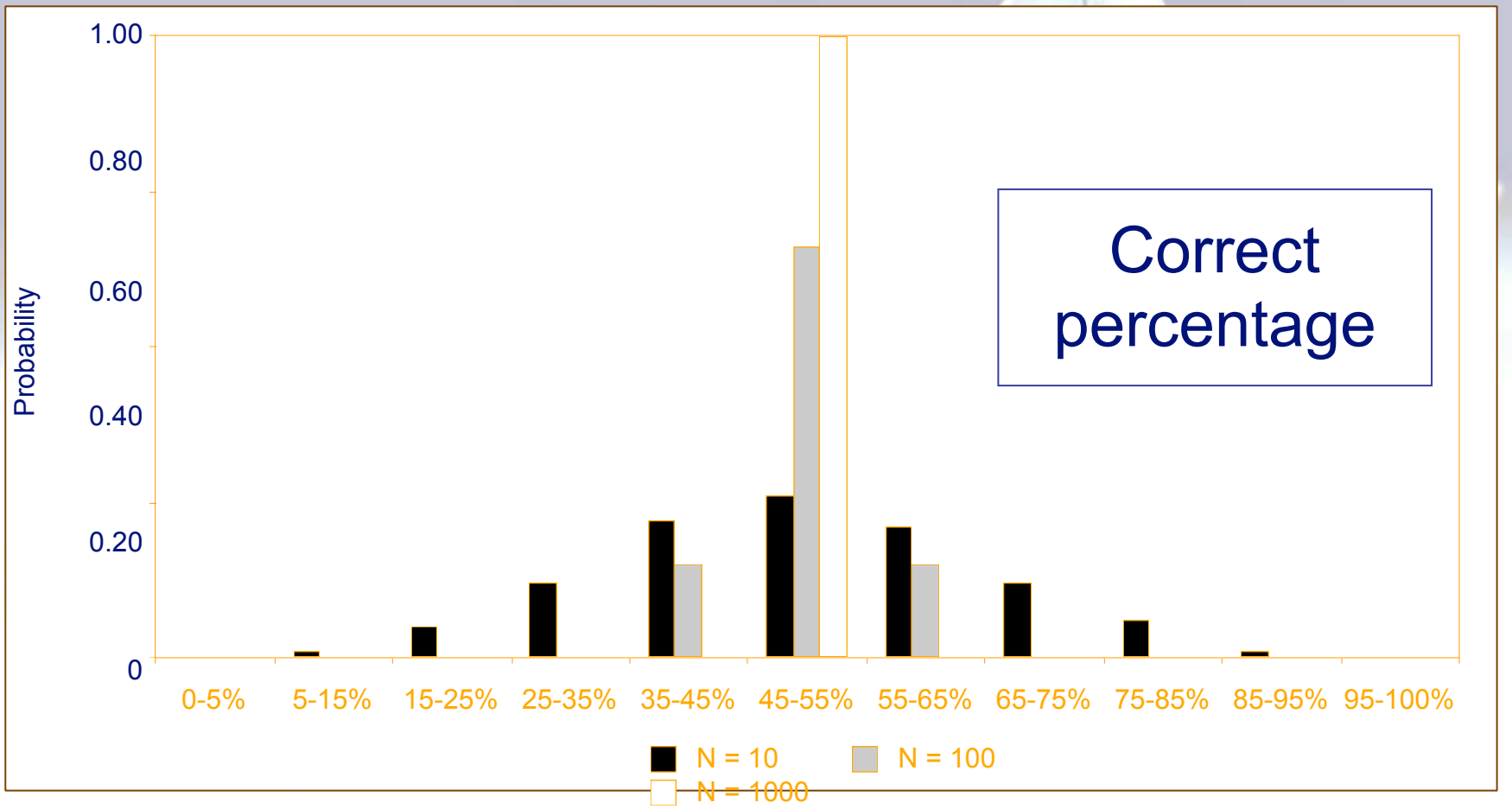
Answer: 50 % engineer
and not 30 %, like mentioned in the sample composition

Representativeness heuristic (2)



Probability for gender combinations for 10, 100 or 1000 births.

Representativeness heuristic (2b)



Representativeness heuristic (3)

Prototype for coincidence

Lottery „6 out of 45”

Ticket 1:	4	16	19	24	28	39
Ticket 2:	1	2	3	4	5	6

Anchoring and adjustment

Frequency and probability estimations are often commenced with an initial value (anchor), which is presented by the wording of a problem or by an other person or an event.

During the process of judging calculations and estimations are carried out and the judgments are adjusted to the anchor.

Anchoring and adjustment (1)

8 * 7 * 6 * 5 * 4 * 3 * 2 * 1 = 

1 * 2 * 3 * 4 * 5 * 6 * 7 * 8 = 

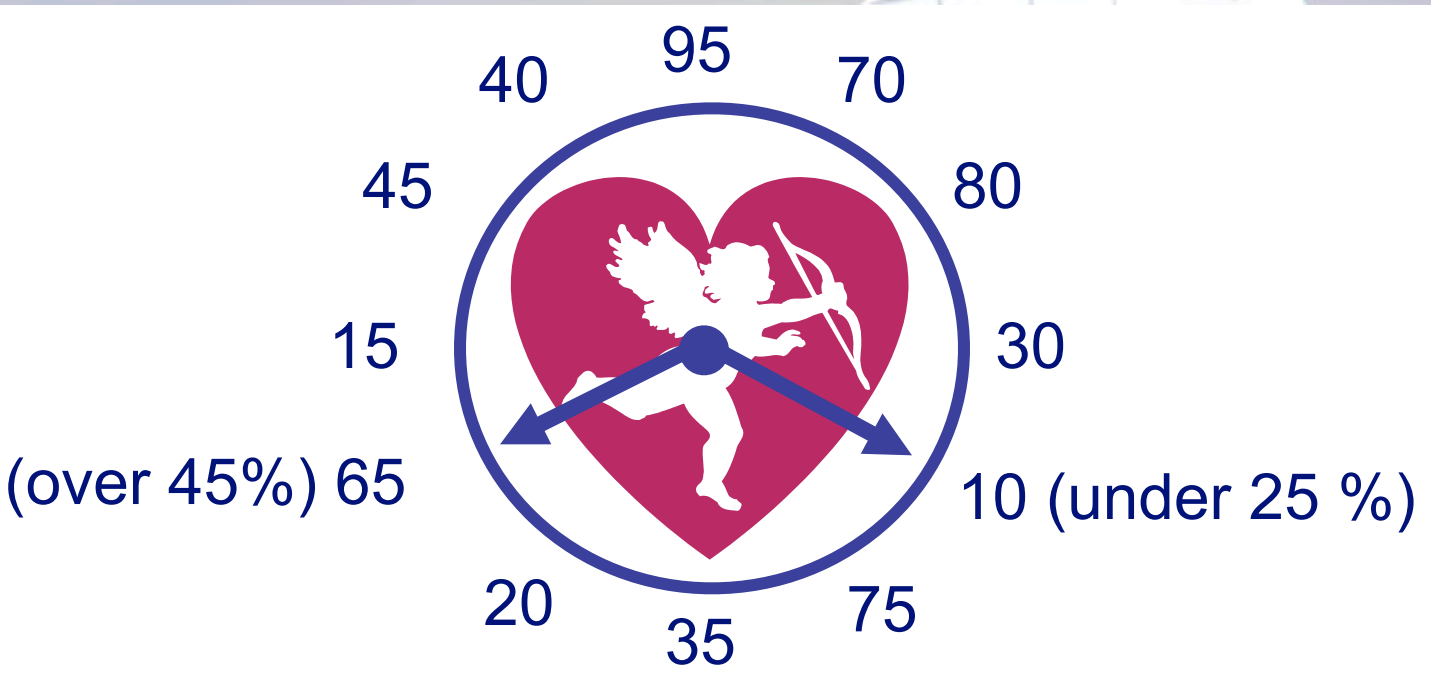
Md (1) = 2.250

Md (2) = 512

Result = 40.320

Anchoring and adjustment (2)

UN - member states in Africa



Anchoring and adjustment (3)

Even experts are subject to anchoring and adjustment.

Actual market value of
a house : $ 74.900.-

Anchor price in catalogue	$ 65.900.-	or	$ 83.900.-
Price estimation			
Students	$ 63.571.-		$ 71.196.-
Realtor	$ 67.811.-		$ 75.190.-

Fast and frugal heuristics

Gigerenzer, Todd, & ABC Research Group (1999):

People apply heuristics in decision making, because the application of heuristics makes use of capabilities that have developed through evolution and which have been learned by people. They are usually applied without consciously thinking about which heuristic is successful in a particular situation.

With the fast and frugal heuristics, the classical norms of rationality are violated, therefore, these heuristics are described as a-rational means. Nevertheless they often lead to sounder decisions and predictions than considerations that are based on the elaborate classical model of rationality.

Fast and frugal heuristics

- Recognition - heuristic:

  If people know one of two objects and do not know the other one, they often conclude that the recognized object is more valuable. Gigerenzer and colleagues tested American and German students on their knowledge of American geography by asking them which city is larger, San Diego or San Antonio. Of the American students 62 % knew the correct answer, while all German students knew that San Diego had more inhabitants than San Antonio. The German students had heard about San Diego more often than about San Antonio and concluded that the recognized object was more important and also larger. The American students knew too much and were uncertain. Often less is more. The recognition heuristic can, as Gigerenzer emphasizes, lead to a contra-intuitive effect – the less is more effect.

Fast and frugal heuristics

- Recognition - heuristic:

  In a further study, Turkish and British students were asked to predict the results of 32 soccer games in England. Although the English students knew a lot about the soccer clubs, while the Turkish students had practically no information, the predictions of the English with 65.6 % correct tips were not much better than those of the Turkish with 62.5 % hits. The Turkish students had applied the recognition-heuristic. Since soccer clubs are usually named after the cities they are located in, and the Turkish students only knew famous cities, they concluded that the famous cities were important and therefore the quality of the clubs was higher. This partial ignorance led to valid information (Goldstein & Gigerenzer, 2002; Hoffrage & Reimer, 2004).

Fast and frugal heuristics

- „Take the best”- heuristic:

  If an option should be selected from a number of alternatives, this is rarely done rationally in the classic sense, which involves an evaluation and comparison of all alternatives. Rather, a specific characteristic that seems particularly relevant is selected according to the “Take the best” heuristic, and the options are compared on the basis of this characteristic. Options that do not conform are rejected.

Fast and frugal heuristics

- Elimination - heuristic:

  The characteristics of the alternatives are successively used to evaluate the alternatives and those alternatives that do not conform are eliminated successively. Tversky (1972) describes decisions as sequential elimination processes. Decision alternatives are seen as a set of criteria or aspects. In the process of making a decision criteria are selected so that the most important ones have the highest probability of being used first to evaluate the alternatives. The alternatives are sequentially “measured” with the respective criterion. If an alternative does not fulfill the subjective standard regarding the criterion it is discarded as useless. The next step is to chose a further criterion, the alternatives are “screened” on basis of this criterion and so forth, until finally one alternative remains.

Prospect-Theory & framing effect

Florindo:
“From crying to laughter is a pleasant step, whereupon you forget all the vexation, but from joy to sorrow, the change is very sensitive”

From “Servant of Two Masters” by Carlo Goldoni

Risk-aversion

Daniel Bernoulli (18th century):

Human beings are risk averse!

A sure gain of € 8.000 is

preferred to a possible gain (p = .85)

of € 10.000.

Risk-aversion and -inclination

a) Sure win of € 240
   or
   25 % chance of winning € 1.000
   and 75 % chance of winning 0

b) Sure loss of € 750
   or
   75 % chance of loosing € 1.000 &
   25 % chance of loosing 0

Risk-aversion and -inclination

However ...

... it should be emphasized that in case of a very small profit, risk-seeking and in case of a small loss, risk aversion can be observed. Kahneman and Tversky (1979) found that 84 percent of the participants preferred secure U.S. $ 500 compared to a chance of winning U.S. $ 1,000 with p = 0.5. However, 72 percent of the participants preferred a game with the chance to win U.S. $ 5.000 with p = 0.001, over the alternative of safe U.S. $ 5. In case of losses the pattern reversed: 69 percent chose the option to lose with a probability of p = 0.5 U.S. $ 1,000, instead of paying $ 500 for sure. When faced with the alternative to lose a small amount of $ 5 for sure or play the lottery and risk $ 5,000, with p = 0.001, 83 percent chose the sure loss of U.S. $ 5.

Risk-aversion and -inclination

Due to Asian flu 600 people are expected to die

Intervention program:

(A) 200 will be saved for sure;

(B) With p = 1/3 all will be saved and with p = 2/3 all will die

Due to Asian flu 600 people are expected to die

Intervention program:

(A) 400 will die for sure;

(B) With p = 1/3 all will be saved and with p=2/3 all will die

Framing - effect

Depending on the semantic frame (“framing”), attention can be drawn on a gain or on a loss. Preferences of decision makers will vary accordingly (“framing effect”).

Kühberger (1995) points to a problem in the description of decision alternatives. If, for example, measures against the outbreak of the Asian flu have to contemplated, one text provides the complete information (the probabilities of the effectiveness of measures to rescue all the people or of failure are listed in full) and the other text provides incomplete information (in one case it is only reported that a certain number of people will survive, in the other case only that a part will die). Further criticism is that most participants do not view the numbers of survivors and victims as absolute numbers but as approximate reference points. Wang (1996) found that framing effects only occurred in the example of the Asian epidemic when the number of affected people is large. If less than 100 people are affected or if the people affected are close to the study participants as e.g. relatives framing effects are cannot be proven.

Framing and fairness (R. Thaler)

Since demand is rising, a popular car model can not be produced in sufficient quantity.

(a) The car dealer raises the price by €200.

(b) The car dealer does not offer a € 200 discount any more

In a structurally weak area a business has to reduce costs or fire employees.

(a) The management demands a salary cut of 7% at an inflation rate of 0%.

(b) The management offers a 5% increase in wages when inflation is at 12%.

Framing – effect

Depending on whether the attention is directed to profits or losses, information will be searched for with differing selectiveness (Fischer, Jonas, Frey, & Kastenmüller, 2008). In case of a potential gain the search for information seems to be more selective and consistent information is more often sought after than in case of a loss. Gain decisions are made with greater subjective certainty than decisions in a loss situation.

Prospect Theory

Descriptive decision theory explaining a number of decision anomalies in decision making under risk.

Phase 1: Editing

Simplification of the decision problem

Phase 2: Evaluation

Assessment of the alternatives

Prospect Theory

Phase 1: Editing
Simplification of the decision problem

Coding: What is an event related to (reference point)?

Combination: Independent events are often seen combined.

Segregation: Safe events are often separated from risky ones.

Cancellation: Identical aspects of two alternatives are ignored whereas disparities are weighted heavily in judgments.

Prospect Theory

Phase 1: Editing
Simplification of the decision problem

Simplification: e.g. odd numbers are rounded. In the case of very low or very high probabilities this process is fundamental.

Detection of dominance: Salient alternatives are discarded in the beginning and are not taken into account any further.

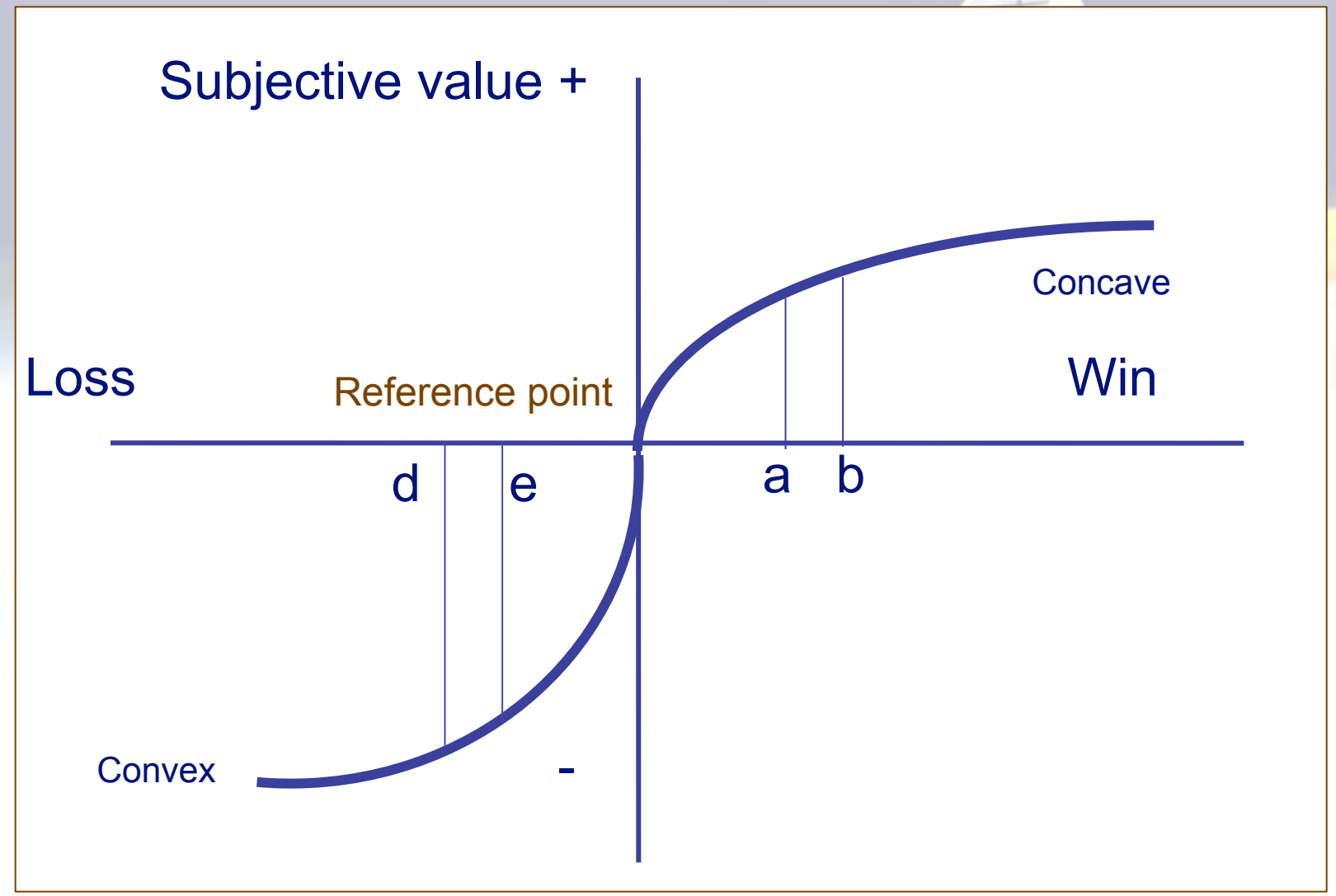
Prospect Theory

Phase 2: Evaluation
Assessment of alternatives

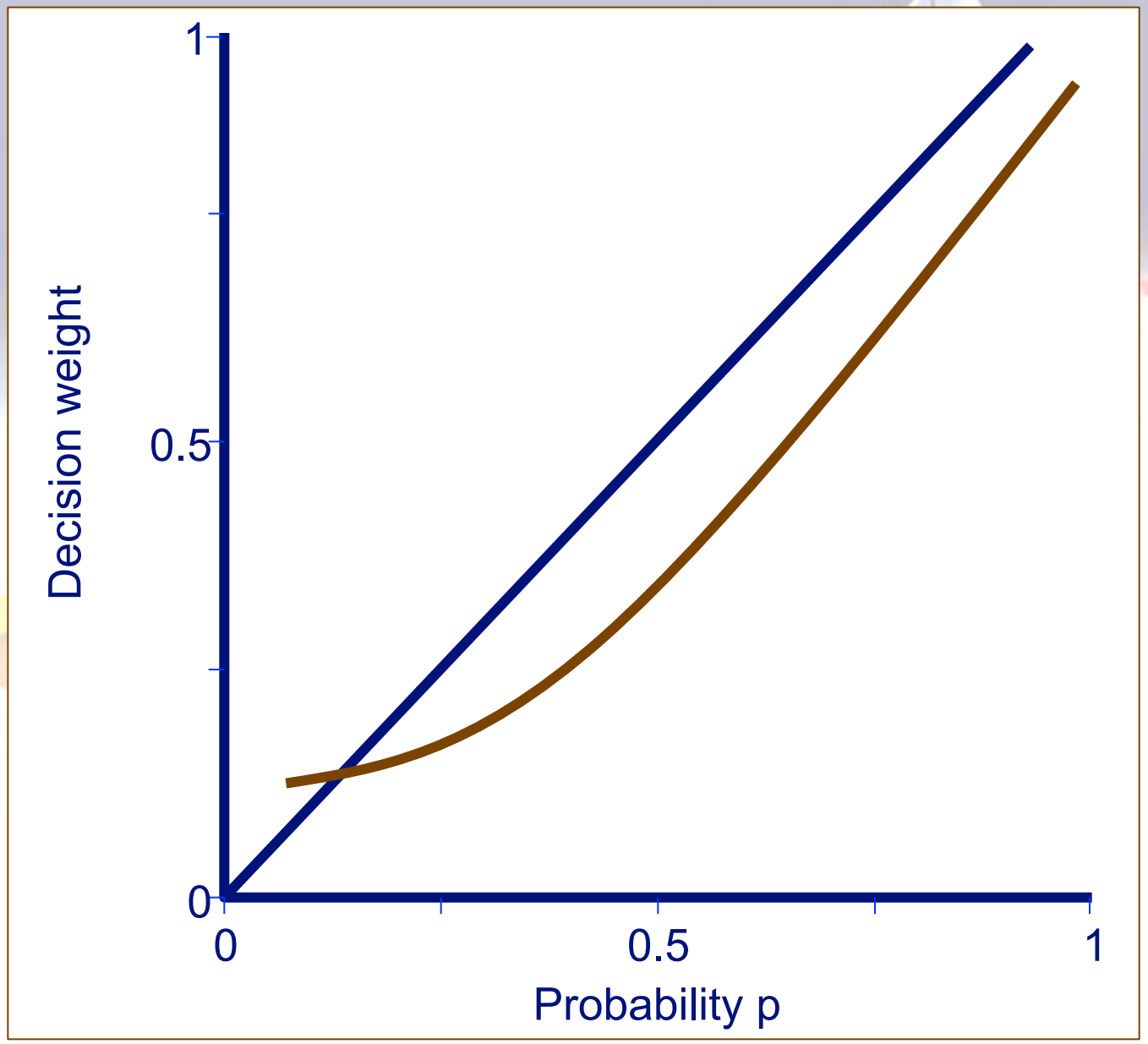
Assessment is guided by two principles

- The value is estimated in relation to a reference point.
- Probabilities are taken into account.

