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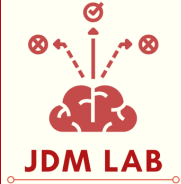


**Psychology, Decision Making, and  
Education to a Circular Economy**

School of Science  
2023-2024

# **PROSPECT THEORY: LOSS AVERSION, FRAMING, ENDOWMENT EFFECT, AND STATUS QUO**

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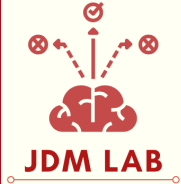


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# PROSPECT THEORY: A DESCRIPTIVE MODEL OF DECISION-MAKING

- Starting from work on the violation of rational axioms, Kahneman and Tversky (1979; 1992) developed a model to describe more accurately how real people make decisions.
  - This model is Prospect Theory.
  - Prospect Theory is not in opposition to the Theory of Expected Utility, but aims at integrating and extending it.
    - Expected Utility Theory provided a model about how people should make the best possible decision (*normative model*).
    - Prospect Theory provides a model about the processes that induce people to make suboptimal decisions (*descriptive model*).



# PROSPECT THEORY: A DESCRIPTIVE MODEL OF DECISION-MAKING

- In Kahneman and Tversky's (1979) model, Expected Utility becomes the benchmark model to assess the quality of choices made by people in several domains (economics, health, etc.).
- In choices under uncertainty, people have a tendency to simplify the decision as much as possible in order to save cognitive energies.
- In other words, cognitive limitations (in terms of memory or attention) make it difficult to execute the complex computations required to obtain a measure of expected utility.

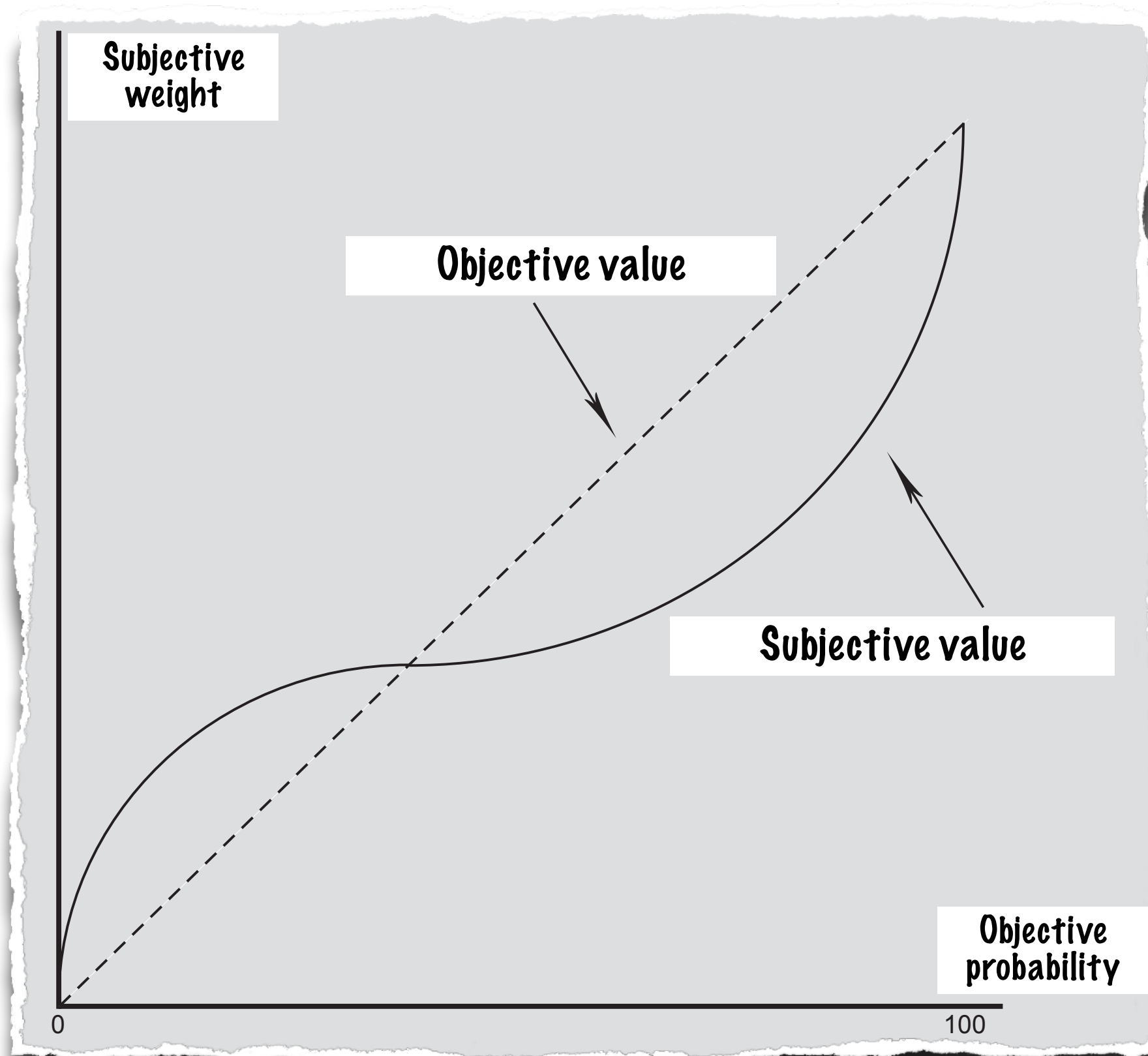
# THE TWO STAGES OF THE DECISION PROCESS

