Behavioral economics

Lecture 3 - **Decisions**

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References:
- Cartwright, E. (2018). Behavioral economics. Routledge.Chicago

Reference dependence

- Natural assessments of an object include size, distance, loudness, temperature, similarity and, whether it is good or bad….
- Importantly, a natural assessment will usually be a relative rather than absolute one.
- It is far more natural for us to say what is bigger, longer, louder, hotter and better, without knowing the exact volume, length, temperature, etc.
- To be able to judge relative magnitude we need some standard of comparison, and this is called the reference point or reference level.
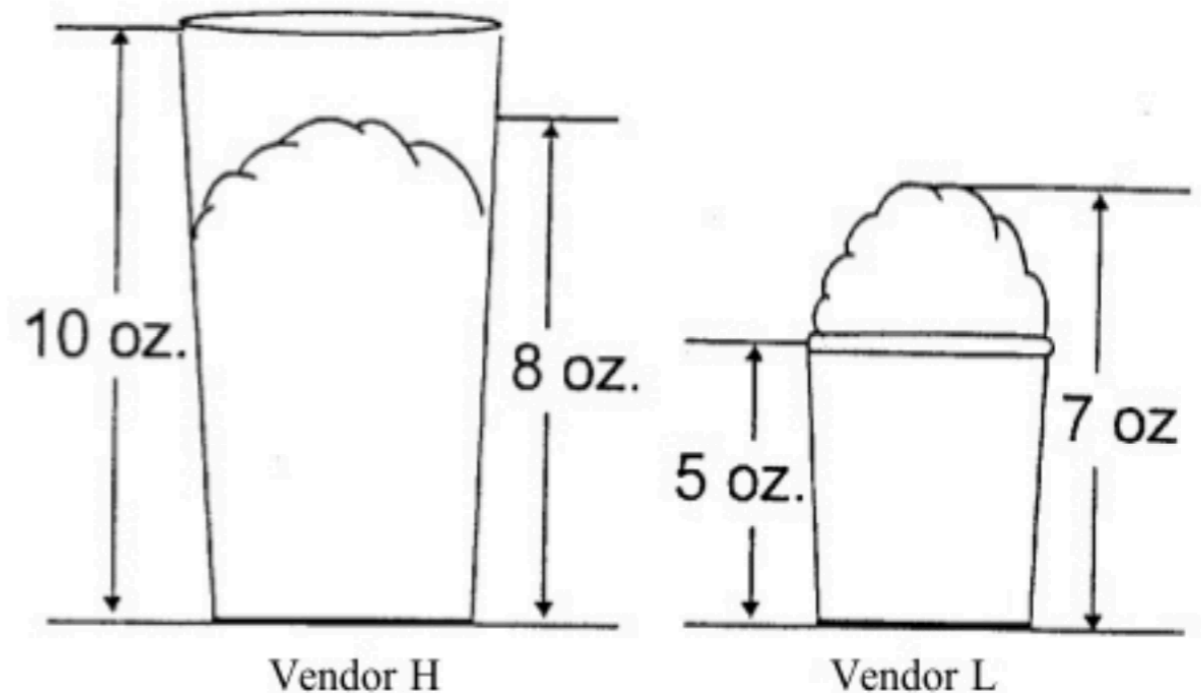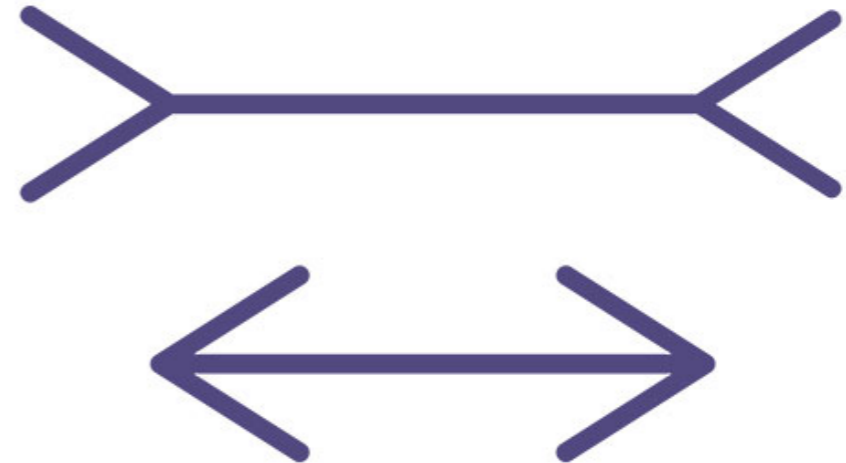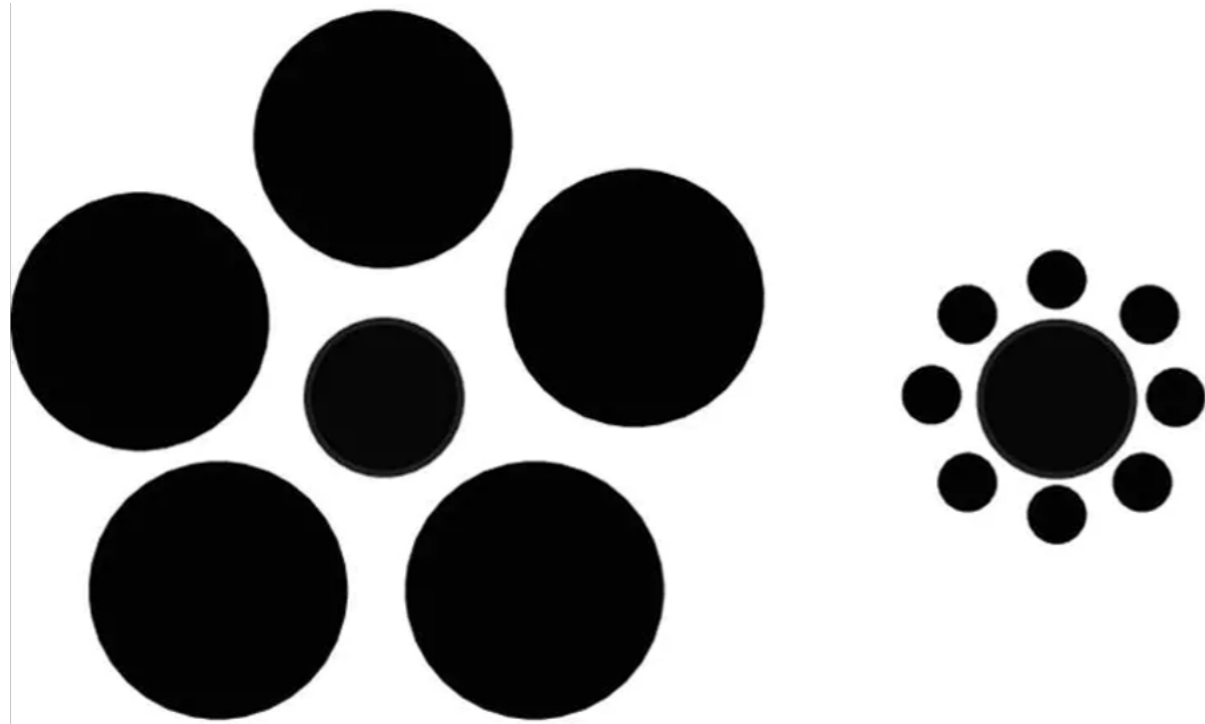