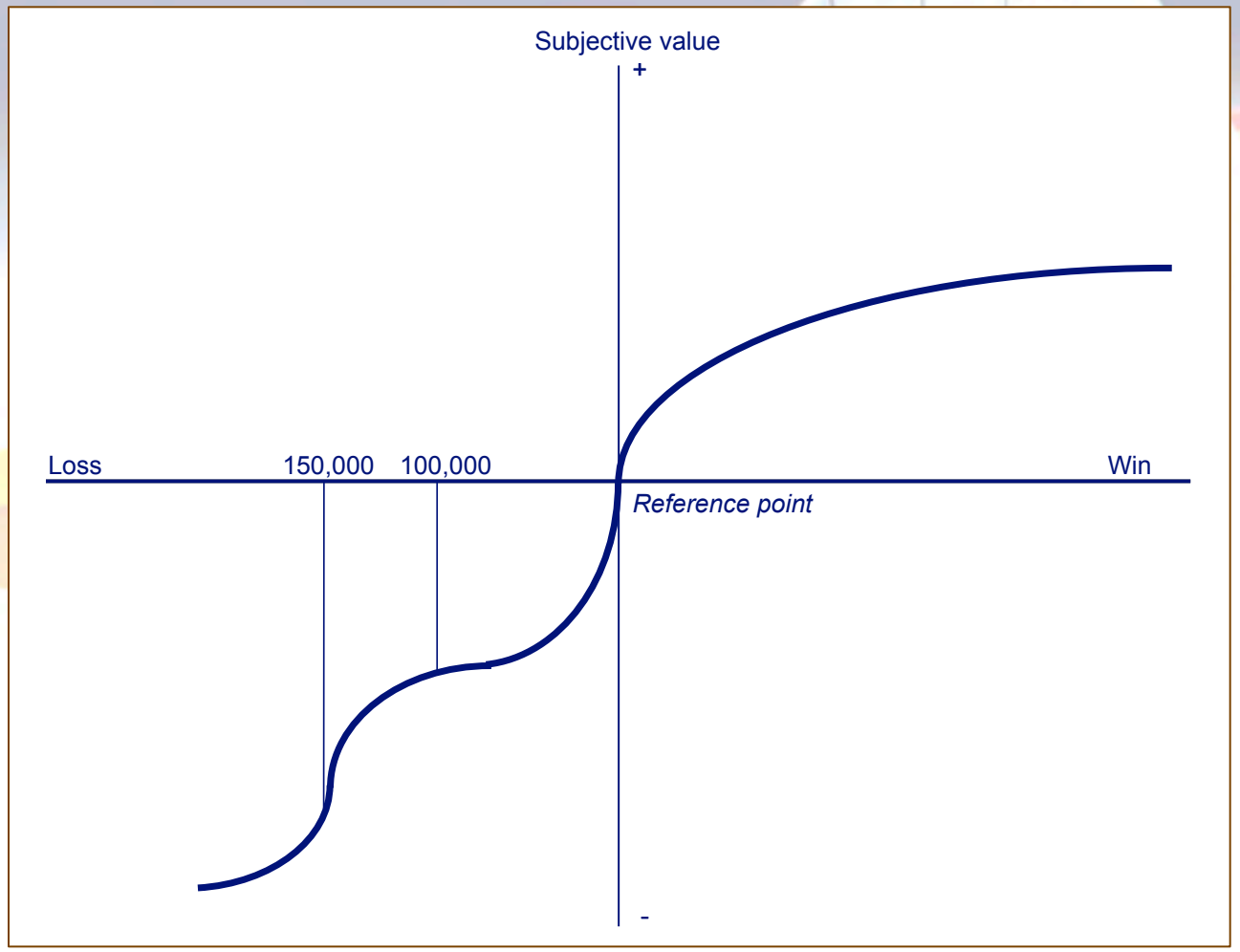
Prospect Theory



Prospect Theory: Weighting function



Value function of a currency dealer who is in charge of deciding up to losses of €100,000. When he reaches losses of € 150,000 he is obliged to report them to his supervisor.



Neuropsychology / Neuroeconomics

Support for the assumptions of the prospect theory comes from neuroeconomics. In the interdisciplinary research field of neuroeconomics economists, neuroscientists and psychologists try to understand human decision behavior better by examining the brain activity while decisions are made. Neuroscientific methods allow the analysis of the activities of the human brain (e.g. Prince & Pawelzik, 2008). In addition to imaging and psychophysiological methods, the measurement of individual neurons, the electrical brain stimulation or the elimination of brain regions can be counted among the methodological tools of neuroscience and, more recently, of neuroeconomics.
First and foremost imaging and psychophysiological methods are used. Apart from the electroencephalogram (EEG), positron emission tomography (PET) is used, which allows the creation of cross-sectional images of the brains of humans and mapping biochemical and physiological processes. Currently, functional magnetic resonance imaging (fMRI) is most popular. This method allows the representation of metabolic activity in the brain by measuring the magnetic properties of oxygenated and deoxygenated blood. Using psychophysiological methods, different physiological responses to a stimulus, such as blood pressure, heart rate, sweating, dilated pupils or muscle tone, can be measured (Sanfey, 2007). Many studies have shown that economic decisions are correlated with neurophysiological processes (e.g., Delgado, Locke, Stenger, & Fiez, 2003; Knutson, Taylor, Kaufman, Peterson, & Glover, 2005). Sanfey, Rilling, Aronson, Nystrom, and Cohen (2003) examined fMRI responses of the players to fair and unfair offers in the ultimatum game and found out that in the case of rejected, unfair offers other brain regions are activated, as in the case of accepted, unfair offers.

Neuropsychology / Neuroeconomics

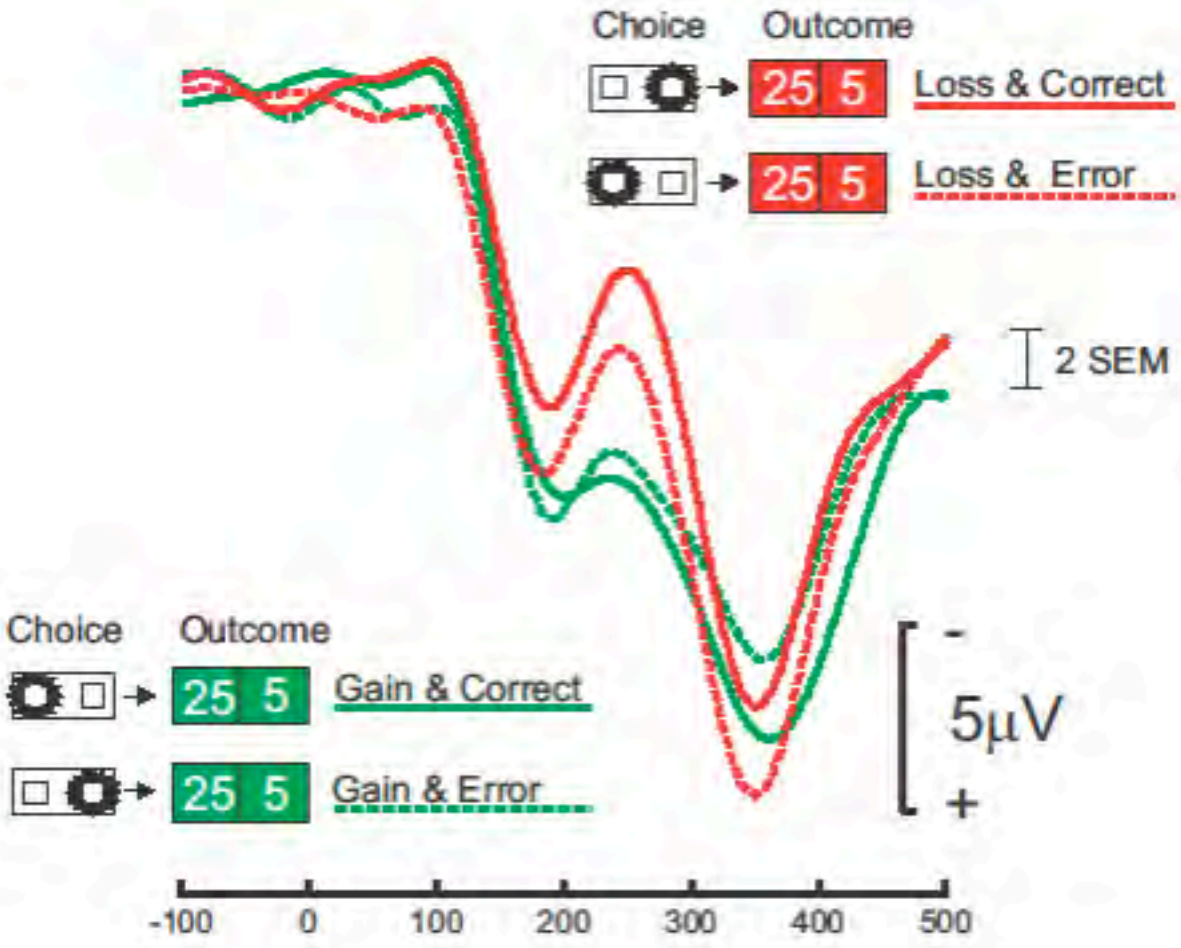
Particularly interesting is a study by Gehring and Willoughby (2002), in which the assumption of prospect theory that losses weigh more heavily than gains was tested. Gehring and Willoughby (2002) recorded neurophysiologic processes 265 milliseconds after the information about a win or loss outcome and found a higher amplitude of a potential which was most likely springing from the frontal area of the Cerebrum Medium in the event of a loss. Twelve people chose between the numbers 5 and 25 and were informed immediately after whether the number they selected was a gain or a loss. In the event of a loss, the electrophysiological responses were more intense than in the case of a gain. This result was also demonstrated when, e.g. the number 5 was selected and the corresponding amount of play money was drawn, but not the number 25, which would have meant a major loss and therefore would have been the incorrect choice. Conversely, in the event of a gain message, the amplitude was smaller, even when 5 had been selected, but 25 would have been the greater profit - hence the incorrect choice was made. The authors argue that the negative result leads to a more intense electrophysiological correlate and not the correct or incorrect choice. Further it was demonstrated that loss results led directly to risky decisions, thus to the choice of the higher number.

Neuropsychology/Neuroeconomics

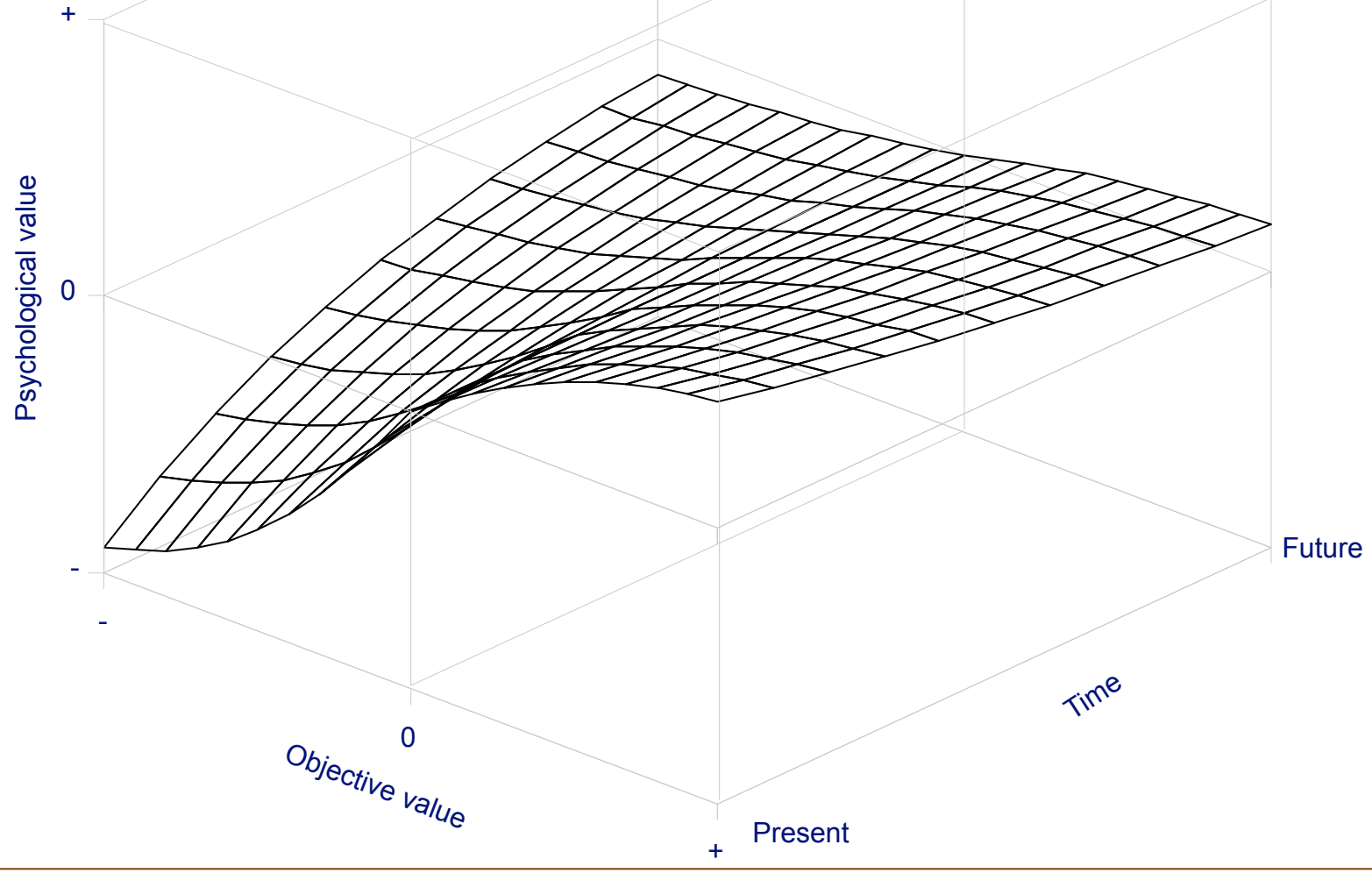
The following figure shows ...

the medio-frontal negativity after the feedback on the correctness of a choice (correct versus incorrect) and on the direction of the result (gain versus loss).

The solid lines refer to correct choices (that is, the choice of the number 5 instead of 25 and thus a loss of 5 cents instead of 25 in a loss situation and the number 25 instead of 5 in a winning situation), the dotted lines to incorrect choices . The black lines represent the electrophysiological responses after a loss, the gray those after after a gain. The electroencephalograph measurements began 100 milliseconds before the loss or tax reporting and ended 500 milliseconds later. The higher amplitude in the event of a loss occurs 200 to 300 milliseconds after the response (from Gehring & Willoughby, 2002, p. 2281).


Choice
Outcome
25 5
Loss & Correct
25 5
Loss & Error
2 SEM
Choice
Outcome
25 5
Gain & Correct
25 5
Gain & Error
-
5μV
+
-100
0
100
200
300
400
500

Time and Earnings Valuation Model by Mowen and Mowen (1991)



Prospect Theory: Summary

- Results, events, values are not assessed absolutely, but in relation to a reference point.
- The subjective value of a gain is valued less than an equally big loss.
- Over time, both profits and losses are discounted.

Endowment – effect; R. Thaler Status quo effect; Samuelson & Zeckhauser

A good appears more valuable to us immediately after it was taken into possession. For returning the good we will demand more than we were willing to pay for the good.

Endowment effect

Experiment:

Group A gets a coffee cup for attending a study. Afterwards they can choose to get cash instead of the cup.

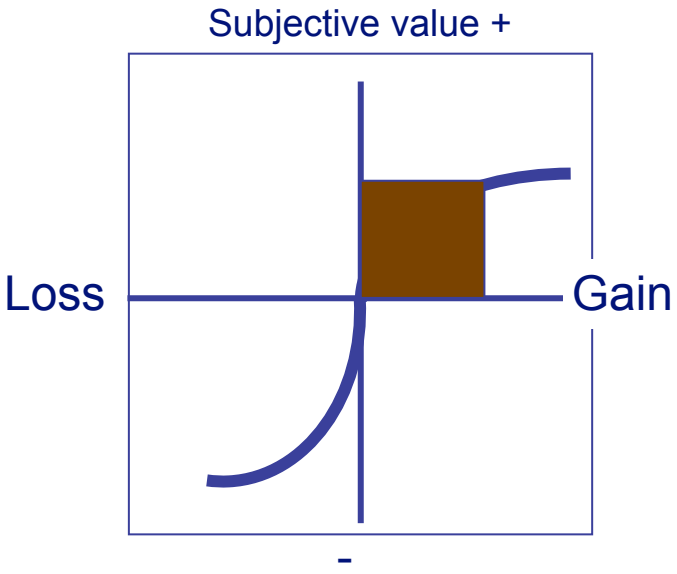
How much? ($ 7.12 respectively $ 7).

Group B gets nothing in advance but still can choose between a cup and money after the study.

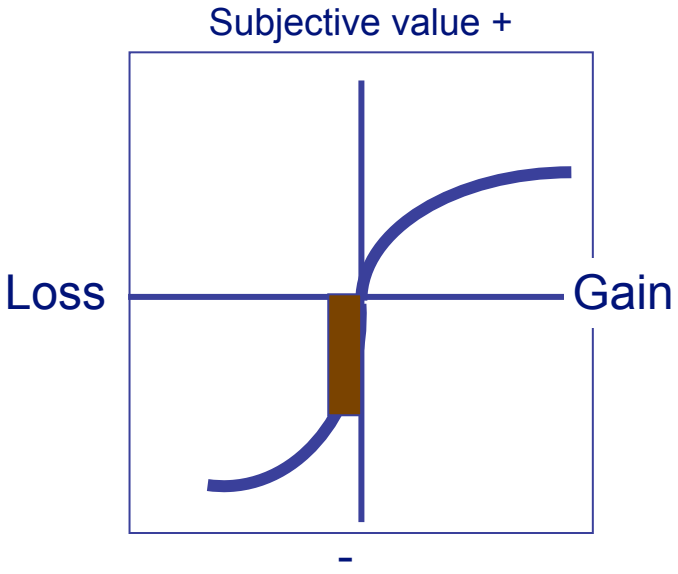
How much money instead of the cup? ($ 3.12 respectively $ 3.5).

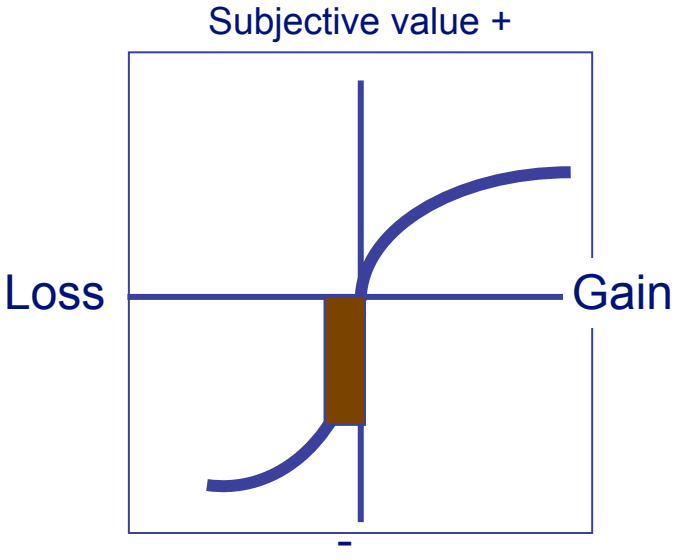
Endowment effect and practice: salary negotiations and revoking of salary increases

Endowment effect

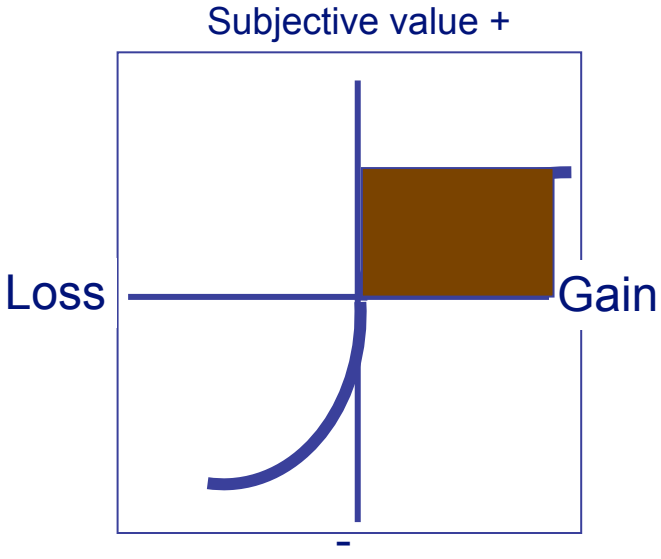


Purchase





Sale



Task

- A top manager of a major car company has been very successful for 3 years. In the 4th year, the company closes with a small loss and in the last year of his contract a blatant loss is retracted. The contract is not renewed.

- A competing company offers the top manager a contract with even better terms enthusiastically. Why, when he was just so unsuccessful?

- *Discuss possible reasons of the non renewal of the contract and the sensibleness of hiring this manager in another company based on the Prospect Theory.*

Sunk costs effect

Past profits and costs have an effect on current ones. Investments are more likely to be made if past investments have already been made than if no investments were made.

→ Good money is thrown after bad money!

Experiment:

Example 1: A holiday with friends in the Rocky Mountains.

Costs: € 5.000; deposit: € 1.500.

Just as the holidays begin, the friends fall ill. It is possible to book a fine winter vacation in the vicinity for € 3.500 instead. However, the deposit is not refunded.

Example 2: Holiday with friends in the Rocky Mountains.

… no deposit

It is possible to book a fine winter vacation for € 3.500 instead.

„Sunk costs effect" in the economy

A company invests in a new product.

Total costs amount to € 6 Mio.

1st Year => Investment of € 1 Mio.

2nd Year => Investment of € 0.5 Mio.

3rd Year => Investment of € 1.5 Mio.