- Prospect Theory states that decisions are made in two phases:
  - «*Editing*» phase
    - This is a preliminary assessment of alternatives and leads to a simplified representation of the available prospects.
  - «*Evaluation*» phase
    - The simplified prospects, as they emerge from the editing phase, are evaluated and the prospect with the highest value is chosen.

## THE «EVALUATION» PHASE

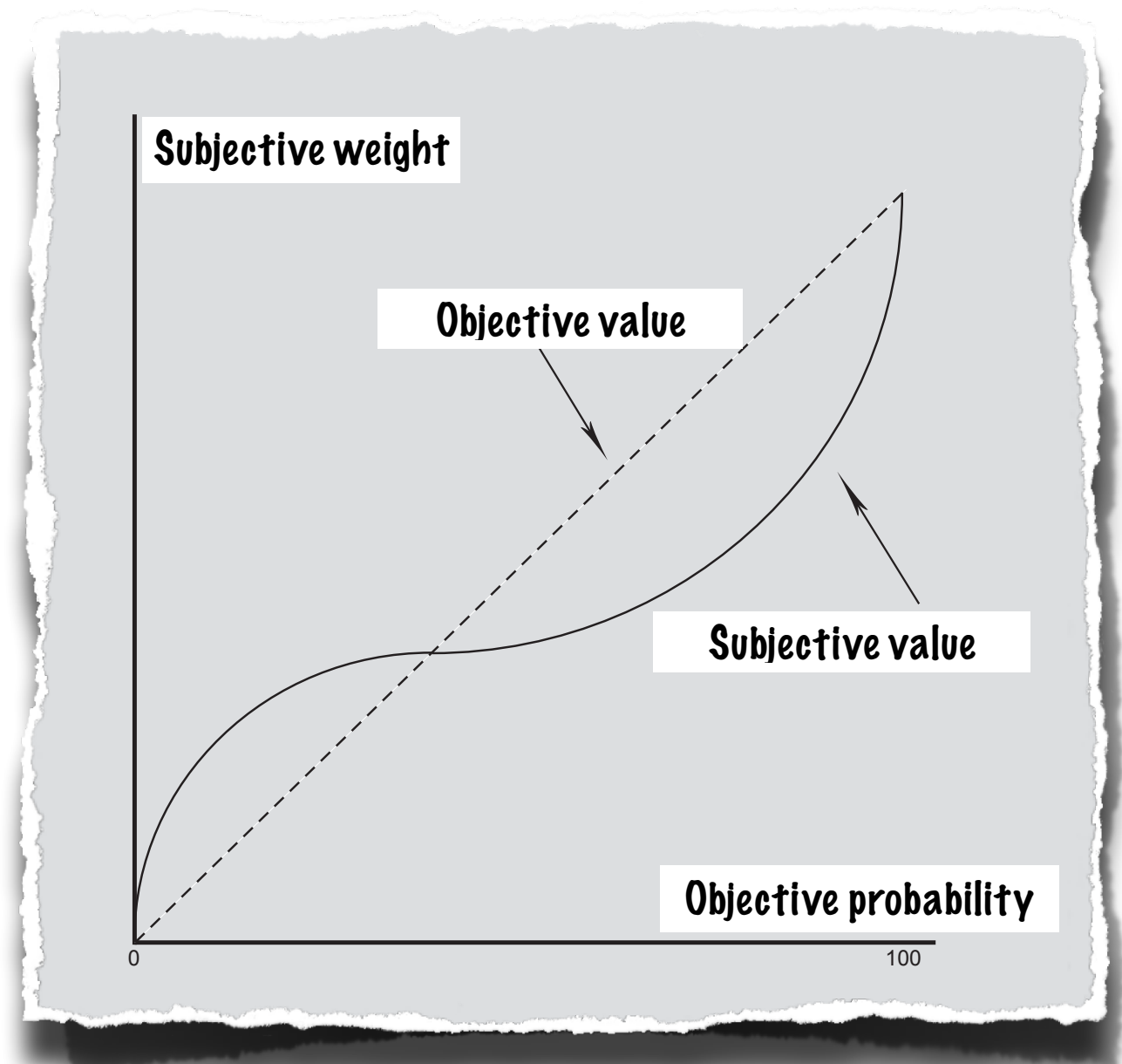
- During the evaluation phase the simplified versions of the prospects are compared and the final choice is made.
  - The evaluation phase relies on two functions that people use to judge, subjectively, the value of outcomes and their likelihood.
    - Weighing function (likelihoods).
    - Value function (outcomes).