Vendor H   Vendor L

Exhibit 1. Drawings in Study 2

WTP prices for Vendor H's and Vendor L's Servings in Study 2

Evaluation Mode	Vendor H's	Vendor L's
Separate evaluation	S1.66	S2.26
Joint evaluation	S1.85	S1.56

Everything is relative
Context matters
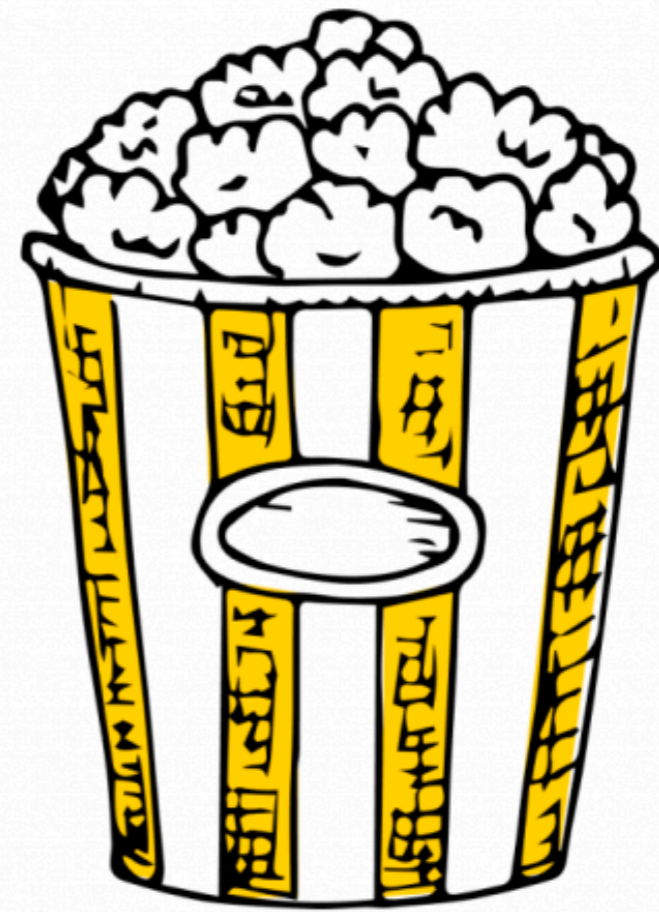
Conflicting and non-conflicting choices
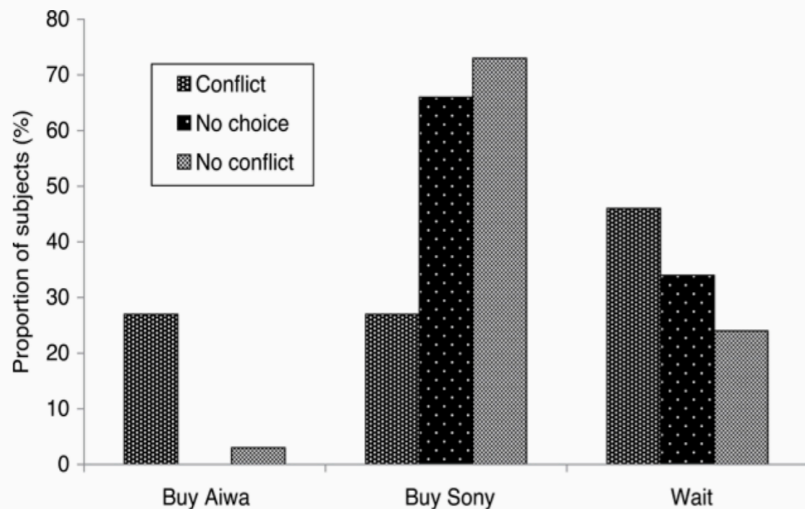
- Difference between conflicting and non-conflicting choices: We say a set of choices are conflicting if one choice is better on one aspect and a different choice better on some other aspect. A set of choices are non-conflicting if one choice is better on all aspects.

- To illustrate the potential consequences of conflicting versus non-conflicting choice, consider this example from a study by Tversky and Shafir (1992). Subjects were asked to imagine that they want to buy a CD player, and walk past a shop with a one-day clearance sale. Some subjects were given the conflicting choices of a Sony player for $99 and a top-of-the-range Aiwa player for $169; this is a conflicting choice because the Sony is cheaper while the Aiwa is better quality. Some were given the non-conflicting choice of the Sony player for $99 or an inferior Aiwa player for $105; this is a non-conflicting choice because the Sony is better in terms of price and quality. Others were just given the option of the Sony player for $99. All subjects were asked whether they would buy one of the players or wait and learn more about the models.