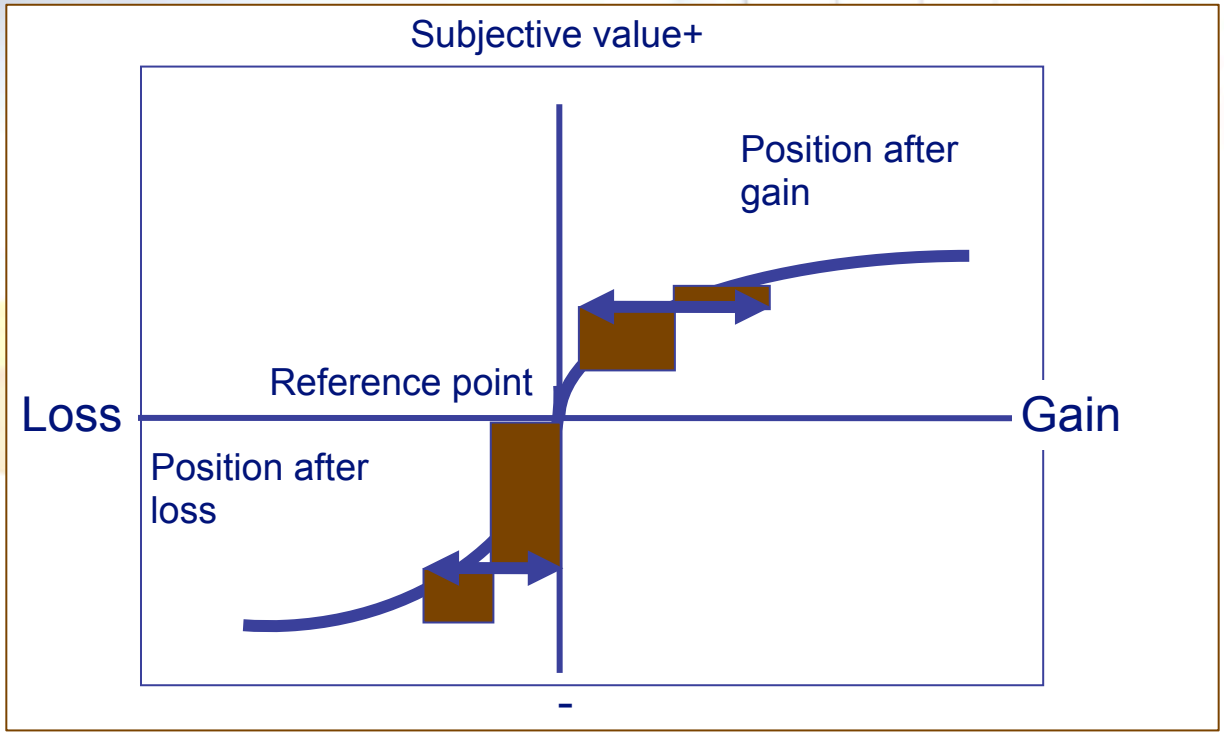
4th Year => Investment of € 2 Mio.

Information that a competitor will be offering a similar product with higher quality for a lower price is received.

5th Year => Remaining investment of € 1 Mio.

„Sunk costs effect” (disposition effect)

Foreign exchange and stock markets: gains are realized early, losses continue



„Sunk costs effect”

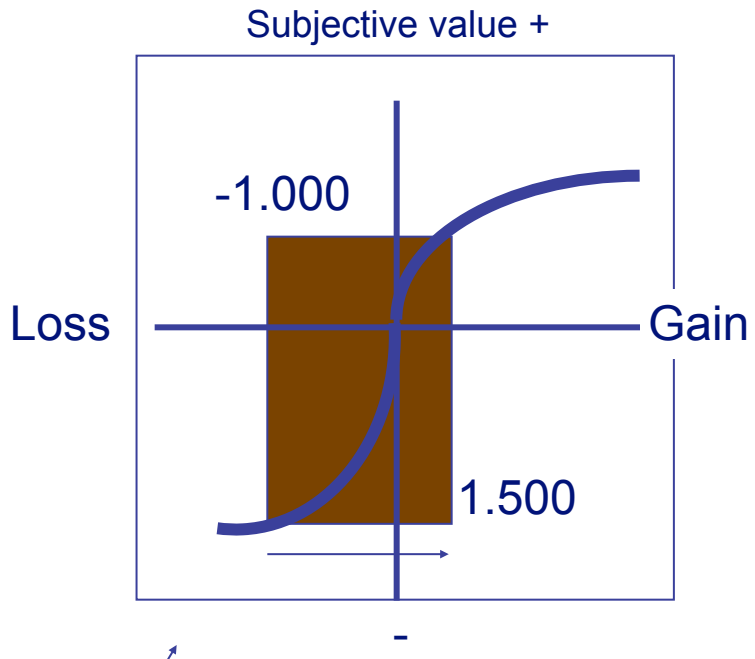
Adherence to economic and political projects if failure is already looming: Vietnam, AKW-Temelin, etc.

Explanation:

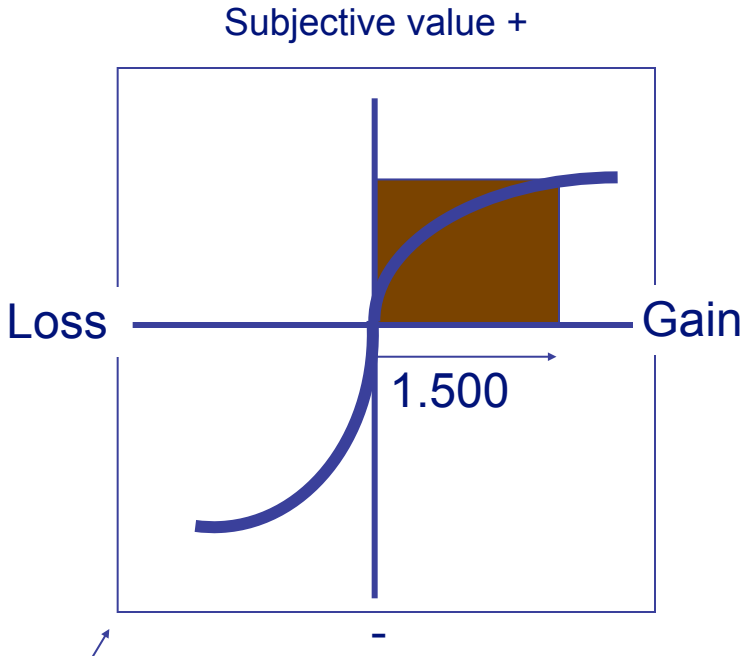
- Decreasing sensitivity in the loss region
- Fear of losing face
- Illusion of control

Example:
A company's investment in three projects:
Project A is a loss of 1,000,
Project B is neither a profit nor a loss,
Project C has a gain of 1,000.

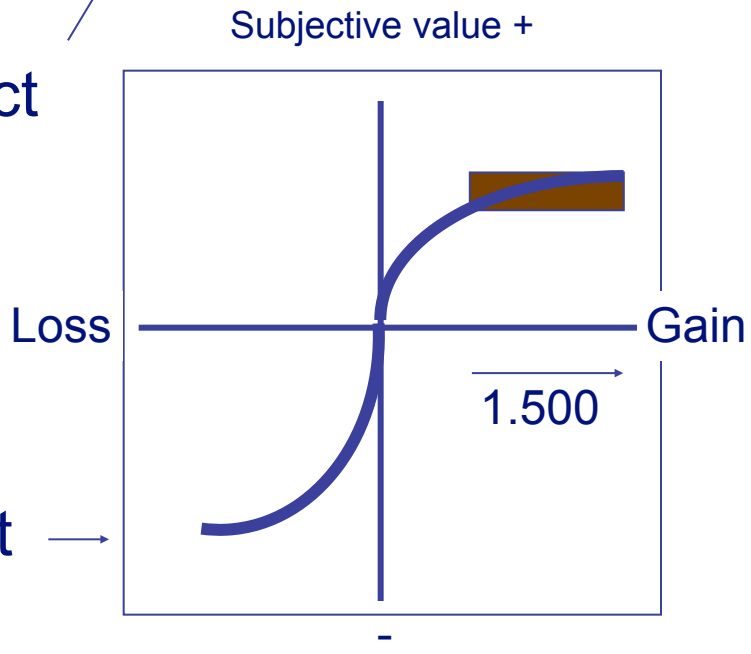
Which project would be worked on primarily if it is assumed that each one can be improved by 1500 through overtime, etc.
The subjective gain in value is clearly the biggest for the loss project!



Loss project



Neutral project

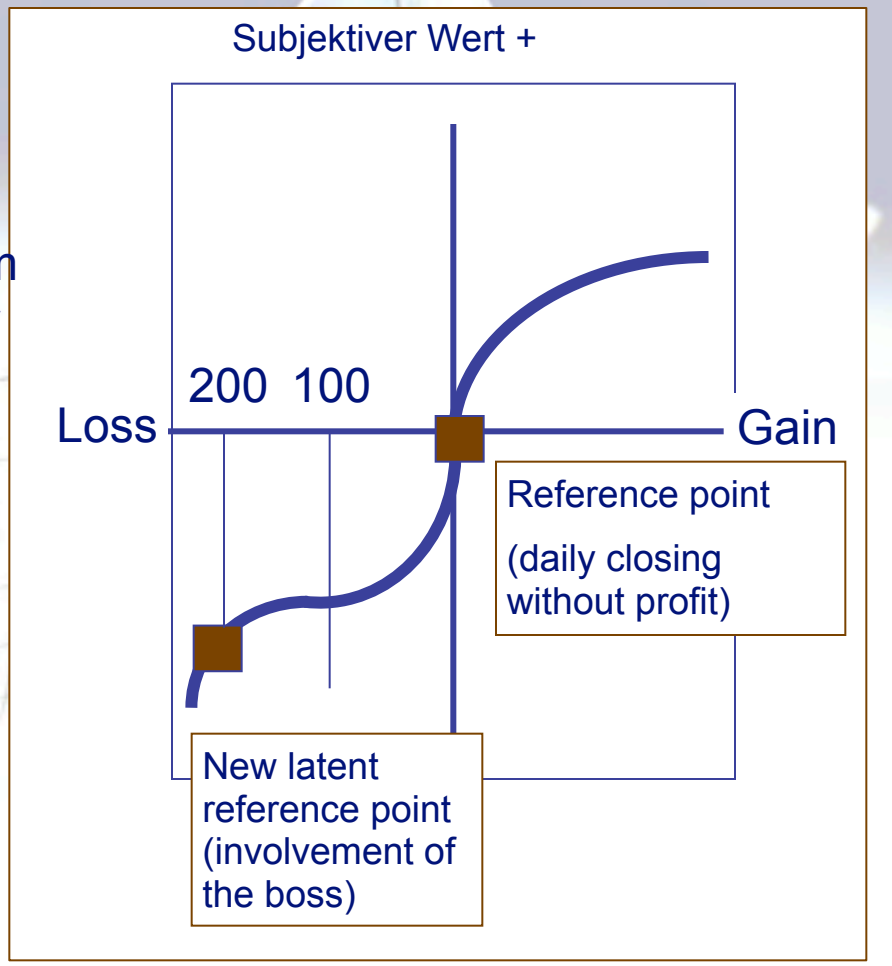


Gain project

„Sunk costs effect" and extreme losses

Profit and loss analysis in the vicinity of the reference point: Increase of risk averse behavior in the gain region and increase of risk seeking behavior in the loss region. From a certain distance from the reference point on, the sensitivity for gains and losses may vary.

Example:
A currency dealer, who is in charge of deciding up to losses of €100,000. When he reaches losses of € 200,000 he is obliged to report on those. This dealer could have small sensitivity for losses around €100,000 and high sensitivity for losses around €200,000.



Past expenditures in the form of money, time and energy

Greitemeyer, Schulz-Hardt, Popien, and Frey (2005) demonstrated that past expenditures in the form of time that were associated with considerable effort, also resulted in “sunk cost” effects. 144 participants of their study, who were all bank employees, were offered four decision scenarios, each with two alternatives. For the first of the two alternatives investments had already been made; for the second, economically advantageous alternative, not. In the first two scenarios, time was invested, in the other two scenarios money was invested. Next, a version for each scenario a was created in which a benefit from the investment was outlined, and a version in which the investments had no obvious benefit. For example, participants were asked in one of the four scenarios, whether they would prefer to attend a very expensive course in statistics, for which they had been thoroughly prepared, or a marketing seminar with no preparation. Overall, 78 percent of respondents chose the statistics seminar, despite the lower interest for it.

Past expenses in the form of money, time and energy

Van Dijk and Zeelenberg (2003) have shown that projects are more likely to be continued, if sunk costs were incurred. In addition, it was investigated whether sunk cost effects also occur in ambiguous situations. A total of 124 persons were assigned to four experimental conditions - a control condition and a low, high and ambiguity “sunk-costs” condition. Students should imagine that they owned a company that wants to bring a new drug for migraine on the market. Their biggest competitor, however, pursues the same plan. In the low “sunk-costs” condition, investments of Fl. 500 000 had been made, in the high condition Fl. 1.5 million had been invested. In the ambiguous condition the exact invested amount is unknown, the participants were simply informed of an investment between Fl. 500,000 and 1.5 million. Afterwards, the participants should decide to continue or abandon the project. The continuation of the project was promoted, if costs of Fl. 500,000 or even of Fl. 1.5 million had already accrued. Both, in the ambiguous condition and in the control condition, the majority decided to stop the project. Ambiguity seems to inhibit the tendency to throw “good money” after “bad”. Ambiguous information seems to be considered less in decisions than certain information.

Past expenditures in the form of money, time and energy

The effect of sunk costs is also frequently observed in reality. Investment stops in company projects that are long due to avoid further costs are often difficult to argue. Repairs on buildings that are more expensive than their demolition and reconstruction are more likely to be approved than admitting that mistakes have been made. The closure of nuclear power stations whose safety is questionable and whose renovation would blow up the costs will be delayed for a long time. The withdrawal from a war that has long been regarded as lost is more difficult to agree on than to fight. Tragic cases that illustrate the impact of the effect of sunken costs are often reported in the daily press. In the Italian daily newspaper Corriere della Sera, for example, on 8 October 1994 on page 17 (Rumiati & Bonini, 1996) a priest was mentioned who lost six billion Lire, the equivalent of the donations of the faithful for the erection of a monument. The father had entrusted some of the money to a local finance company to make more money from the donations. As a confidant of the company told the priest about difficulties to repay the invested money, the father “threw” the remaining billion lire to the “bad” money, in the hope that the company would recover and the money could be paid back. However, ultimately the priest lost everything.

Past expenditures in the form of money, time and energy

It must nevertheless be noted that past costs not always necessarily lead to high risk tolerance, but the contrary, risk aversion, is possible. Zeelenberg and van Dijk (1997) did not examine financial costs, but performance and risk taking. The authors administered their subjects various vignettes.

For example, they should imagine that they had done a hard work. The supervisors then offered them $ 50 as remuneration or $ 100 with a probability of .5 and $ 0 with equal probability. The gain or loss was determined with a fair coin, and the subjects had to indicate whether they preferred the sure reward, or the risky game. Many wanted to have the sure U.S. $ 50, because the anticipated loss would have caused frustration or deep regret. However, if the supervisor offered to pay either $ 50 in addition to the agreed wage, respectively in addition to a game with the outputs of U.S. $ 100 with a probability of p = 0.5 and U.S. $ 0 with p = 0.5, the risky alternative was chosen. Besides the risk-taking behavior in gain and loss situations, the anticipated regret is relevant in decision situations (Loomes & Sugden, 1982). Further, a gender-specific behavior seems likely: Women seem to be more likely to be risk averse than men (Brooks & Zank, 2005).

Escalation of costs

Blind to all reason:

Ruinous escalation in the economy: Frequent Flyer Program and mileage credits (Delta Airlines offered three times the mileage credit; (1987: free flights $ 1.5 to $ 3 billion)

(Shubik 1971; auction following the American model - € 100)

Mental accounting (R. Thaler)

People have mental accounts for various operations and costs are charged event-specific.

Experiment with theater tickets (€ 10)
Group A lost ticket and may spend another € 10 for the theater.
Group B lost € 10 and may buy the ticket.

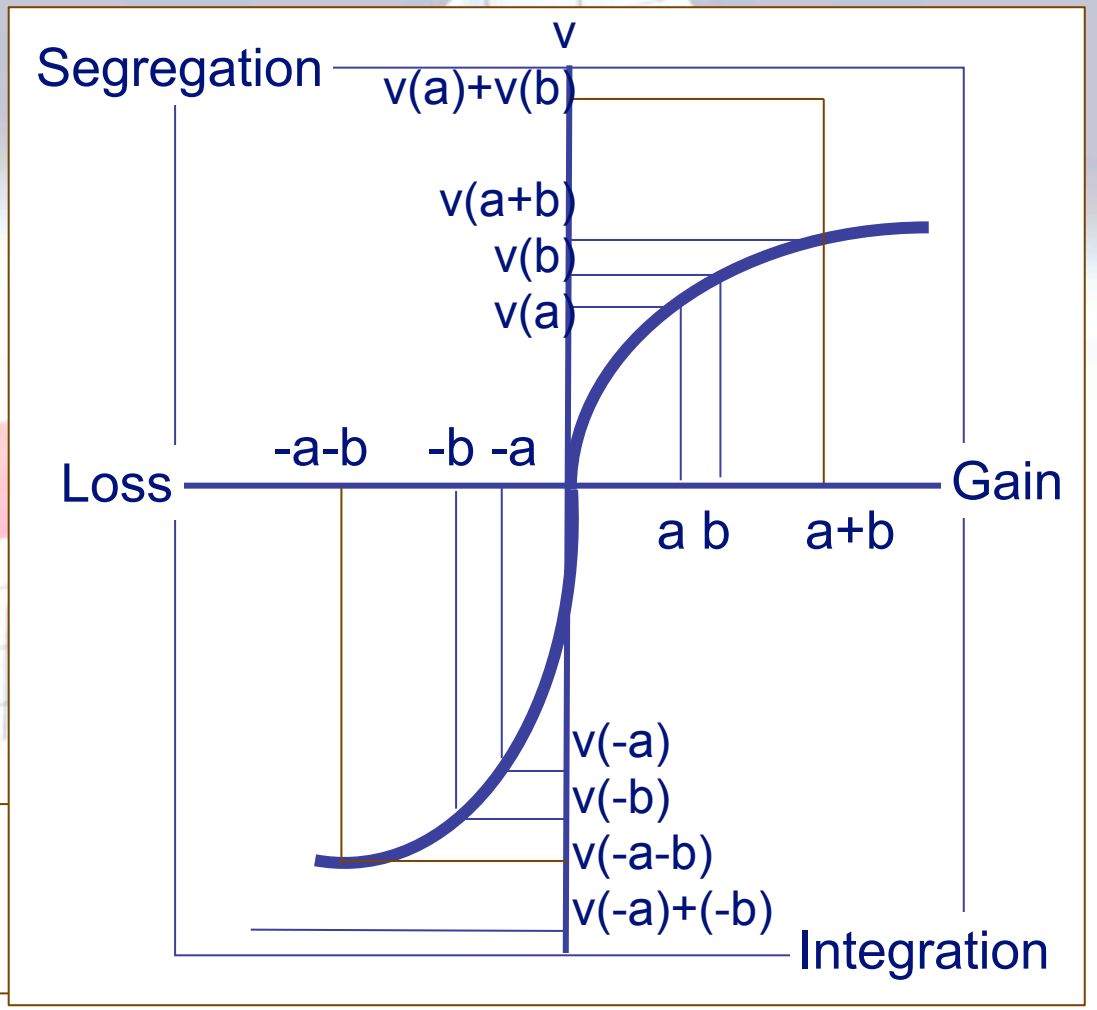
Mental accounting

Households, businesses and administrations organize their budget for specific expenditures in accounts.

If accounts are “empty”, meaningful spending is refrained from.
If accounts are “full”, inappropriate expenditures are made.

Mental accounting and gains vs. losses (hedonic framing)

Decision makers record inputs, outputs, etc. on different accounts. How should multiple gains or losses be recorded in order to experience maximum benefits (hedonic framing)?



Separate earnings; Integrate losses!

Pride and regret

Orientation of the decision:

- Not along the consequences of the decision but:
- Along the regret of the absence of a consequence of an alternative

Aversion against anticipated regret has a similar effect to that of loss aversion.

Vice versa, anticipated pride has a similar effect to prospective gain.

Regret

What would have happened, had I decided differently?

The clearer one can envision the right step, the more a wrong decision is regretted.

Consequences of a wrong decision are regretted more intensely than consequences of not deciding.

→ No decision

→ Passivity instead of activity

Regret aversion

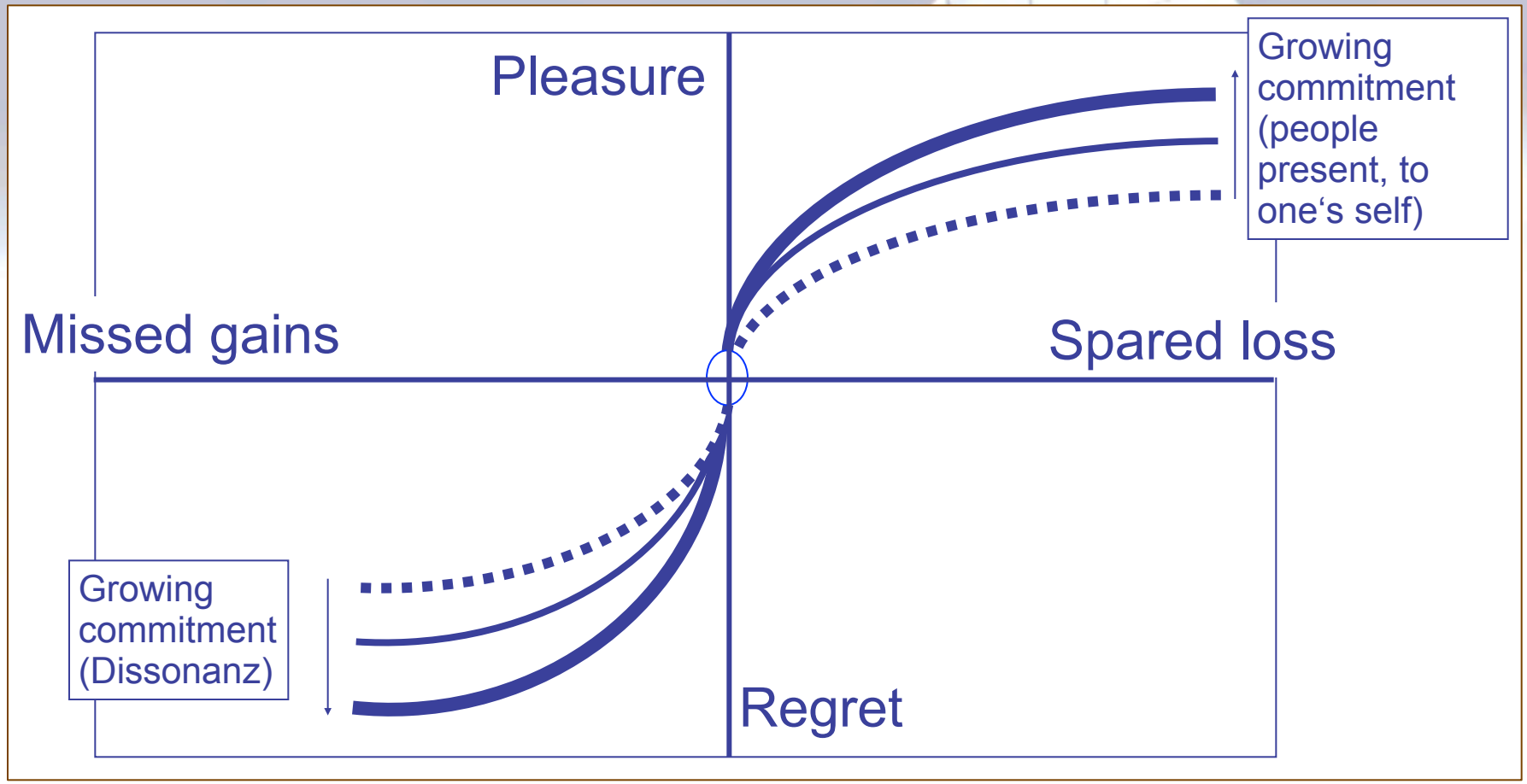
Regret if no decision was made

E.g. a person could fret for a long time over not having bought the stocks an acquaintance had advised, because now their value had risen.