# THE «EVALUATION» PHASE: WEIGHING FUNCTION



# WEIGHING FUNCTION

- The weighing function casts light on two important features of how people judge probabilities:
  - Low probabilities are usually overestimated.
  - Medium and high probabilities are usually underestimated.

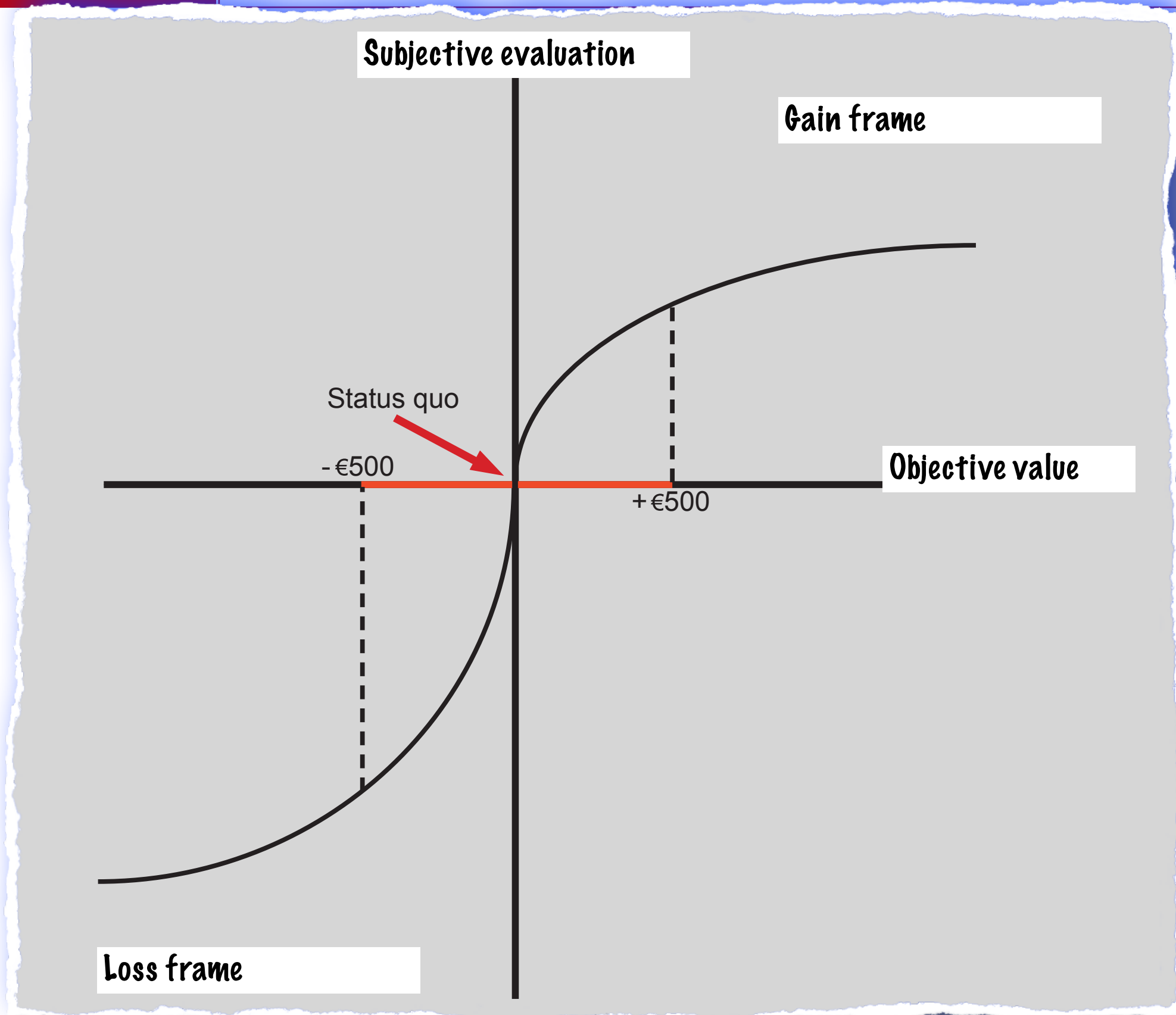


## WEIGHING FUNCTION

- As a consequence, very unlikely outcomes are overestimated compared to having no chance to obtain them.
- In contrast, very likely outcomes are underestimated compared to when they can be obtained for sure.
  - This explains the certainty effect and the example presented while discussing the violation of the independence axiom.
    - Going from a sure win to a very likely win (e.g., 98%) makes that prospect significantly less attractive (high probabilities are underestimated).
    - Going from a sure loss to a very likely loss makes that prospect significantly less negative (low probabilities are overestimated).