The higher the commitment, the more intense the regret with wrong decisions.

With growing commitment

- Regret aversion of missed gains
- Pride in spared losses increase.



Dealing with loss and regret aversion

- Think about whether
  - Commitment
  - Self-obligation
  - Impression management to third parties
  - Requires justifications.
- Forget the initial value of a good
  - E.g. shares.
- Reflect changes in value from the current date on into the future.

Descriptive decision models: individuals and groups

- Descriptive models describe decisions, while normative models characterize an ideal decision:

- A person or group is aware that he/she/it is making a decision or a verdict and the person or group is identifiable
- All alternatives are determined and known in advance
- The consequences of the alternatives are known and can be evaluated
- The evaluation follows constant targets
- Consequences occur with certain probabilities and these are known
- The relevance of information can be assessed and if the information is not sufficient, further information can be collected.

Sequential elimination (Tversky, 1972)

Decisions as a sequential process of elimination:

Decision-alternatives are sets of characteristics, criteria.

When decisions are made relevant criteria are selected and alternatives are chosen in accordance with the current criteria.

Alternatives not fulfilling the criteria are eliminated.

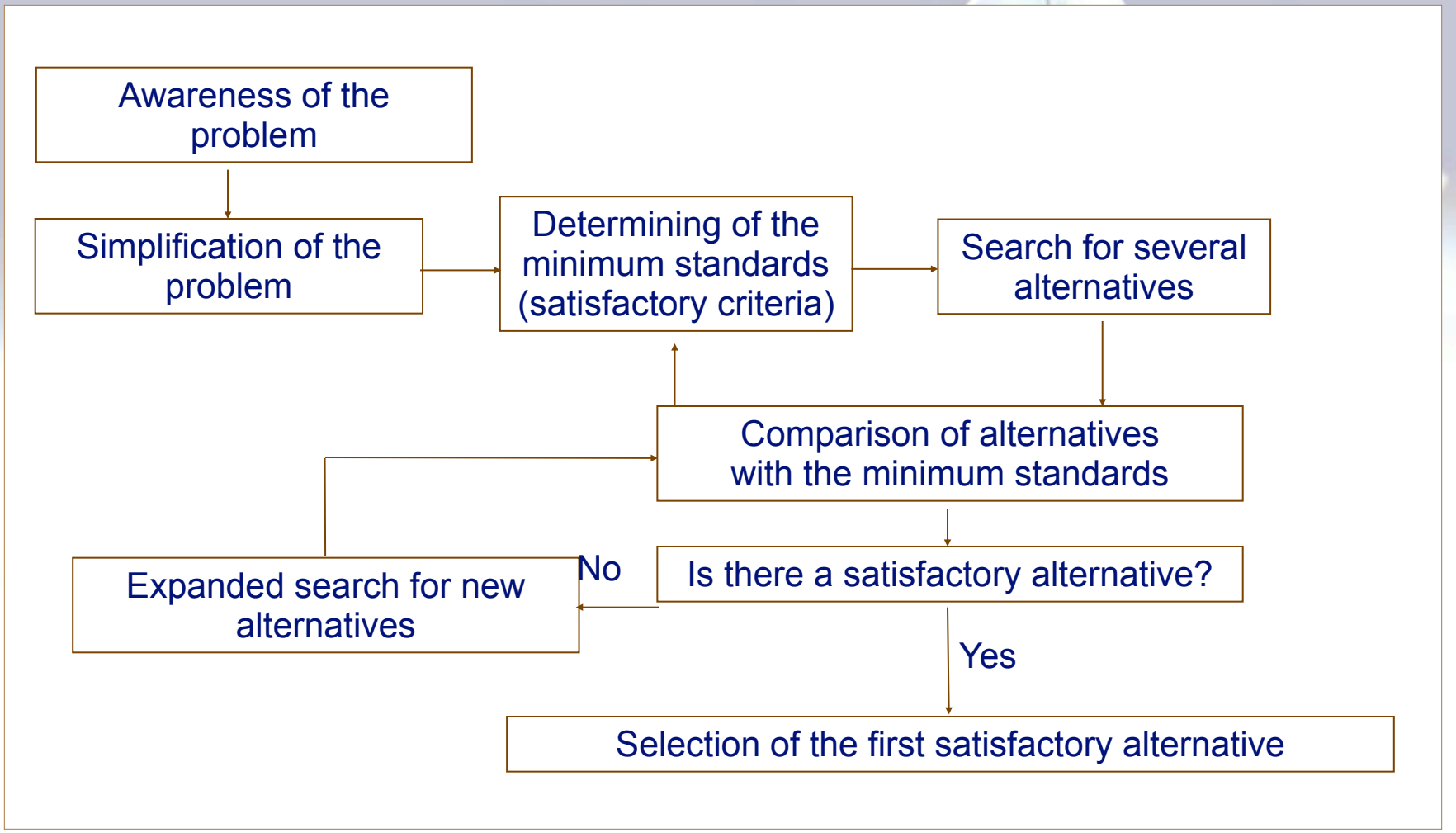
This process is continued until one alternative is left as the optimum.

(Problem: An alternative can be discarded based on an inadequate criterion despite being optimal in all other characteristics)

Bounded rationality (Simon, 1957)

Human beings have a limited capacity to behave rationally (bounded rationality) and are satisfied with satisfactory alternatives (satisfycing principle)

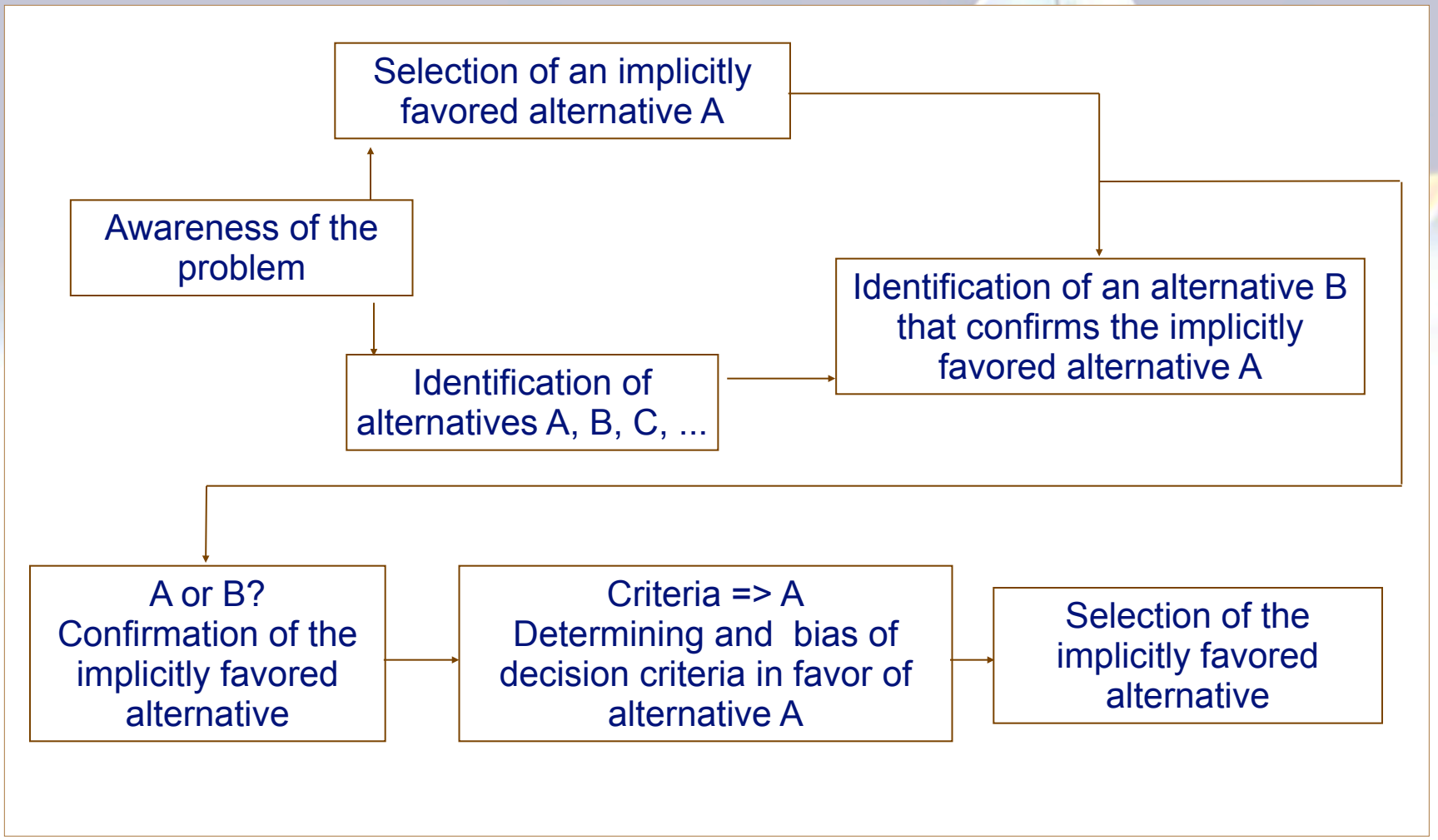
Bounded rationality (Simon, 1957)



„Implicit favorite” Model (Soelberg, 1967)

- Human beings decide spontaneously for an alternative.
- This alternative is compared to others.
- The process of comparison serves the confirmation of the spontaneous selection.

Principle of implicit favorites (Soelberg, 1967)



Do groups decide better than individuals?

- Group-think (Janis)
- Garbage can models (garbage-decisions; March, Olson & Simon)
- Muddling through (incremental decisions; Braybrooke & Lindblom)

Group-think

Bay of Pigs-crisis 1961 (USA-Kuba):

Analysis of the documents of the decision makers, J.F. Kennedy

In cohesive groups that are isolated from alternative information sources and in which the leader prefers a particular solution, the risk of group thinking increases.

- Risks under high conformity pressure and self-censorship, overestimation of the invulnerability of the group and collective rationalization are
- Inadequate target definition
- Selective information processing
- Inadequate assessment of the consequences of the alternatives
- Poor implementation plans

Garbage can model (Cohen, March, & Olsen, 1972)

- “Organizations gather information but do not use it. Ask for more, and ignore it. Make decisions first and look for the relevant information afterwards.”

In organizations there are flows of solutions and problems – if they more or less fit together, a decision comes about.

Garbage can decisions

- Decisions are rarely “developed”, but mostly copied
- Most deficiencies are not detected unless a solution is available
- In order to make optimal decisions at all,
  - Rituals
  - Myths
  - Symbols have to be unmasked
- Information must be collected systematically

Garbage can decisions

- Organizations are chaotic arenas
- People, solutions, problems float by, sometimes are “fished out of the flow of events” and normally float away again
- Sometimes there are solutions, but no corresponding problems. Then it can be observed that a solution is looking for a matching problem ...
- ... budget surpluses in some departments and companies are spent on solutions that are looking for their problems at a later point in time...

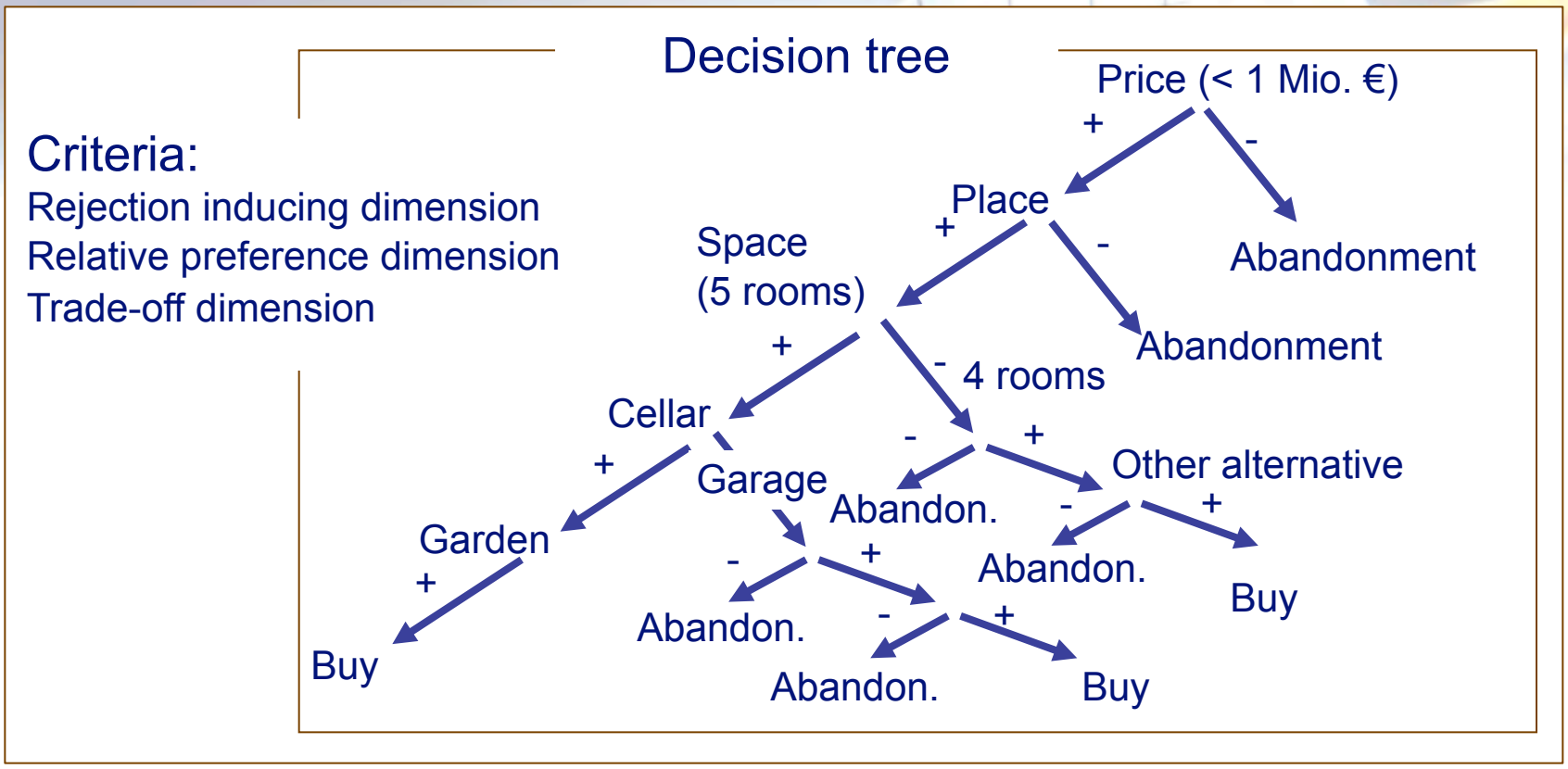
“Muddling through” – incremental decisions (Braybrook and Lindblom, 1963)

- In politics, decisions are described as complex
- Since not all relevant information is retrievable, decisions are made in “small steps”

... A walk through a swamp, where it is never quite clear whether the ground carries, or the next step leads into the demise...

Incremental decisions

Park (1982) studied couples who had bought a house and could see an incremental approach.



"What we did yesterday lies in the darkness of oblivion, and what we are supposed to do tomorrow, lies in obscurity. We human beings are creatures living in the present."

(Dörner, 1989)

12 Tactics to reduce uncertainty (Lipshitz & Strauss, 1997)

Tactics R (reduction)

a) Seeking new information
b) Delaying the decision
c) Obtaining expert opinions
d) Decisions according to established rules

Tactic A (assumption based reasoning)

e) Construction of a mental decision model to test alternatives

Tactic W (weighing)

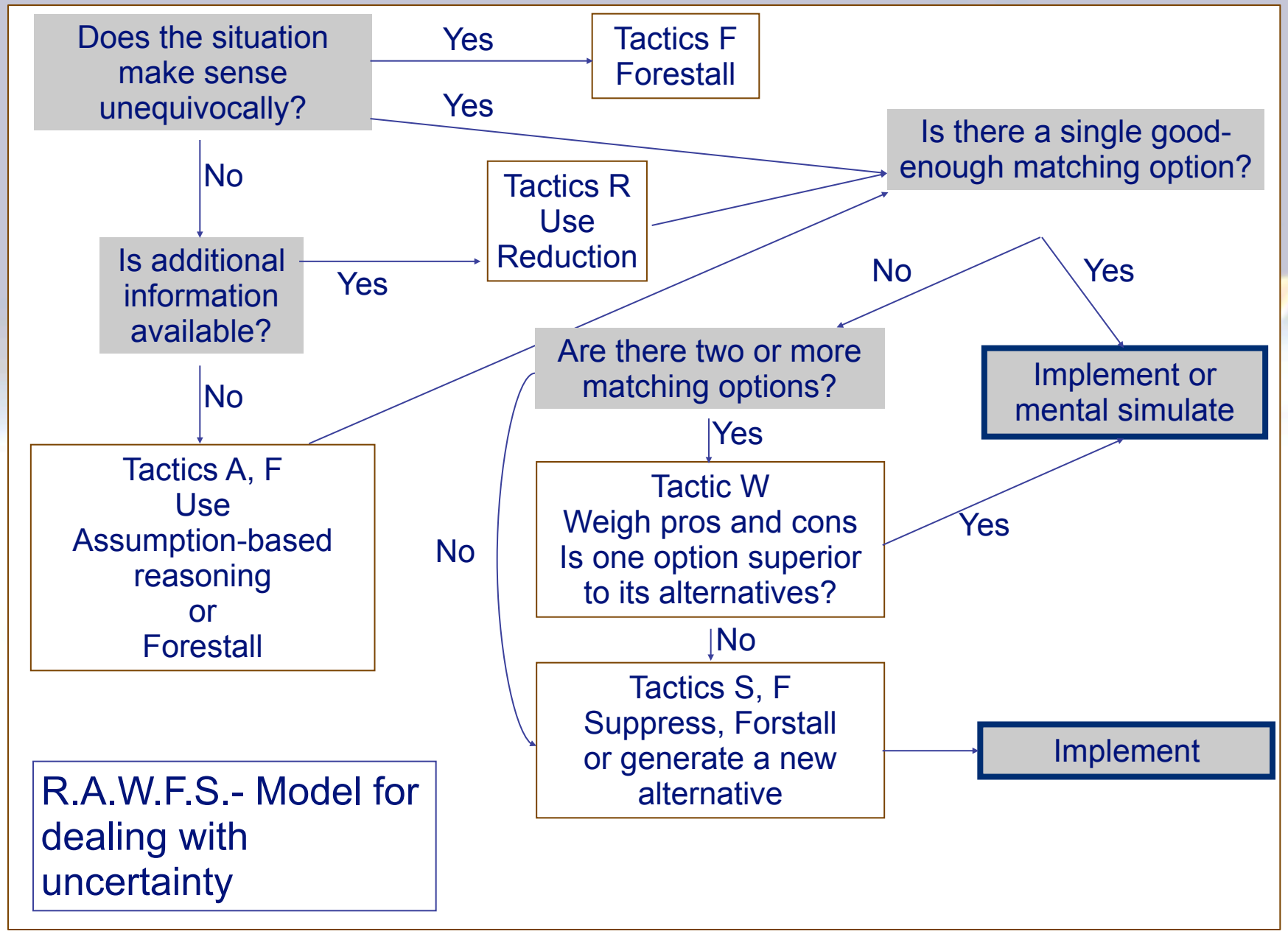
i) Weighing the advantages and disadvantages of the alternatives

Tactics F (forestalling)

f) Planning of responses to unwanted consequences
g) Reservation of resources to counter adverse consequences
h) Planning reversible and avoiding irreversible actions

Tactics S (suppression)

j) Ignorance of uncertainty
k) Faith and intuition
l) Gambling (e.g. tossing a coin)


Does the situation make sense unequivocally?
Yes
Tactics F Forestall
Yes
Is there a single good-enough matching option?
No
Tactics R Use Reduction
Is additional information available?
Yes
No
Yes
No
Are there two or more matching options?
Implement or mental simulate
Yes
Tactics A, F Use Assumption-based reasoning or Forestall
No
Tactic W Weigh pros and cons Is one option superior to its alternatives?
Yes
No
Tactics S, F Suppress, Forstall or generate a new alternative
Implement
R.A.W.F.S.- Model for dealing with uncertainty

Rationality and utility maximization

- Deviations from the rational model cause costs
- To increase the odds, people can consciously prevent normal anomalies

More and more institutions offer services to assist people in avoiding utility decreasing behavior (e.g. anti-smoking seminars, advice on money matters, nutrition counseling).

Risk-defusing-operators (RDO)

In risky situations that may cause undesired output, it is possible to consider what measures could be taken in an emergency. A vacation in a tropical country seems attractive on the one hand, because an exotic country with foreign customs can be explored, on the other hand, it is threatening, since there may be diseases that a difficult to diagnose and treat. A tourist could ponder whether to go on vacation, choose an alternative location or stay home. If he decides to spend his vacation in the tropics, he might think about possible measures to reduce the risk of diseases. For example, he could get vaccinated against tropical diseases, or he takes precautions in case of illness immediately to have appropriate medication available. The precautions taken to diffuse the threat of negative consequences are referred to risk diffusing operators by Huber (e.g. Huber, 2007; Huber & Huber, 2003).