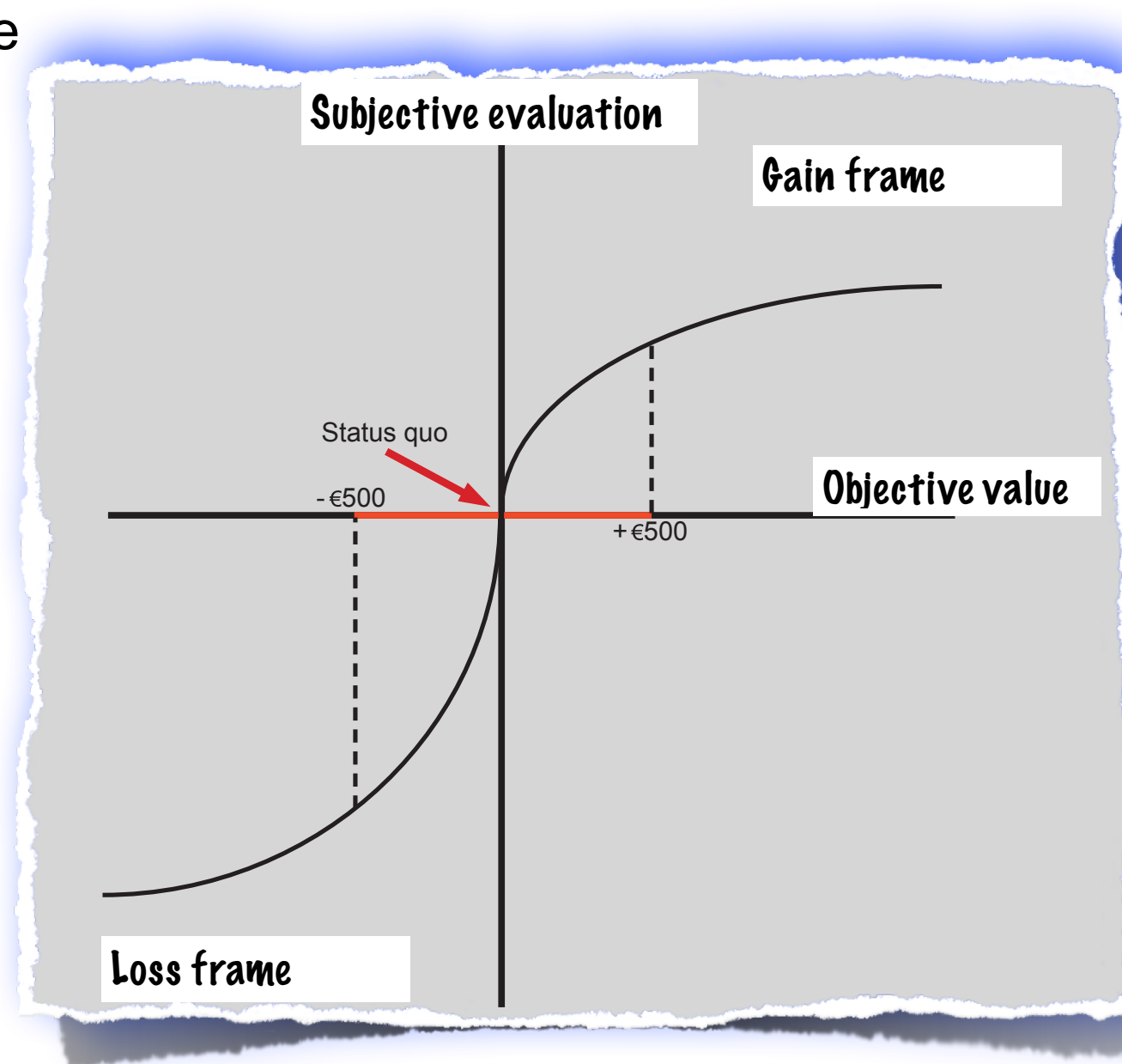


# THE «EVALUATION» PHASE: VALUE FUNCTION



# VALUE FUNCTION

- The value function described by Kahneman e Tversky (1979) has three central features:
  - Outcomes are evaluated in relation to a reference point and are categorized as gains vs. losses.
  - In both frames (gains and losses) the function is characterized by diminishing marginal sensitivity to changes.
  - In the loss frame the function is steeper than in the gain frame.



# VALUE FUNCTION

- The three main features of the value function are at the core of a series of systematic, irrational behaviors, such as:
  - Framing effect.
  - Endowment effect.
  - Status quo bias.

## FRAMING





# FRAMING



# FRAMING

- The framing effect arises when people make different choices in contexts that are logically equivalent although different in the way they are presented.
- For instance, on some occasions, the same decision problem can be presented both in terms of possible gains or in terms of possible losses.
  - We already covered some instances of the framing effect while discussing the violation of the invariance principle.
    - Different descriptions of a problem that are formally identical can induce people to behave differently.