Risk-defusing-operators (RDO)

A risk defusing operator is a risk mitigation action that aims to reduce the risk of occurrence of negative consequences when choosing a particular option. Risk defusing operators are often used in everyday life, for example by insuring against risks (Huber & Huber, 2008). The concept of risk defusing operators is aimed at controlling hazards. Huber and Huber (2003) distinguish between risk defusing operators before the onset of a negative consequence and those that are applied afterwards. In the case of the holiday in the tropics, the vaccination is an operator before the occurrence of negative consequences, whereas the transport of medications is an operator after the occurrence of a negative event. In the first case, costs are paid (cost of the vaccines, pain, etc.), even if ultimately no disease occurs. In the second case costs only arise if the negative event actually occurs. Decision makers weigh the costs of a risk mitigation operator and the probability of negative events and then decide on a measure before or after the occurrence of a negative event. When a negative event can be detected with certainty, and if there is a possibility of repair, then the people decide for operators following the occurrence of negative consequences. Is the probability of detection low and difficult to repair, they opt for operators prior to the occurrence of undesirable consequences (Huber & Huber, 2003).

RDO – Kirchler, Hölzl & Huber (2010)

Study 1 and 2

Method

Participants: 180 participants.

Material and procedure. Participants worked through three scenarios; in each scenario, they made a choice between one action containing a pre-event RDO and another action containing a post-event RDO. After completing all three scenarios, participants answered additional items related to the scenarios (e.g., manipulation checks, perception of the situation, ease of comprehension) and on demographic characteristics. The questionnaire took about 15 minutes to complete. Participants received € 3 in cash for their time.

Three quasi-realistic risky decision scenarios: Tunnel, Newts and Cerebral Disease. Experimental variations concerned detection probability of the negative event and situational regulatory focus. Detection probability of the negative event was varied in three levels: 40%, 90% and 100%.

The main dependent variable was the choice of pre-event RDO or post-event RDO in the three scenarios.

Table 1
Choice of Post-event RDO, Study 1

	Detection probability		
Scenario	**40%**	**90%**	**100%**
Tunnel	**12[a] (20%)**	**18[a] (30%)**	**40[b] (67%)**
Newts	**12[a] (20%)**	**29[b] (48%)**	**29[b] (48%)**
Cerebral disease	**13[a] (22%)**	**25[b] (42%)**	**46[c] (77%)**

Table 2
Choice of Post-event RDO, Study 2

	Detection probability		
Scenario	**40%**	**90%**	**100%**
Tunnel	**11[a +] (18%)**	**16[a] (28%)**	**33[b] (57%)**
Newts	**16[a] (28%)**	**35[b +] (58%)**	**36[b] (62%)**
Cerebral disease	**14[a] (24%)**	**27[b] (47%)**	**43[c +] (72%)**

Lohhausen is everywhere... (Dörner, 1989)

Complex problems:

- Businesses, organizations
- Administration, government
- Household

Decision – makers:

- Carry out easy tasks, instead of solving relevant problems
- Are caught up in crisis management
- On detection of deficiencies
  - ➡ Fill gaps
  - ➡ Repair and mend
- Pursue sub-ordinate goals
- Lose track of ultimate goals

- Lohhausen
- Tanaland

Dictatorial
mayors, regents or government staffs are supposed to administrate the city and town and lead them to prosperity

... and Tanaland too (Dörner, 1989)

Good solutions are found by those, who

- Do not lose sight of the overall aim
- Divide it into subordinate goals
- Concretize, solve and then contemplate these subordinate goals in the overall context

  → In particular, developments over time should not be disregarded

- Frequently marginal aims are pursued and the city or country are lead to their ruin

The 7 most common mistakes in decision making

- Postponing
- Rash and hasty decisions
- Emotional decisions
- No distinction between relevant and irrelevant facts
- Too much invested energy
- Only the soft nuts are cracked
- Sole reliance on experts' advice

3 central pointers for making the right decision

1. Don’t decide solely upon your good feeling
2. Reveal covert aims
3. Under time pressure, pay attention to possible manipulations and „white spots”

The logic of success

In contrast to the „Logic of Failure”, Doerner (2010) stresses that in complex decisions good actors try to

Elaborate precise/concrete goals and to take possible interactions of these goals into account.

They choose a focus without neglecting the context.

The aims’ dependencies are taken into consideration; contradicting goals are balanced and the aims are chosen on the basis of their importance.

Good actors analyze the situation as a network of dependent elements as well as multiple conditionalities. Foremost, they seek information that contradicts their own view of the world.

To them the future is not the result of a linear projection of the present, but the effect of active factors of the present.

Their planning is primarily based on causal factors that determine changes in reality.

The logic of success

In contrast to the „Logic of Failure", Doerner (2010) stresses that in complex decisions good actors try to

Good actors plan „broadly" and always consider current conditions/ as well as long term and side effects.

They plan according to the current situation and the causal factors and analyze whether the conditions necessary for successful action are given, even if this has always been the case.

During the decision making process and the carrying out of actions, good actors monitor the effects of their behavior, analyze failures and change their behavior accordingly.

Good actors analyze failures in respect to their own responsibility for the unfavorable outcome and do not search for a „scapegoat".

Their willingness to intensely reflect their own failures and errors in thinking, planning and hypotheses generation results in a transformation of thought as opposed to adhering to habits in analysis.

Dörner, D. (2010). Die Logik des Gelingens? Vortrag an der Wirtschaftsuniversität Wien, Solutionmanagement Center, Wien am 16. Oktober 2010.

Policy applications

- Problem: “..people often don’t know what’s best for themselves (and when they do, often have trouble getting themselves to do it).” (Loewenstein, 2007).
- Policy aim: help people to reach better solutions (government, consumer interest groups, companies) without restricting their freedom of choice.

„Nudge" (Thaler & Sunstein, 2008)

Through subtle measures „choice architects" can „nudge" people to behave sensibly.

Libertarian Paternalists!

Opt-out- provision: Options can be set so that sensible behavior is the default, but the freedom of choice is still maintained, as e.g.:

In Austria every citizen is registered as an organ donor, whereas Germany still relies on an opt-in system.

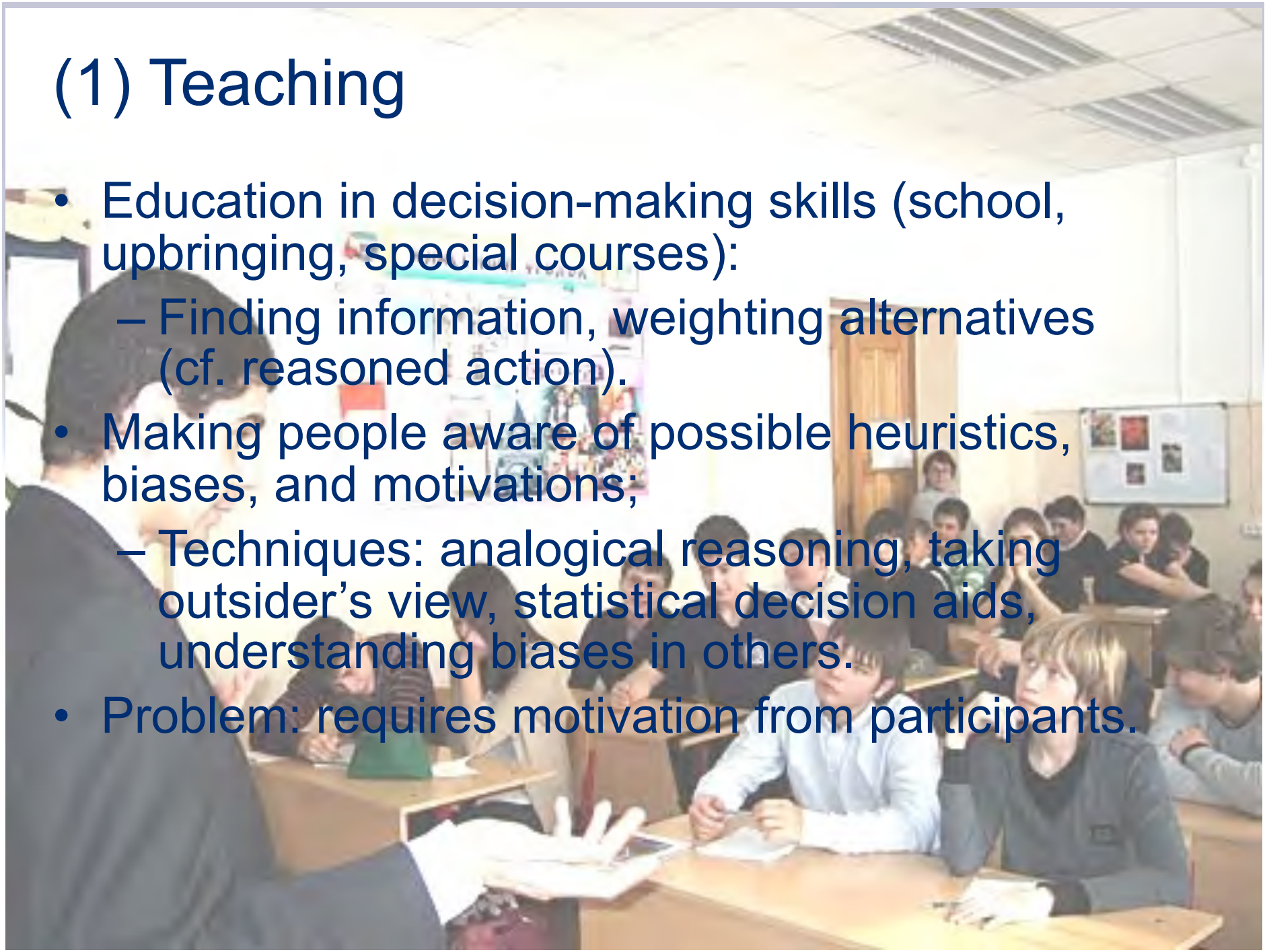
Cash machines return the bankcard before they dispense the money, whereas in other countries it works the other way round.

In Paris the ticket readers in the metro can read the tickets from all sides.

Policy instruments

- Teaching
- Learning
- Communication
- Changing the context of choice
- Rules and laws

(1) Teaching



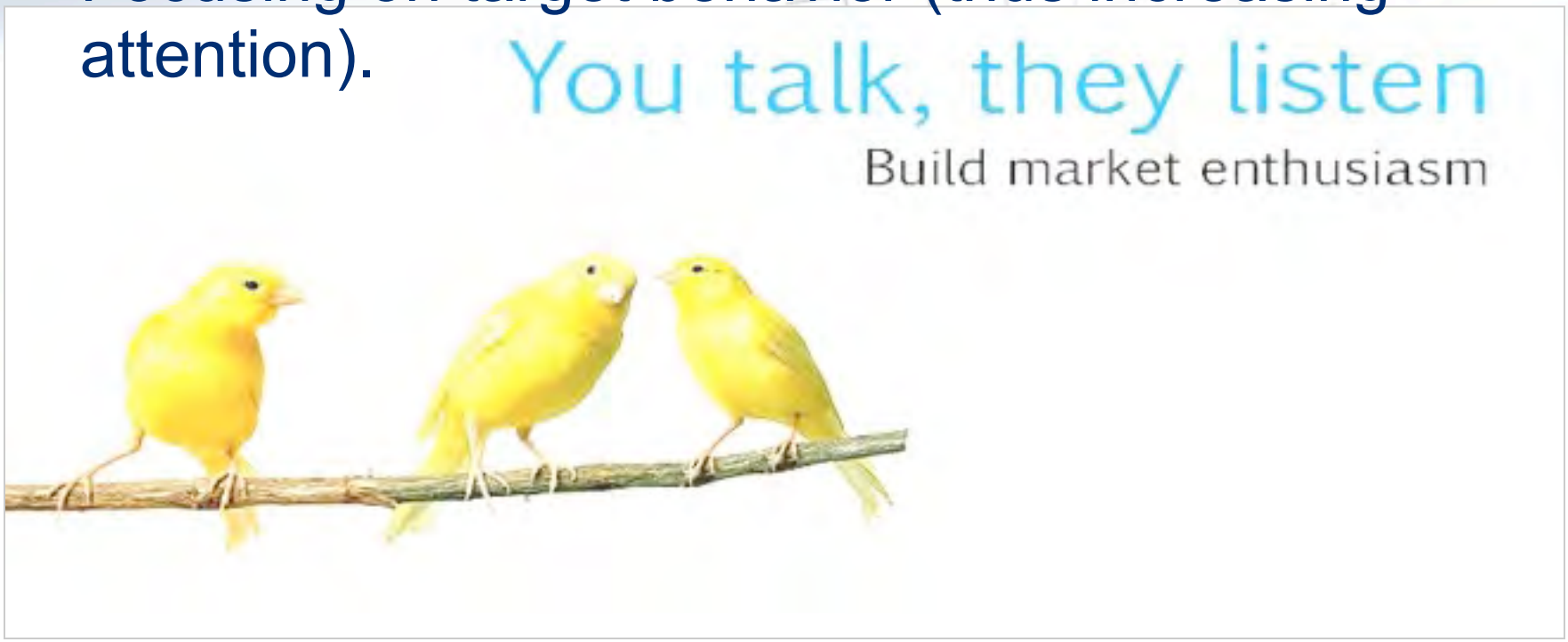
- Education in decision-making skills (school, upbringing, special courses):
  - Finding information, weighting alternatives (cf. reasoned action).
- Making people aware of possible heuristics, biases, and motivations;
  - Techniques: analogical reasoning, taking outsider's view, statistical decision aids, understanding biases in others.
- Problem: requires motivation from participants.

(2) Learning

- Classical and operant conditioning;
  - Incentives (lower taxes, subsidies, arbitrage);
  - Problems: limited learning opportunities, wrong type of feedback (e.g., short term), crowding out intrinsic motivation (cf. blood donations).
- Social learning (imitation, role models);
- Insight learning (reasoning, creativity).

(3) Communication

- Changing cognitive or affective determinants of behavior;
- Focusing on target behavior (thus increasing attention).

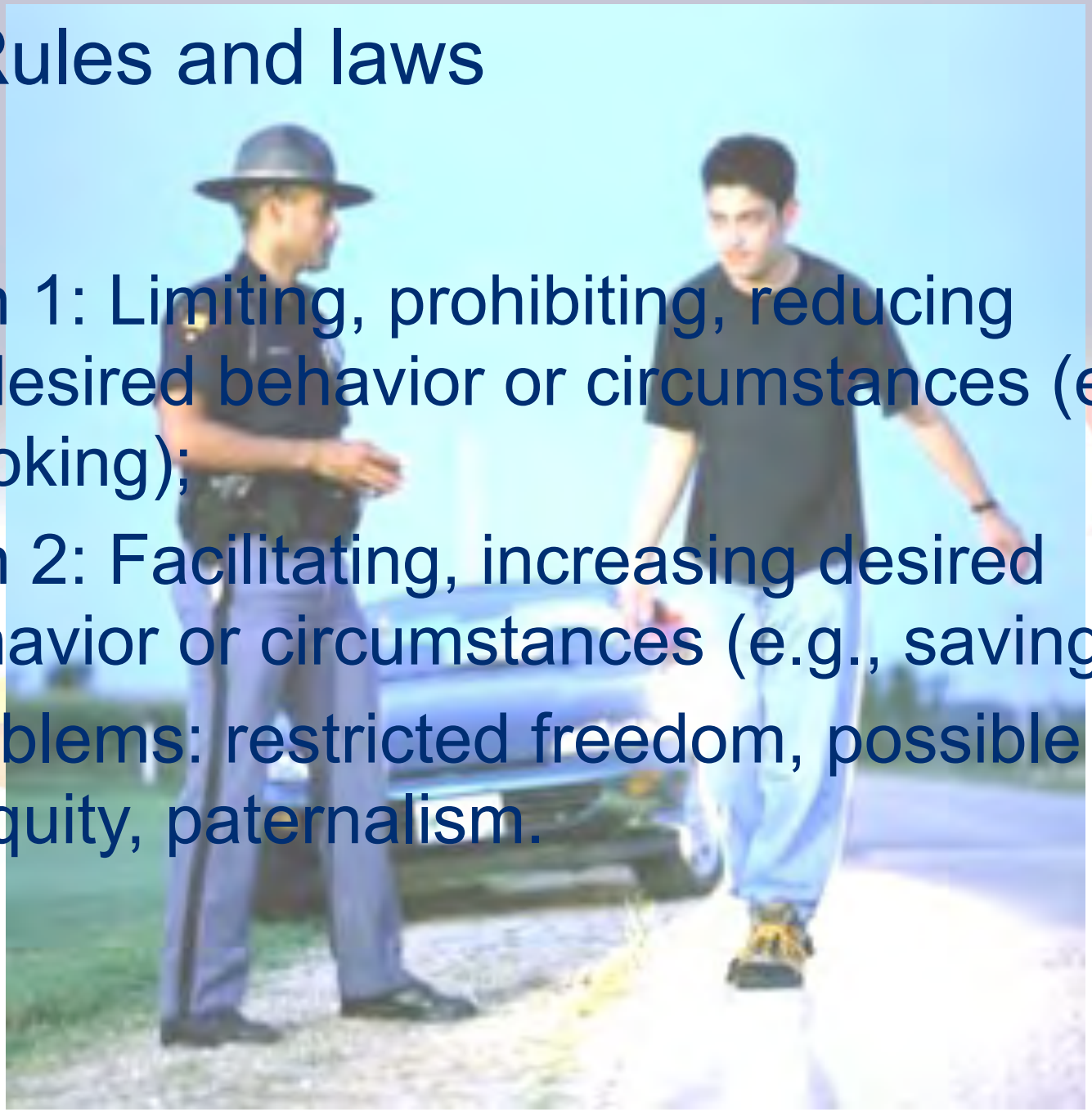


(4) Changing the choice context

- Using heuristics and biases to the advantage of decision makers: choic

Soccer goal urinal

(5) Rules and laws



- Aim 1: Limiting, prohibiting, reducing undesired behavior or circumstances (e.g., smoking);
- Aim 2: Facilitating, increasing desired behavior or circumstances (e.g., saving);
- Problems: restricted freedom, possible inequity, paternalism.

Paternalism

- "…benefiting people on an individual basis, premised on the idea that people cannot be relied upon to pursue self-interest…" (Loewenstein & Haisley, 2007)
- Policy measures in order of decreasing paternalism:
  - Teaching, laws and rules
  - Learning
  - Communication
  - Changing the choice context

Libertarian Paternalism

- Asymmetric (libertarian) paternalism:
  - Does not affect rational decision makers;
  - Works to the advantage of biased decision makers.
- Policy applications
  - Providing information;
  - Framing;
  - Changing status quo;
  - Format effects;
  - Motivational effects.

(1) Providing information

- Ready-to-use information:
  - Product price per unit;
  - Effective Annual Percentage Rate;
  - Labels & warnings, licenses;
  - Customer reviews (e.g., Zoover, Amazon, E-bay);
  - Brand comparisons (e.g., PriceRunner, PriceGrabber).
- Important for experience goods.

(2) Changing the status quo

- Order of information presentation of Google search results:
  - 42% clicked on the first hit, 8% clicked on the second hit;
  - When first and second hit were reversed, 34% still clicked on the new first hit, 12% clicked on the new second hit.

Joachims et al., 2005

Status quo effect on internet questions

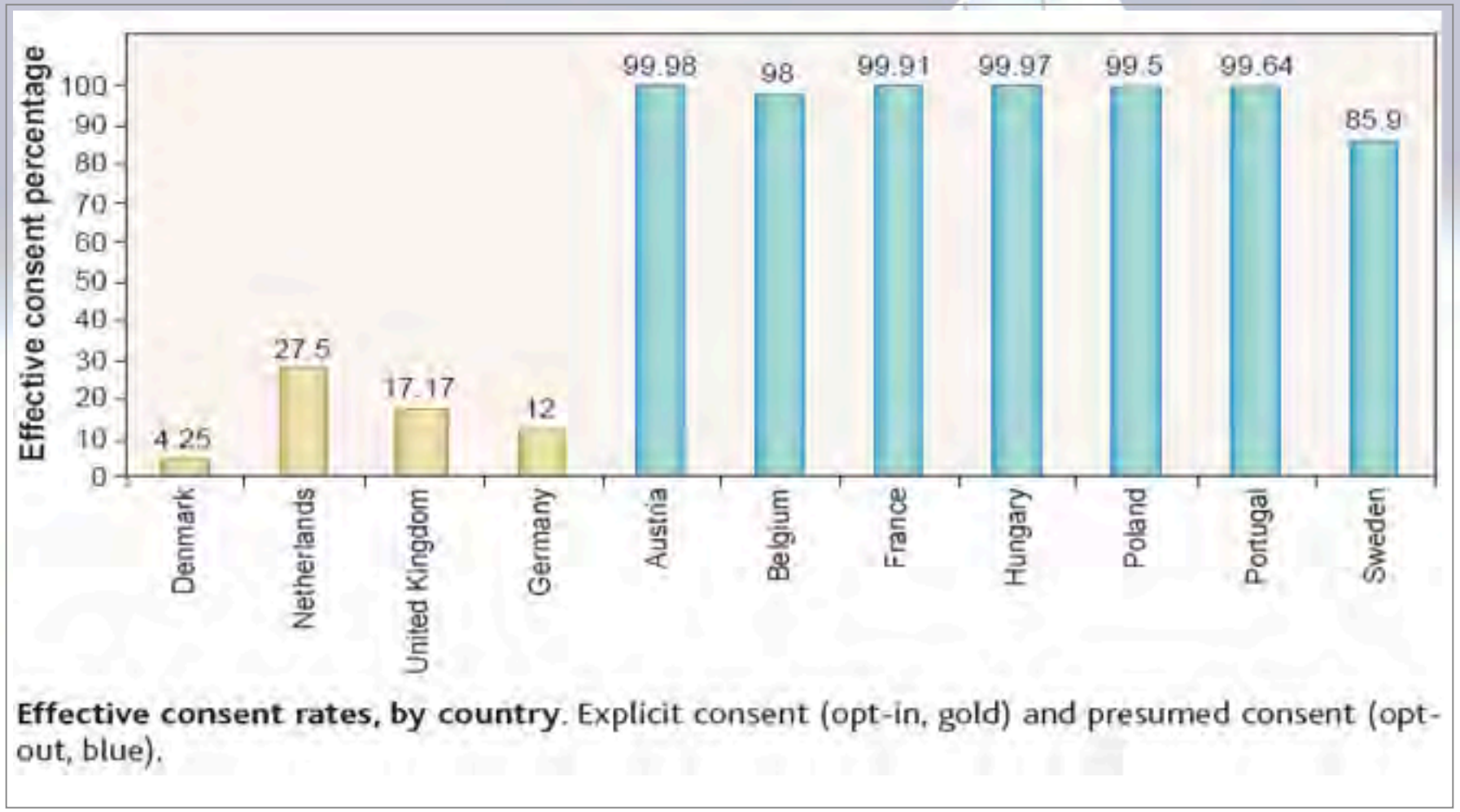
Table 1. Formats and participation rates, experiment 1 (Johnson, Bellman & Lohse, 2002)

Question		Percent participating
(1) 0	Notify me about more health surveys	48.2
(2) 0	Do NOT notify me about more health surveys	96.3
(3) 0	Notify me about more health surveys	73.8
(4) 0	Do NOT notify me about more health surveys	69.2

Status quo effect on internet questions (cont'd)

Eine kleine Spende bitte

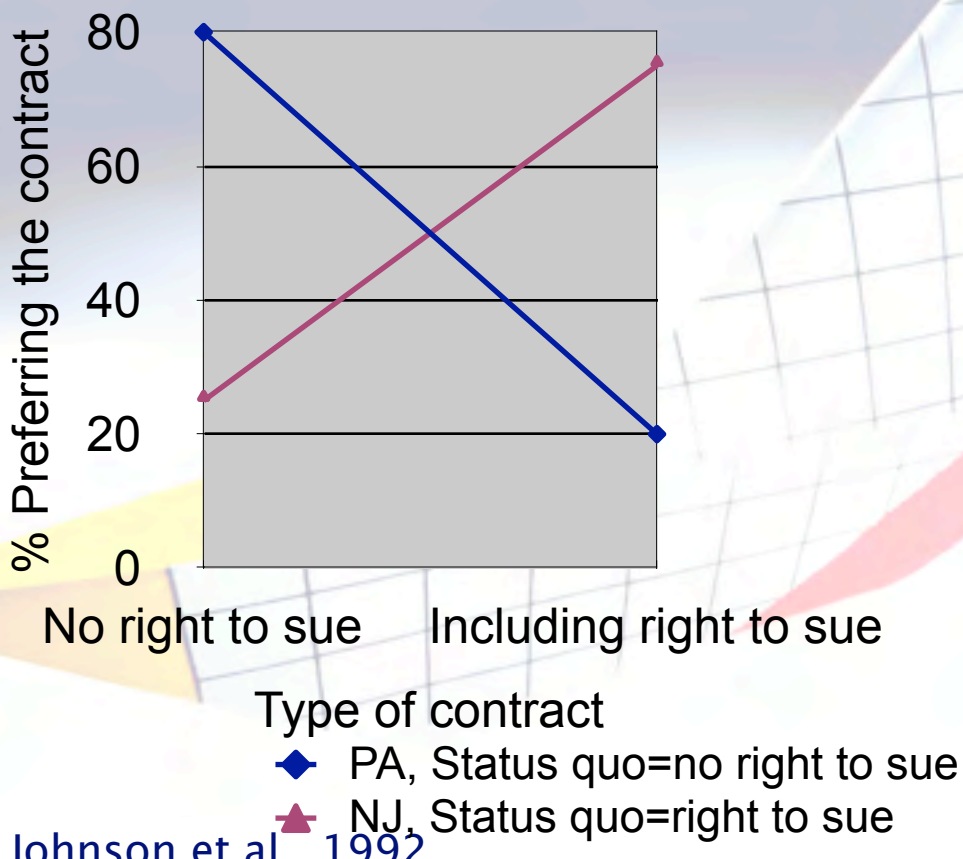
Status quo effect on organ donation



Effective consent rates, by country. Explicit consent (opt-in, gold) and presumed consent (opt-out, blue).

Johnson & Goldstein 2002

Preference for car insurance contracts



Johnson et al., 1992

Building up versus scaling down a pizza

Building up

Scaling down

Spending:
US: $ 2.71
IT: $ 3.16

Spending:
US: $ 5.20
IT: $ 7.44

Levin, Schreiber, Lauriola & Gaeth, 2002

Examples of changing the status quo (cont'd)

- Other examples:
  - Keeping vs. firing personnel;
  - Moving into another dwelling;
  - Staying in marriage or divorce;
  - Continue subscription to magazine or journal;
  - Giving up one's membership of club, union, or service provider, etc.

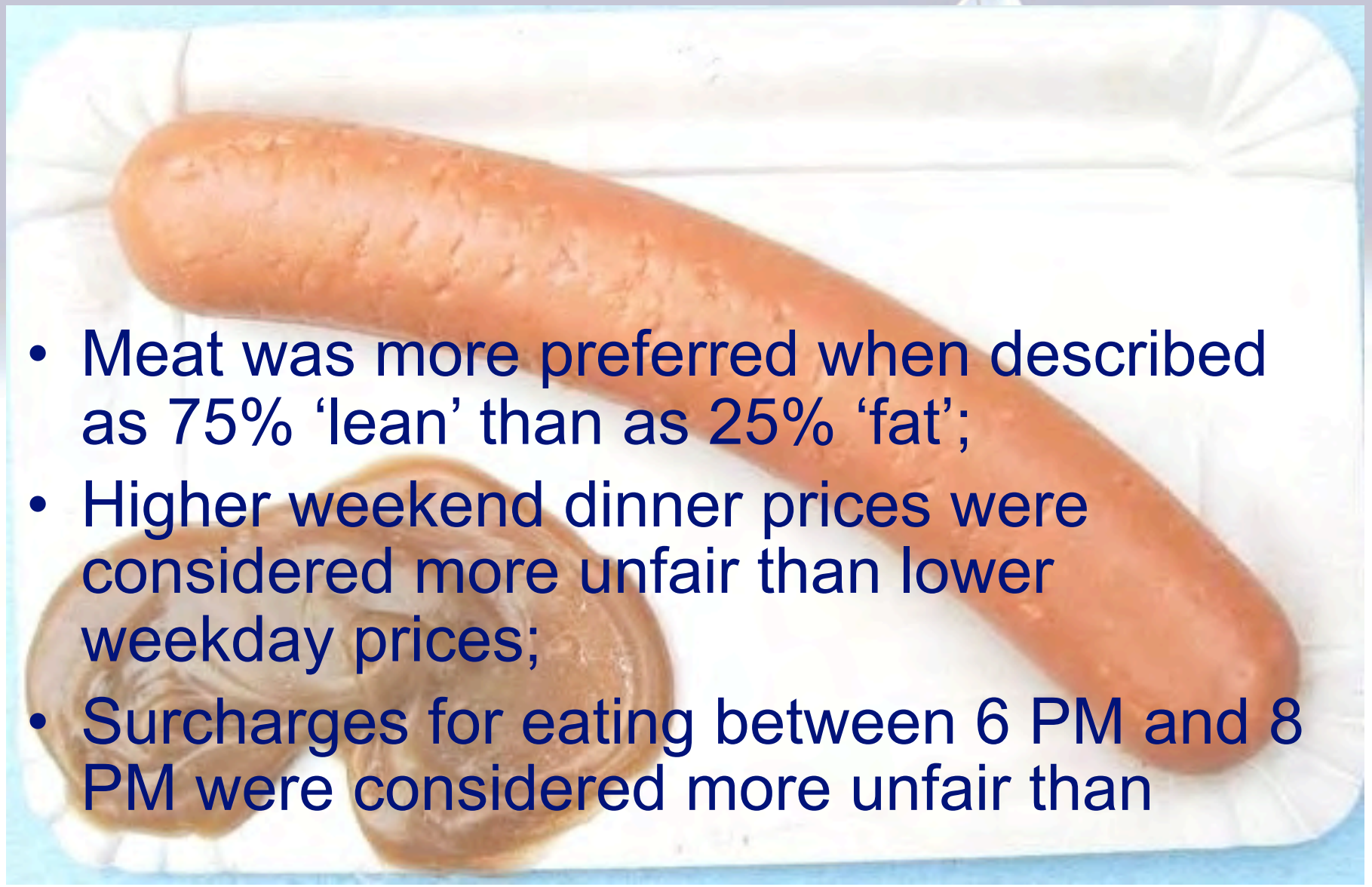
Policy Suggestions from SQB Research

- At a buffet, put healthy items first in order (Loewenstein, 2007);
- All government lunches vegetarian by default, meat only on dietary request (Prast, 2010);
- Signing up for bank overdrafts;

Explanation of status quo effects

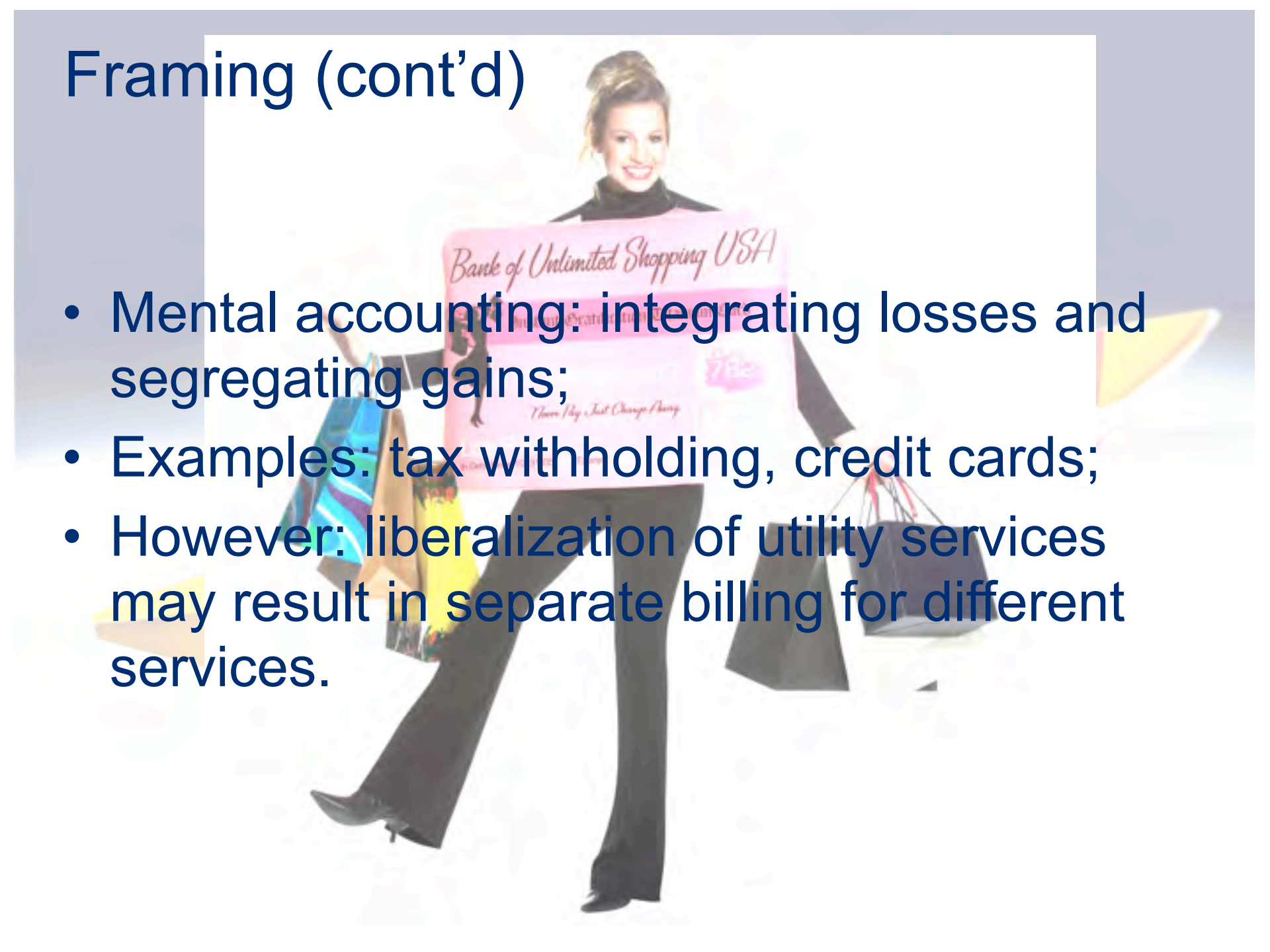
- Deviating from the status quo is considered painful because:
  - Deviating is considered as a loss. Losses loom larger than commensurable gains. Hence decision makers are loss averse;
  - Decision makers might believe that defaults are suggestions by the policy maker/marketer;
  - Deviating may require effort, whereas accepting the default is effortless;
  - Commission may lead to more regret than

(3) Framing



- Meat was more preferred when described as 75% ‘lean’ than as 25% ‘fat’;
- Higher weekend dinner prices were considered more unfair than lower weekday prices;
- Surcharges for eating between 6 PM and 8 PM were considered more unfair than

Framing (cont'd)



- Mental accounting: integrating losses and segregating gains;
- Examples: tax withholding, credit cards;
- However: liberalization of utility services may result in separate billing for different services.

Framing (cont'd)

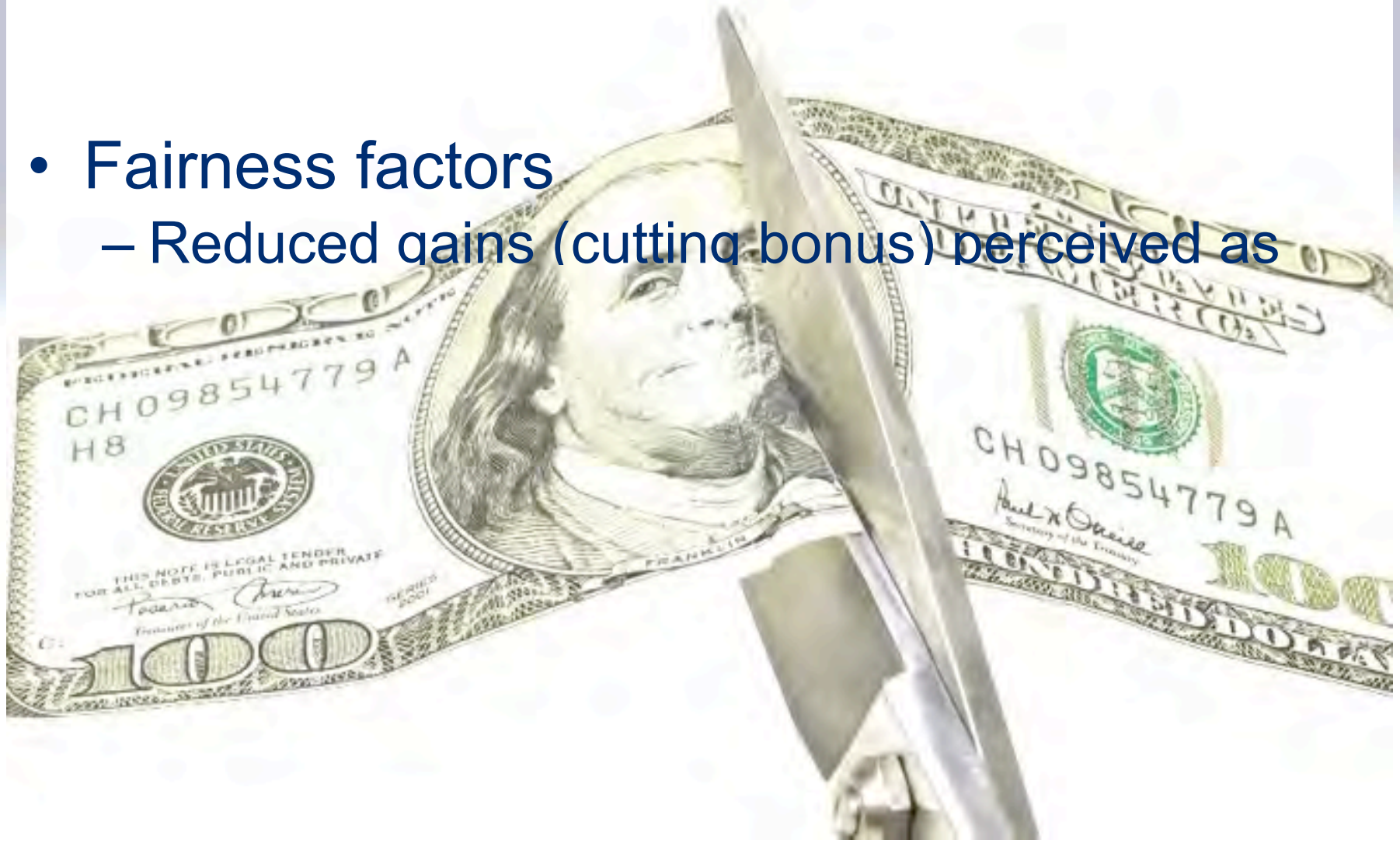
- Setting budgets for categories of expenses possibly results in under-consumption;
  - Setting budgets is mostly practiced by low-income groups and by those who have difficulties to make ends meet;
  - Setting budgets facilitates keeping track of one's expenses.
  - Spending likelihoods differ across pension budgets, home equity, wealth accounts, and cash money/current accounts.

(4) Format effects

- Students' willingness to pay for a diskette containing two computer games in different order:
  - $ 4.08 bad game – good game
  - $ 7.10 good game – bad game

Motivational Effects (cont'd)

- Fairness factors
  - Reduced gains (cutting bonus) perceived as



Markets

Chapter 4

Price policy

Prices convey the exchange ratio of merchandise.

Prices are the area in which companies can rapidly change their parameters – strategic instrument of marketing

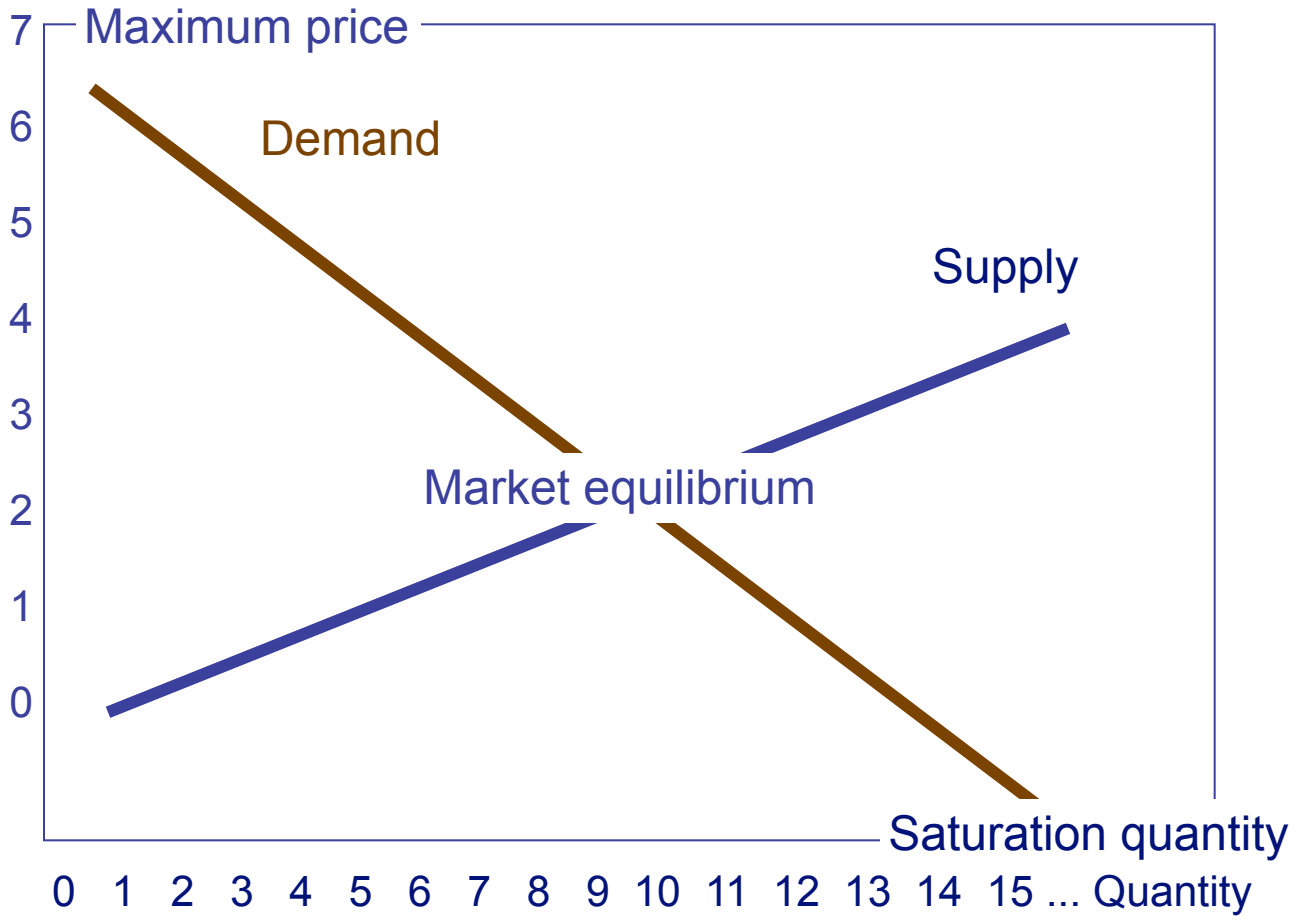
- Price and demand
- Price and quality

Price and demand

- Supply and demand determine the prices.
- Prices determine supply and demand.

The lower the price, the higher the demand.

The higher the price, the higher the supply.



„You get what you pay for"
Price as a signal of product quality

Erich Kirchler, Florian Fischer & Erik Hölzl (2010)

Agenda

I. Subjective quality and price
II. „Objective" quality and price
III. Relation between price and objective quality
IV. Relation between price and quality depending on the level of expenditure
V. Subjective assumptions about price-quality relations and complexity of products
VI. Conclusions

Approaches to product quality
(Steenkamp, 1989)

1. The metaphysical approach
2. The production management approach
3. The economic approach
4. **The perceived quality approach**
    - Study on the price and perceived quality relation (Leavitt, 1954)

Table 1: Percentage of participants preferring the expensive over the inexpensive brand

Assumptions about quality variation	Price range (US-Cents) 68-72	66-74	62-78	52-58	Average percentage
High variation	64 %	50 %	61 %	50 %	56 %
Average variation	47 %	44 %	54 %	41 %	47 %
Low variation	6 %	6 %	10 %	35 %	14 %
No quality variation	0 %	0 %	7 %	0 %	2 %

„Objective” quality and price

Measure of objective quality:

The correlation between price and expert judged quality is used as an indicator of the relation between price and product quality.