# FRAMING

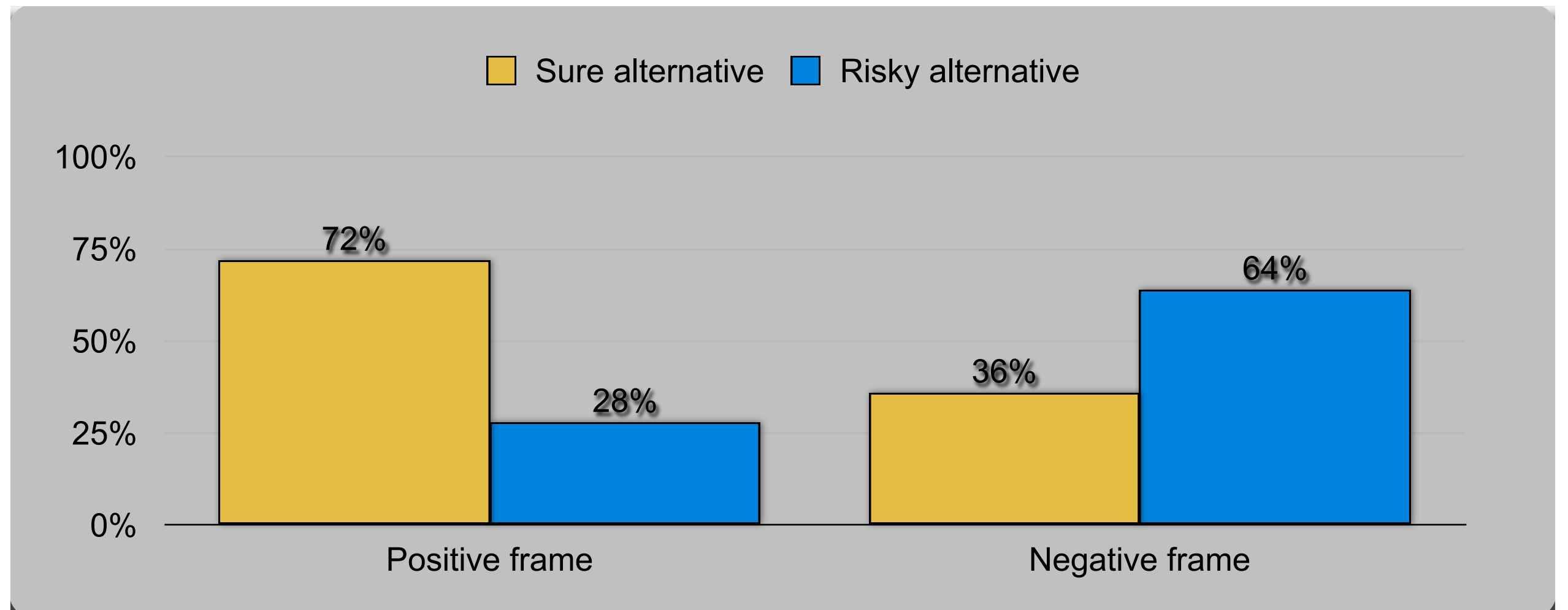
- One of the scenarios used by Kahneman and Tversky (1986) is the following:
  - Imagine you are €300 richer than you actually are, then choose one of the following alternatives:
    - A: Gaining €100 for sure.
    - B: 50% chance of gaining €200 or 50% chance of gaining nothing.

# FRAMING

- Now, imagine you are €500 richer than you actually are, then choose one of the following alternatives:
  - C: Losing €100 for sure.
  - D: 50% chance of losing €200 or 50% of losing nothing.



## FRAMING



- As we can see, people's choices are inconsistent, therefore irrational from an economic standpoint, because the outcome are the same in both versions of the problem:
  - A ( $€300 + €100 = €400$ ) is the same as C ( $€500 - €100 = €400$ ).
  - B ( $€500$  or  $€300$ ) is the same as D ( $€300$  or  $€500$ ).

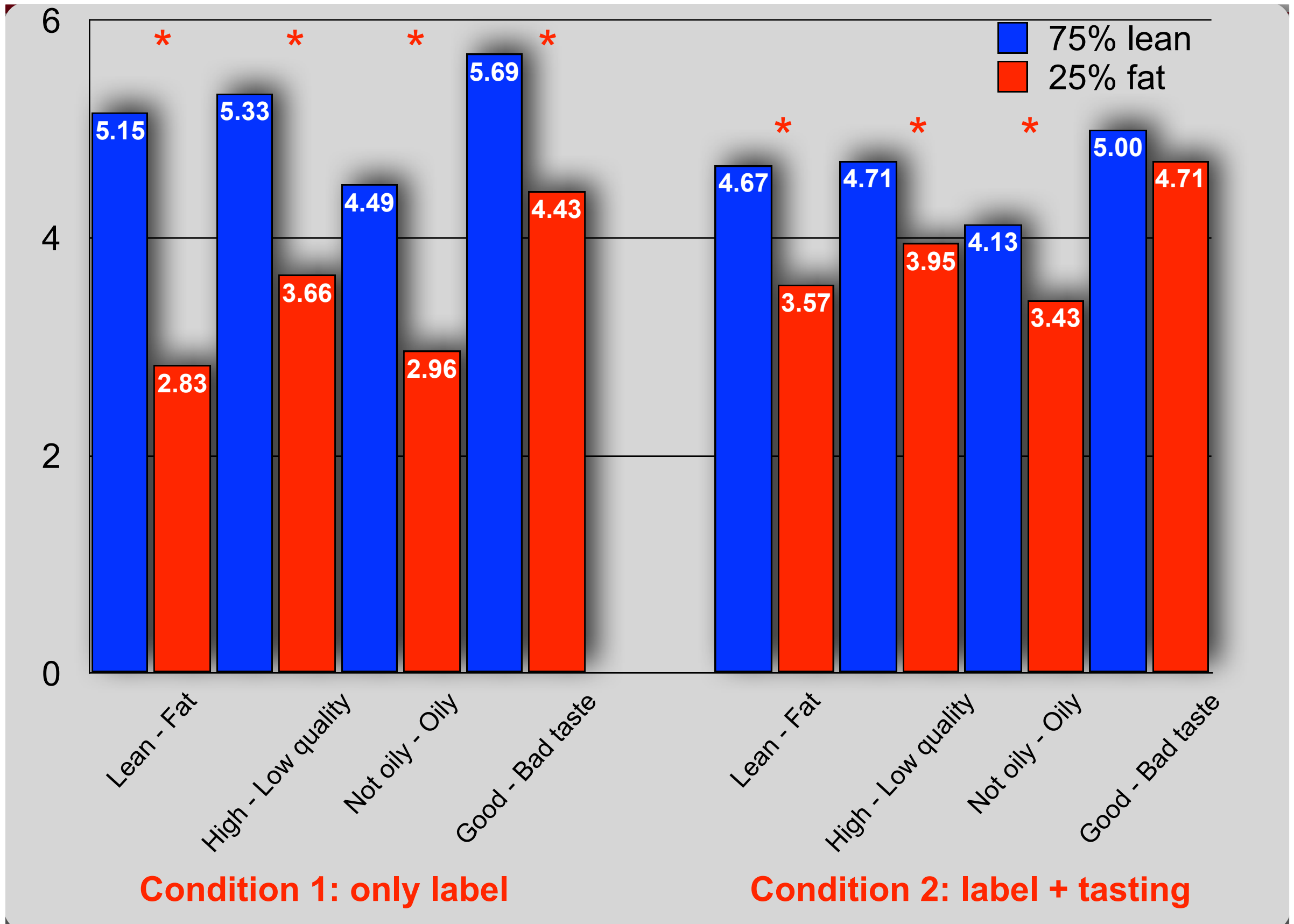
## FRAMING

- A consumer behavior study tested the framing effect using products labels such as “% lean” versus “% fat”.
  - Participants were asked to assess and judge a piece of meat. There were two different experimental conditions:
    - Condition 1 «only label»: Half of participants in this condition were told the meat was “75% lean”, while the other half was told that the meat was “25% fat”.
    - Condition 2 «label + tasting»: Participants were given either one or the other information and where also allowed to taste the meat.

# FRAMING

- All participants judged the meat on four different dimensions using 0-7 scales:
  - Bad taste vs. good taste.
  - Oily vs. not oily.
  - Low quality vs. high quality.
  - Fat vs. lean.