Table 2: Studies on the relation between price and objective product quality

(adopted from Böhm, et al., 2007, p. 14)

Author(s)	Year of publication	Data base	N of tests	r
Oxenfeldt	1950	Consumer Reports 1939-1949	35	.25 s
Friedmann	1967	Consumer Reports 1961-1965	29	.15 s
Morris & Bronson	1969	Consumer Reports 1958-1967	48	.29 s
Diller	1977	Stiftung Warentest 1972-1976	269	.19 p
Sproles	1977	Consumer Reports 1972-1974	135	.26 s
Riesz	1978	Consumer Reports 1961-1975	679	.26 s
Dardis & Gieser	1980	Consumer Reports 1970-1977	105	.28 s
Geistfeld	1982	Consumer Reports 1976-1977	18	.20 s
Yamada & Ackermann	1984	Monthly Consumer 1972-1981	79	.06 s
Bodell, Kerton & Schuster	1986	Canadian Consumer 1978-1985	91	.19 p
Diller	1988	Stiftung Warentest 1972-1986	36	.24 s
Steenkamp	1989	Consumentengids 1977-1986	413	.29 s
Faulds & Grunewald	1993	Stiftung Warentest 1986-1989	32	.10 s
Fürst et al.	2004	Stiftung Warentest 1999-2002	152	.13 p

Note: s = Spearman-Rho correlation; p = Pearson-Bravis correlation

Table 3: Studies on the relation between price of food and (objective) product quality

(adopted from Böhm, et al., 2007, p. 15; Böhm et al., 2007, study included)

Author(s)	Year of publication	Data base	N of tests	r
Oxenfeldt	1950	Consumer Reports 1939-1949	10	-.13
Friedmann	1967	Consumer Reports 1961-1965	9	.09
Diller	1977	Stiftung Warentest 1972-1976	22	-.11
Riesz	1978	Consumer Reports 1961-1975	40	.09
Diller	1988	Stiftung Warentest 1972-1986	1	.39
Judd	2000	Cooking magazine	40	.04
Fürst et al.	2004	Stiftung Warentest 1999-2002	not available	-.02
Böhm et al.	2007	Stiftung Warentest 1994-2006	46	-.12

Note: s = Spearman-Rho; p = Pearson-Bravis correlation

Conclusion of former studies

Price-quality relations are weak

→ Price is a poor market signal of quality for most products, but:

Do consumers' assumptions about price-quality relations resemble objective price-quality assessments?

Course of action

- Analysis of data on prices and product quality and comparison with previous findings in the literature
- Comparison of correlations among different product categories and for inexpensive and expensive goods
- Measurement of consumers' assumptions about price-quality relations
- Analysis of consumers' assumptions about product complexity
- Analysis of price-quality relations by perceived (assumed) product complexity

Data set

- Data was taken from 37 issues of the consumer magazine „Konsument” (2004-07 for the most part)
- Price: the average price indicated in various stores
- Quality: the average judgment of experts, measured on various product attributes and expressed by ratings (1 to 5) and by percentages of total quality
- Data set: 210 tests, involving 2,277 brands; the products were categorized into 8 categories (i.e. „car and transport”)

Procedure and analyses

The relation between price and objective quality was computed as Spearman-Rho correlations between price and quality as rank of each brand within a product test

Computation of

1. The price-quality-correlation of all 210 product tests,
2. The average correlation within the 8 product categories,
3. The average correlation of all product categories

Price and quality relations within product tests

- Correlations vary from r = -.89 to r = 1.00
- 40 correlations were positive and statistically significant (p=0.05)
- 7 correlations were significant but negative
- In 37 tests the most expensive product was judged as the qualitatively best product

Figure 1: Price-quality correlations (categorized into 10 categories varying from r = -1 to r = 1) found in 210 product tests

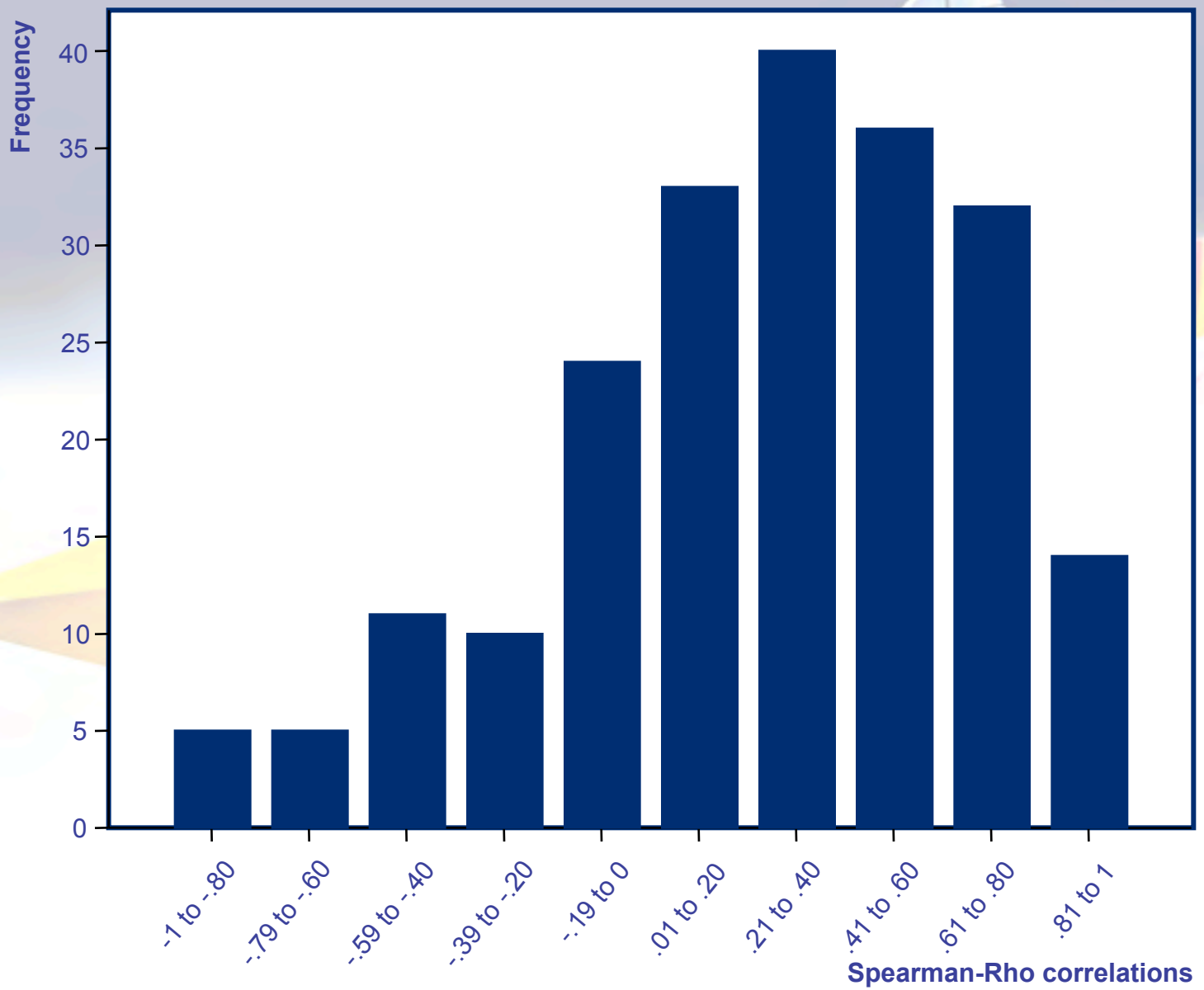
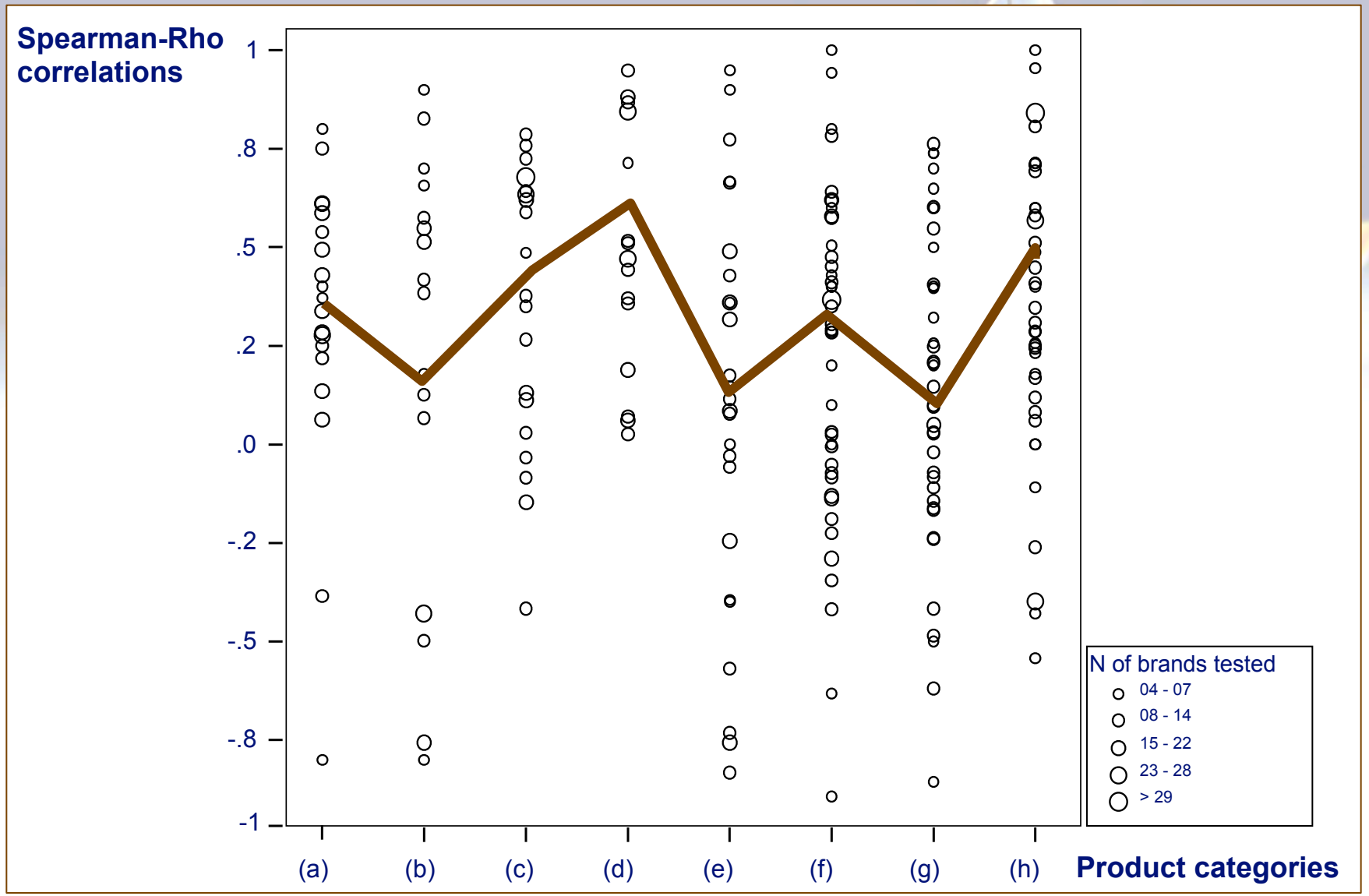


Table 4: Average price-quality relations within 8 product categories (Spearman-Rho correlations)

Category	N brands	N product tests	df	r	p
(a) Car and transport	257	19	255	.34	<.01
(b) Construction and energy	174	16	172	.13	.09
(c) Video, camera, music	269	19	267	.42	<.01
(d) Computer and telephone	218	15	216	.58	<.01
(e) Food and beverages	272	25	270	.07	.24
(f) Leisure and family	408	40	406	.24	<.01
(g) Health and cosmetics	320	38	318	.06	.25
(h) Home and garden	351	36	351	.42	<.01

Figure 2: Correlations between price and quality of 210 product tests by 8 product categories



Note: The solid line represents average correlations in the 8 product categories. (a) = car and transport, (b) = construction and energy, (c) = video, camera, music, (d) = computer and telephone, (e) = food and beverages, (f) = leisure and family, (g) = health and cosmetics, (h) = home and garden.

Does the relation between price and quality depend on the level of expenditure?

Table 5: Price-quality relations by price category

Price categories	N brands	N product tests	Percentage of brands tested	df	r	p
< € 10	618	59	28.4	616	-.01	.75
€ 10.1-100	625	62	29.8	623	.31	<.01
€ 100.1-500	658	54	26.0	656	.47	<.01
€ 500.1-1000	196	18	8.7	194	.53	<.01
> € 1000	172	15	7.2	170	.25	<.01

Questionnaire on price-quality relations and complexity

a) *Do you think that the price of [product] reliably indicates the quality of that product?*

b) *Do you think that the quality of [product] can easily be assessed or that the quality of that product is hard to judge because the product is very complex?*

- 41 respondents; average age: 32.6 years (SD = 14.4);
  56% males; 44% females.
- 5-point scales:
  1 = a high price indicates a low quality, and quality can easily be assessed.
  5 = a high price indicates also high quality, and quality is hard to judge because the product is highly complex.

Results

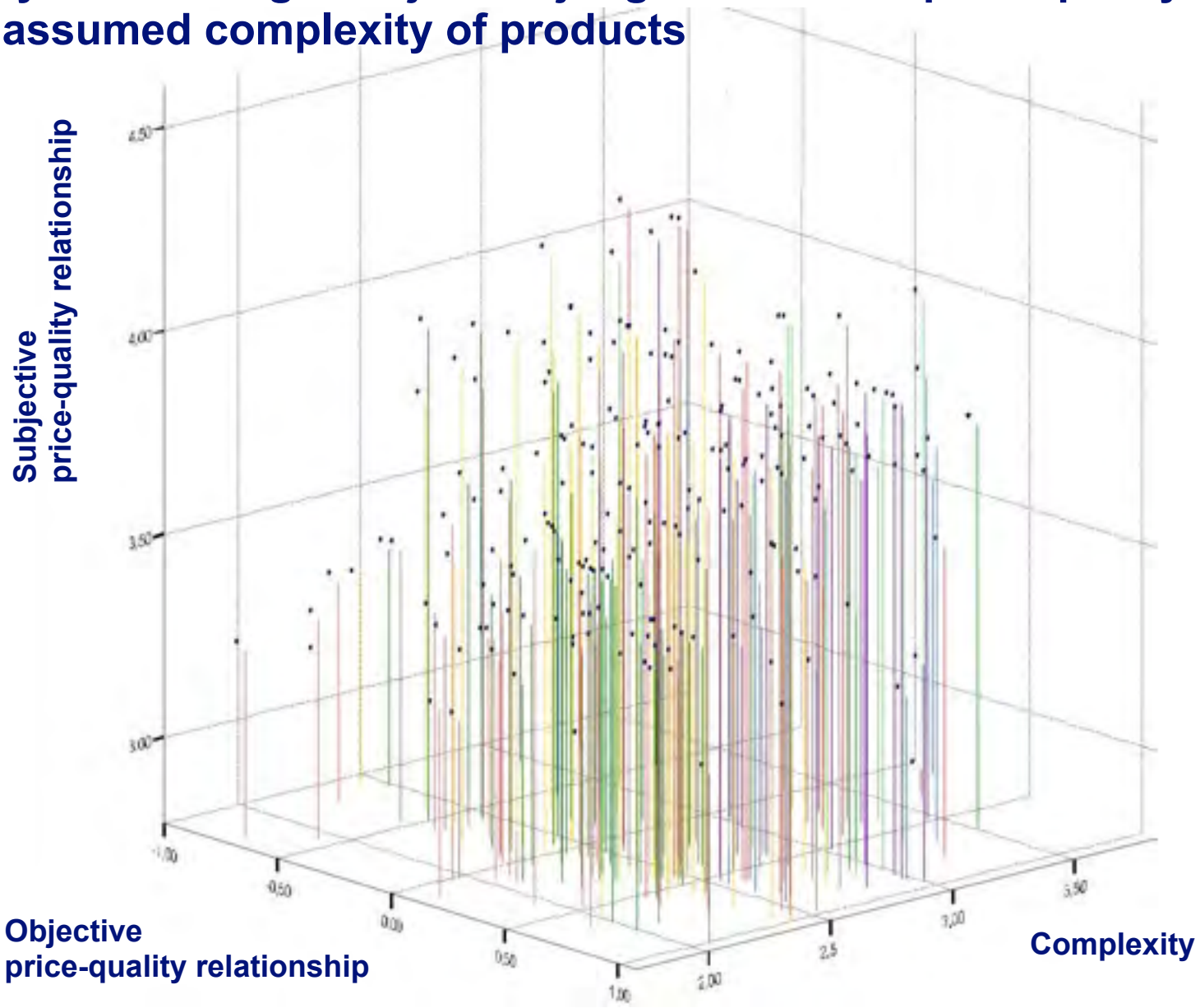
- **The average price-quality relation: M = 3.67 (SD = 0.29)**
- The **strongest** relation: Car and transport (M = 3.87, SD = 0.40)
- The **lowest** relation: Food and beverages (M = 3.52, SD = 0.27)
- Univariate analysis of variance (8 product categories → price-quality judgments) shows a sign. effect
  (F = 6.19, df = 7,200, p < .01)

- **The average product complexity: M = 2.59 (SD = 0.38)**
- The **most complex** products: Video, camera and music items
  (M = 3.06, SD = 0.30)
- The **least complex** products: Food and beverage items
  (M = 2.19, SD = 0.30)

Table 6: Spearman-Rho correlations between (a) the objective price-quality relationships and the subjective assumptions about price-quality relationship ($r_{OPQ - SPQ}$), (b) the objective price-quality relationships and subjective assessments of complexity ($r_{OPQ - C}$), and (c) the subjective assumptions about price-quality relationship and complexity ($r_{SPQ - C}$)

Products	**N**	**$r_{OPQ - SPQ}$**	**p**	**$r_{OPQ - C}$**	**p**	**$r_{SPQ - C}$**	**p**
(a) Car and transport	19	.24	.32	.01	.98	-.57	.01
(b) Construction and energy	16	.30	.26	-.38	.15	-.18	.50
(c) Video, camera, music	19	.21	.40	.26	.29	.33	.17
(d) Computer and telephone	15	.05	.85	.19	.54	-.43	.11
(e) Food and beverages	25	.58	<.01	.33	.11	.51	<.01
(f) Leisure and family	41	-.10	.52	-.20	.21	.05	.75
(g) Health and cosmetics	38	-.13	.45	-.33	.05	-.03	.88
(h) Home and garden	37	.33	.05	.20	.27	.50	<.01
Overall	210	.23	<.01	.14	.04	.22	<.01

Figure 3: Objective price-quality correlations for the 210 product tests jointly with average subjective judgments about price-quality relations and assumed complexity of products



Conclusions (I)

- Price is a rather poor signal of quality.
- The average correlation between price and quality is moderately positive (r = .30), ranging from highly negative to highly positive across product categories.
- The more expensive products are, the higher the relation turned out.
- Subjective assumptions about price-quality relations are more positive, *however* consumers do not seem to have a correct understanding about when and for which product categories the price can be used as a signal of quality.
- Subjective assumptions co-vary moderately with objective price-quality relations.

Conclusions (II)

- Subjective assumptions were related to product complexity, though the results are ambivalent:
  - Food and beverages as well as home and garden sectors: The higher the complexity of a product, the more consumers assume that expensive products are also qualitatively better than inexpensive products.
  - Car and transport sector: The correlation is negative.
- Problems of measurement:
  - Neither price nor quality can be measured precisely.
  - Testing agencies examine only product characteristics that are amenable to quality measurement.
  - Testing agencies define specific product characteristics and combine judgments of these characteristics to a single quality indicator.

Quality judgments based on the price
(Shiv et al., 2005)

Does the consumption of a marked down energy drink lead to a reduced performance in solving puzzles?

Participants who paid the discounted price performed less well in solving the puzzle than the participants who had paid the usual price.

If the participants were told that the quality of the beverage had not changed despite the discount, the differences in performance were negligible.

Financial Markets

Chapter 8

Financial markets

- Stock market
- Psychology of the stock exchange

Stock market

The stock market is a market on which brokers trade goods. Shares are issued and traded either through exchanges or over-the-counter. The share prices or exchange rates are formed under regulated conditions and at defined times in accordance with the law of supply and demand. Securities (stocks, bonds), exchanges, goods (raw materials) are traded.

- Abstractness: actual goods are replaced arbitrarily divisible bulk goods respectively entitlements to them
- Anonymity: buyer and seller don‘t meet in person

The stock market is considered an ideal of an efficient market.

Hypothesis of market efficiency:

Immediately a lot of market participants have access to all the freely available and relevant information, which is processed in a complete and quick manner. Behavior is rational and goal-oriented (Fama, 1965).

At all times, the exact exchange rate results solely from the expected dividend payments as well as the expected increase in value and reflects both accurately(Schulz-Hardt, Vogelgesang, & Mojzisch, 2007).

“Random-walk-hypothesis”:

Due to the self-regulatory capacities of the stock market, share prices vary unsystematically and randomly.

Systematic violations of the random-walk-hypothesis (Duggan, 1999)

- Calendar effects: In January exchange profits are higher than during the rest of the year.
- Weekly effects: Share prices usually rise on Friday and fall on Monday.
- Intraday effect: Share prices rise during the first respectively the last 45 minutes of the day.
- Holliday effect: On the day before a holiday share prices tend to rise more than usual.
- Volume of trade: The number of shares being traded can‘t be explained rationally.
- Price earning effects: Shares with low prices increase much more in value than shares that recently suffered substantial losses in value.
- Initial public offerings: The first day after going public, share prices rise by 20% on average.
- Market volatility: Share prices are too volatile to be caused by rational market behavior.

What is traded on the stock market?

Equity security (e.g. shares)

An instrument that signifies an ownership position (called equity) in a corporation, and represents a claim on its proportional share in the corporation's assets and profits. Ownership in the company is determined by the number of shares a person owns divided by the total number of shares outstanding. Most stock also provides voting rights, which give shareholders a proportional vote in certain corporate decisions.

Debt securities (e.g. bonds)

The buyer of the debt security effectively lends the issuer money in exchange for the security, which gives the holder the right to receive interest payments and, at maturity, the principal.

Derivative security (e.g. derivatives)

Derivatives are financial products, such as futures contracts, options, and mortgage-backed securities. Most of derivatives' value is based on the value of an underlying security, commodity, or other financial instrument.

Psychology of the stock exchange

Speculation bubbles are a proof that fluctuations in price on international financial markets do not conform to the principle of rationality.

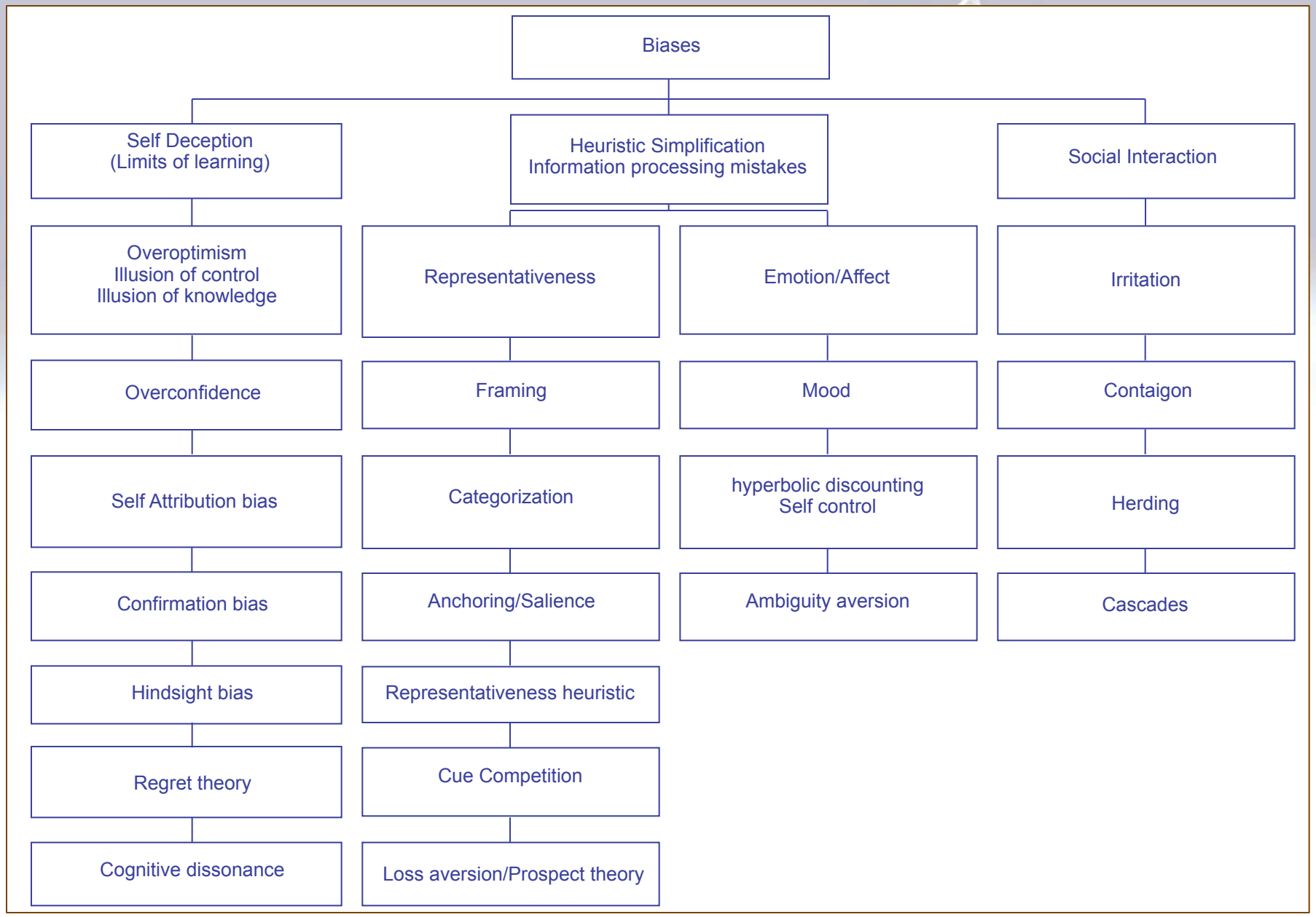
- Emotions
- Spontaneity
- Framing
- Herding
- Information is processed inadequately
- …

Fundamentals of best and worst trading decisions (Oberlechner, 2004)

Strong opposition: center

Strong approval: outer ring

Sources of errors in financial decisions (nach Montier, 2010)



Effect of performance presentation format on investment fund choice

Diacon and Hasseldine (2007) found evidence that presenting past information in terms of fund values or percent yields significantly affects investment fund preference and perceptions of risk and return.

- Presentation of information: percent yields were rated more negative.
- The timescale of past performance information had no such impact.

Under- and overreaction

Often old information is underrated whilst new information is overrated. Thus, especially in destabilized stock markets media reports gain great influence on price movements.

Schachter, et al. (1986)

- When there is a stable upward trend investors expect it to continue and tend to ignore daily events.
- When no clear trend is apparent, investors are influenced by daily events (e.g. plain crashes, murder).

Overreaction because of money illusion

- Svedsäter, Gamble, and Gärling (2007): The nominal value of a stock (e.g. euro compared to Swedish krona) influences the estimations of price movements after a media report.
- Ikenberry, Rankine, and Stice (1996): Splitting a stock (instead of one stock for 100€, investors receive 2 for 50€) influences investors' behavior. Stock prices tend to rise after a stock split. The lower nominal value generates the impression that the stock has become cheaper.

Disposition effect

(Shefrin & Statman, 1985)

Which equity stake would you sell? A or B?

A) Initially bought for 500€, the equity stake now has a value of 1000€.

B) Initially bought for 1500€, the equity stake now has a value of 1000€

➨Most would sell A!

Reason: Risk aversive behavior when winning; risk taking tendency when losing.

Prospect Theory: Psychologically, losses loom larger than wins. Therefore losses are avoided whenever possible.

The disposition effect may cause investors to put together portfolios which they would not have put together under other circumstances: Linnainmaa (2005): At the end of the day individual day traders are reluctant to close losing day trades. They even sell other stocks from their portfolios to finance the unintended purchases.

House-money-effect (Thaler & Johnson, 1990):

Risk taking behavior is influenced by prior monetary gains. Recently won money is not yet perceived as one's own money, but as being house money. Players in the casino as well as stock brokers take more risks after they have experiences high wins.

The disposition effect can be reduced:

Self-control (Thaler & Shefrin, 1981): Authorize financial advisers to sell stocks without further inquiry if prices fall below a certain value.

- Experience dependent on others' outcomes (Fox & Dayan, 2004): Participants were handed out varying outcomes of investments. Outcomes were perceived as losses or gains depending on other participants' outcomes. In case the own outcome was equaled the outcomes of others the disposition effect was limited.
- Positive mood (Piñón und Gärling, 2004): A picture was presented with the purpose of inducing a positive or negative mood. Those in a positive mood ignored recent losses and sold stocks that diminished in value, while those in a negative mood kept them.

Risk spreading

High volatility of stocks may be linked to large losses and/or gains. Therefore it is important to assess a stocks‘ risk correctly and spread risk on several independent stocks.

Most investors spread risk unreflectedly:

- 1/n-Heuristic: Capital is spread on all available options in equal amounts (e.g. 50% high-risk, 50% low-risk).
- Home-bias: Often investors buy stocks of native companies.

Hedesström, Svedsäter, and Gärling (2007): Laypeople diversify their portfolio more effectively if they are provided with knowledge on the interdependence of their stocks.

Tendency towards variation:

Simonson (1990):

One group of customers bought several sweets on one shopping trip (simultaneous choice), while the other group of customers bought one sweet at a time, just before each consumption occasion (sequential choice). The simultaneous choice condition yielded more variety seeking (greater variety of sweets chosen) than the sequential choice condition. Satisfaction was higher when choosing sequentially.

Read und Loewenstein (1995). “Diversification Bias”: Tendency towards variation to prevent saturation. Underestimation of duration between choosing and consumption. When choosing simultaneously they adapt their choices to their current needs.

Hindsight bias

- Hindsight bias (Fischhoff, 1975): Describes the inclination to perceive past anticipations and predictions retrospectively as more accurate than these anticipations and predictions actually were at the time they were made.

Reasons:

- Recollection errors
- “I knew it all along”-tendency
- “Creeping determinism”: “it had to happen”

- Kahneman et al. (1998): Within an hour of the market closing every day, experts can be heard on the radio explaining with confidence why the market acted as it did. Even if they had predicted otherwise the day before.
- Biais und Weber (2007): Investors criticize their financial advisors for not telling them about declining stock markets, although the trend had been obvious. Hindsight biases prevent learning processes used in future decisions.

Representativeness heuristic

Oberlechner (2004)

a) The U.S. dollar will rise in relation to the D-Mark.

b) The Swiss Franc will be worth more in December than in July.

c) The U.S. dollar will rise in relation to the D-Mark AND the Swiss Franc will be worth more in December than in July.

d) The U.S. dollar will rise in relation to the D-Mark OR the Swiss Franc will be worth more in December than in July.

75% of the interviewed exchange dealers thought of option c) to be most likely to happen, even though the probability of single events (like a or b) is higher than that of combined events.

Anchoring

Being asked for numerical judgments a person starts with an implicitly suggested reference point (the “anchor”) and makes adjustments to it based on further information (even if completely unrelated) to reach his or her estimate.

Judgments made on the financial market may be biased by unconsciously chosen reference points which indicate whether the situation is perceived as a gain or a loss.

- Value when the share was bought (if purchase happened recently).
- Highest value of a share in the past.

"Starting Low but Ending High" effect (Ku, Galinsky, und Murnighan, 2006): Contrary to the anchor effect, low starting bids at auctions may ultimately result in high closing bids.

Reasons:

- Low starting bids stimulate to buy – the more bidders, the higher the price.
- Sunk costs: Bidders who have placed a bid when prices where at low levels already invested a lot of time and energy.
- The number of other bids could influence the perception of the subjective value of the auctioned good (more bidders → higher subjective value).

An empirical analysis of auctions on eBay confirmed the following:
Auctions starting low → more bids, successful transactions more often
Auctions starting high → less bids, successful transactions more seldom

Recognition heuristic

Goldstein and Gigerenzer (1999)

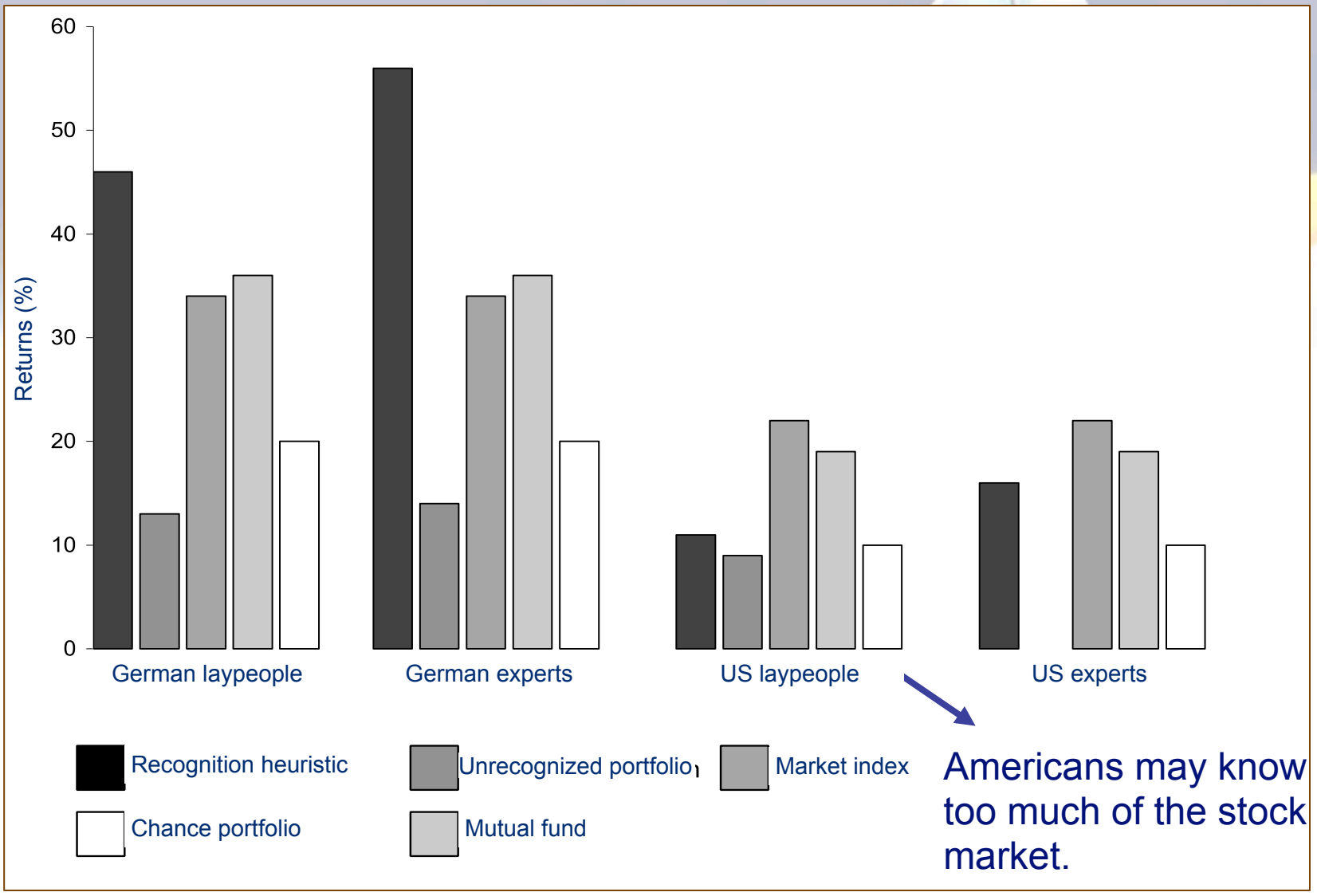
Students from Germany and from the USA were asked whether San Diego or San Antonio had more inhabitants.

While 100% of German students knew the correct answer (San Diego), only 66% of the students from the USA did so.

German students were able to use the recognition heuristic. Due to the fact that they only knew of San Diego they concluded that San Diego probably had more inhabitants than San Antonio.

At the stock market the impact of the recognition heuristic has been demonstrated as well (Borges, Goldstein, Ortman, and Gigerenzer, 1999): Portfolios that were arranged referring to the principles of the recognition heuristic outperformed (over a six moth period) portfolios consisting of less known shares respectively portfolios which had been put together randomly.

Comparison of the performance of portfolios (domestic recognition) (Borges et al., 1999)



Emotions

Being in a positive mood causes rather superficial thought processes (Schwarz, 2000).

Music was used to induce positive/negative/neutral mood. Those participants who had gotten into a neutral mood made the highest profits, while those who had been in a positive mood earned the least (Au, Chan, Wang, & Vertinsky, 2003).
On sunny days share prices tend to rise (Saunders, 1993).

Participants were asked to describe companies that were linked to positive or negative emotions. Thereafter participants were more willing to invest in shares of companies which had been linked to positive feelings. Also participants expected the performance of shares linked to positive emotions to be better than those of companies linked to negative emotions (MacGregor, Slovic, Dreman, & Berry, 2000).

Social influences

Herding behavior: Tendency of investors to simply imitate others behavior without any considerations (e.g. buy/sell just because others did so as well).

- Interpersonal communication: Investors‘ behavior is influenced by rumors; even when the source of the information is known to be unreliable (DiFonzo & Bordia, 1997).
- Media reports: Investors who have gained knowledge about the reasons of recent changes in prices make appropriate purchasing/sales decisions. Their decisions in turn intensify the (supposed) trend.
- Observation of other investors’ behavior

It is less harmful to one’s reputation to make conventional mistakes than to swim against the current and maybe be proven right or maybe not(Keynes, 1936/1997).

Informational cascades commence when investors neglect their private information and imitate others (Shiller, 2000).

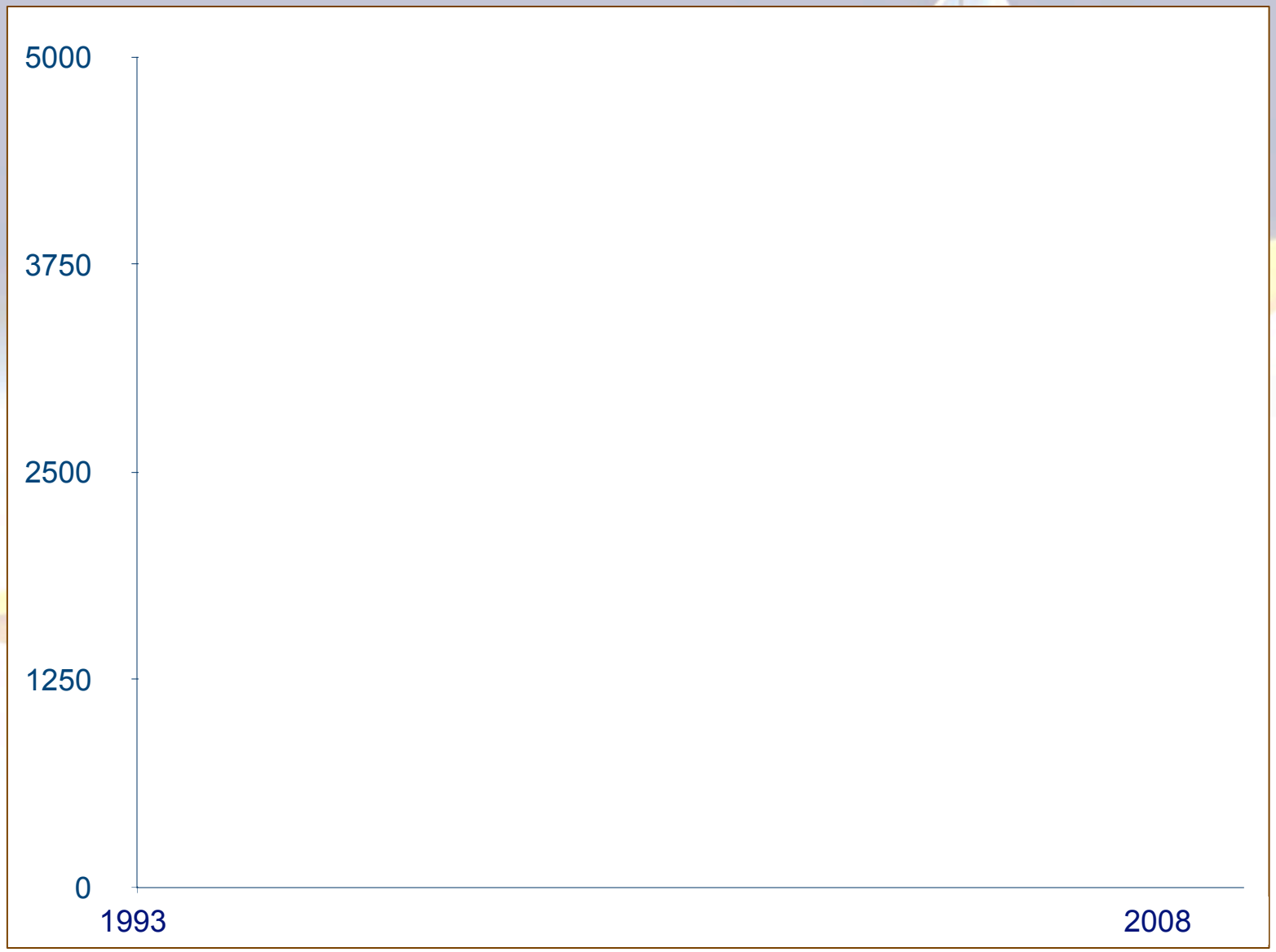
Speculative bubbles

= Difference of market price and fundamental value of an investment.

Because of unsubstantiated assumptions that market prices will continue to rise, there can be a tremendous increase in market prices, which ultimately results in a bubble. When investors recognize that prices are inflated, massive and panic-like selling can occur.

→ Panic after „Lehman Brothers Inc.” had to declare insolvency.

NASDAQ 100 index from 1993 to 2008



Causes for speculative bubbles

- Financial infection: by global cash flows
- Psychological infection: “Viral infection” of emotions, expectations and attitudes spreads.
- Psychological escalation: Feedback effect; media coverage of the future success of novel technologies causes euphoria, increases the demand for these stocks which results in a rise of share prices. This in turn causes another euphoria, etc. etc.

Investors are infected by a phenomena labeled “herding”.

Behavior of “herding”

(Oberlechner, 2004)

- When share prices start to rise it is reasonable to buy shares.
- When share prices have already risen (or fallen) and mass media still covers the information which ultimately led to the enormous rise (or decline) and the information no longer represents a novelty, it is reasonable to sell. At this point professional brokers start to sell.

Characteristics of successful investors

(factor analysis; Oberlechner, 2004)

1. Factor: Disciplined cooperation: discipline, capacity for teamwork
2. Factor: Tackling decisions: aggressiveness, stress resistance, risk tolerance
3. Factor: Market meaning-making: correct evaluation of information, intuition and experience
4. Factor: Emotional stability: professional, mature appearance
5. Factor: Information-processing: analytical thinking, ability to learn
6. Factor: Interested integrity: curiosity and integrity
7. Factor: Autonomous organization: independence, organizing ability, optimism
8. Factor: Information handling: mathematical, social and communicative skills

“Seven cardinal sins of fund management” (Montier, 2005)

1) Pride: The sin of overconfident predictions - The folly of forecasting
2) Gluttony: The sin of accumulating information - The illusion of knowledge, or is more information better information?
3) Lust: The sin of believing in manager information - Meeting companies. Why waste your time listening to company management?
4) Envy: The sin of exaggerated self-confidence - Thinking you can out-smart everyone else
5) Greed: The sin of hyperactivity - Short time horizons and overtrading
6) Sloth: The sin of gullibility - Believing everything you read
7) Wrath: The sin of group decisions - Are two heads better than one?

Determinants for trust in financial institutions

(Gärling, Kirchler, Lewis, & van Raaij, 2010)

1) Competence (knowledge of financial products and the ability to communicate this knowledge)
2) Integrity (authenticity; honest/thorough consultancy)
3) Transparency (concerning rules, procedures, change and comprehensible communication on these topics)
4) Benevolence (giving advice and communicating from the client's perspective and the client's interest)
5) Value congruence (of important values and norms of a financial-services provider and its customers)
6) Stability (predictability, continuity, solvency)
7) Reputation (positive trustworthy image by communicating one's performance and values)