# FRAMING



- Levin, Schneider and Gaeth (1998) described three different types of framing:
  - ***Risky choice frames.***
    - This is the case in which different descriptions of the same problem change people's risk preferences (like in the gambles problem or in the Asian disease problem).
  - ***Attribute framing.***
    - This is a case in which a dimension of a stimulus is expressed along complementary positive versus negative terms (the meat experiment).
  - ***Goal framing.***
    - This framing aims at changing people's behavior by using messages that maximize the likelihood of achieving the goal (for instance, describing the risk associated with smoking versus the benefit associated with not smoking).

- ***Risky choice frames:***

- This type of framing is measured through people's choices. There are any differences when outcomes are described as gains vs. losses?

- ***Attribute framing:***

- This type of framing is measured through evaluations (judgments) of an alternative described positively (% lean) or negatively (% fat).

- ***Goal framing:***

- Since the aim is to actually change people's behavior, researchers will compare the amount of people who change their behavior depending on the message they received (how many individuals stop smoking after learning about the risk of smoking vs. the benefit of not smoking).

(Levin, Schneider & Gaeth (1998). All frames are not created equal: A typology and critical analysis of framing effects. *Organizational Behavior and Human Decision Processes*, 76, 149-188)

## ENDOWMENT EFFECT

- The endowment effect has been introduced and studied in depth by Knetsch, Kahneman and Thaler (1989; 1990; 1991; 2001).
- This bias concerns the asymmetry that exist between willingness to pay (WTP) for a product and willingness to accept (WTA) to sell the same product.
  - Usually:
    - Sellers set a price that is higher than the price buyers are willing to pay.
    - This bias is well-know to negotiators.

## ENDOWMENT EFFECT

- This asymmetry arises because those who own the object attach a sense of ownership that leads them to overestimate the value of the object compared to those who do not own it.
  - It is a reaction driven by loss aversion since people do not want to give away (lose) the object.
- These researchers have shown that this bias can be found even when the object to sell has been given to the seller in that very moment (no ownership).
  - A direct experience or the memory of how (when) the object was used is not required for the endowment effect to appear.



# ENDOWMENT EFFECT

**Group 1**



**Would you swap the mug for the candies?**

**Group 2**



**Would you swap the Candies for the mug?**

**Group 3**



**Which one do you prefer?  
The mug or the candies?**

# ENDOWMENT EFFECT

**Group 1**



**Would you swap the mug for the candies?**

**89% keep the coffee mug**

**Group 2**



**Would you swap the Candies for the mug?**

**90% keep the candies**

**Group 3**



**Which one do you prefer?  
The mug or the candies?**

**56% chose the coffee mug  
44% chose the candies**

# ENDOWMENT EFFECT

**Group 1  
"Buyers"**



**What is the highest price  
you are willing to pay to  
buy this coffee mug?**

**Group 2  
"Sellers"**



**What is the lowest price  
you are willing to accept to  
sell this coffee mug?**

\* Responses from the original study; the value of the mug was around €4.00

# ENDOWMENT EFFECT

**Group 1  
"Buyers"**



**What is the highest price  
you are willing to pay to  
buy this coffee mug?**

**Average response: €2.75**

**Group 2  
"Sellers"**



**What is the lowest price  
you are willing to accept to  
sell this coffee mug?**

**Average response: €5.25**

\* Responses from the original study; the value of the mug was around €4.00

## STATUS QUO BIAS

- Car insurances in New Jersey and Pennsylvania (Johnson & Hershey, 1993).
  - In the early '90 the laws on car insurance changed in both states. To reduce cost a new policy was introduced that excluded coverage for theft and fire. However:
    - In New Jersey, new drivers had to buy the new policy and could then choose to upgrade it to the full coverage one (opt-in solution).
    - In Pennsylvania, new drivers had to buy the full coverage policy and could downgrade to the new, cheaper policy (opt-out solution).

## STATUS QUO BIAS

- An analysis of drivers' decisions in the two states showed that the status quo option had a significant effect on the insurance they ended up with:
  - Only 20% of drivers in New Jersey chose to upgrade to the full coverage policy (for these drivers the status quo was the cheaper policy).
  - In contrast, almost 75% of drivers in Pennsylvania chose to keep the full coverage policy (it was the status quo for them).