- As we would expect, more people buy the Sony when the choice is non-conflicting than when it is conflicting. The more interesting comparison is that between a non-conflicting choice and no choice. Crucially, we see that more people choose the Sony when the choice is non-conflicting than when there is no choice at all. This latter observation violates the regularity condition of choice that an increase in the number of available options should not increase the share buying a particular option. It seems that the presence of an inferior option increased the likelihood of buying the Sony.

- What we have just seen suggests that one alternative can look more or less desirable depending on what it is compared to. A slightly different possibility is that particular aspects of an alternative can look more or less desirable depending on what they are compared to.
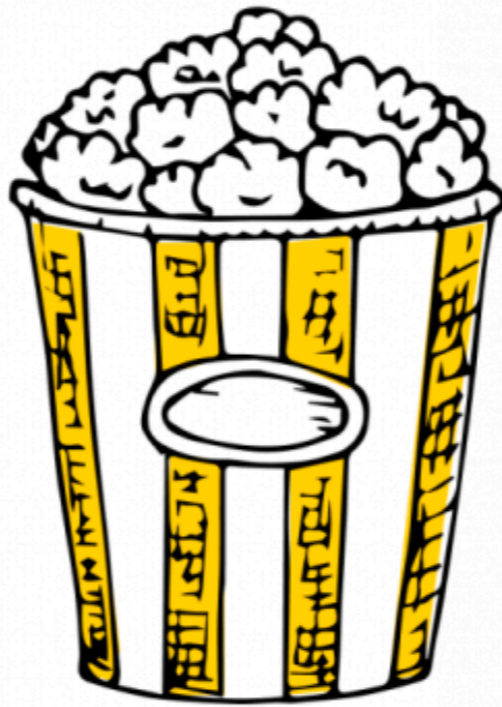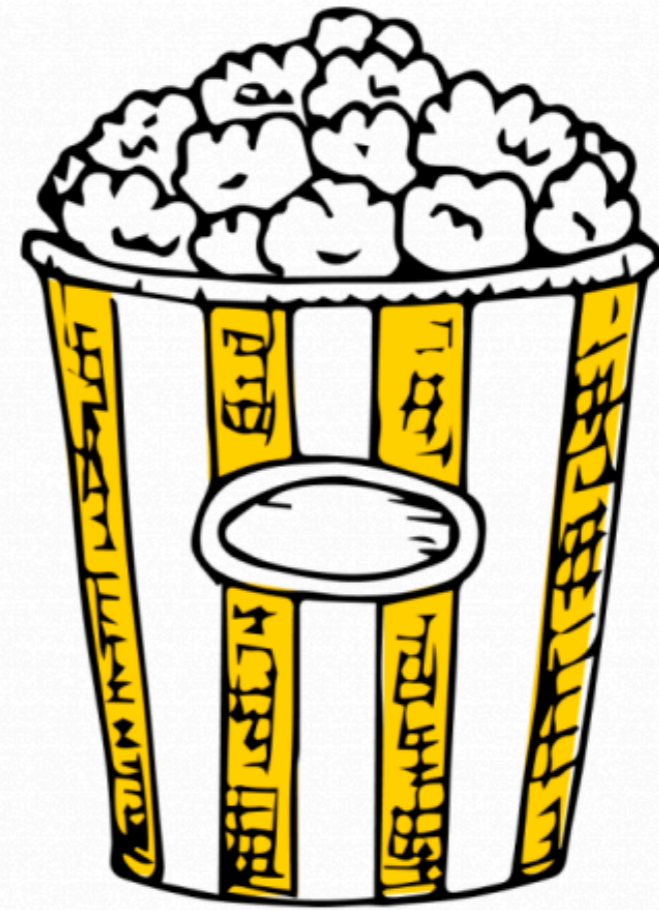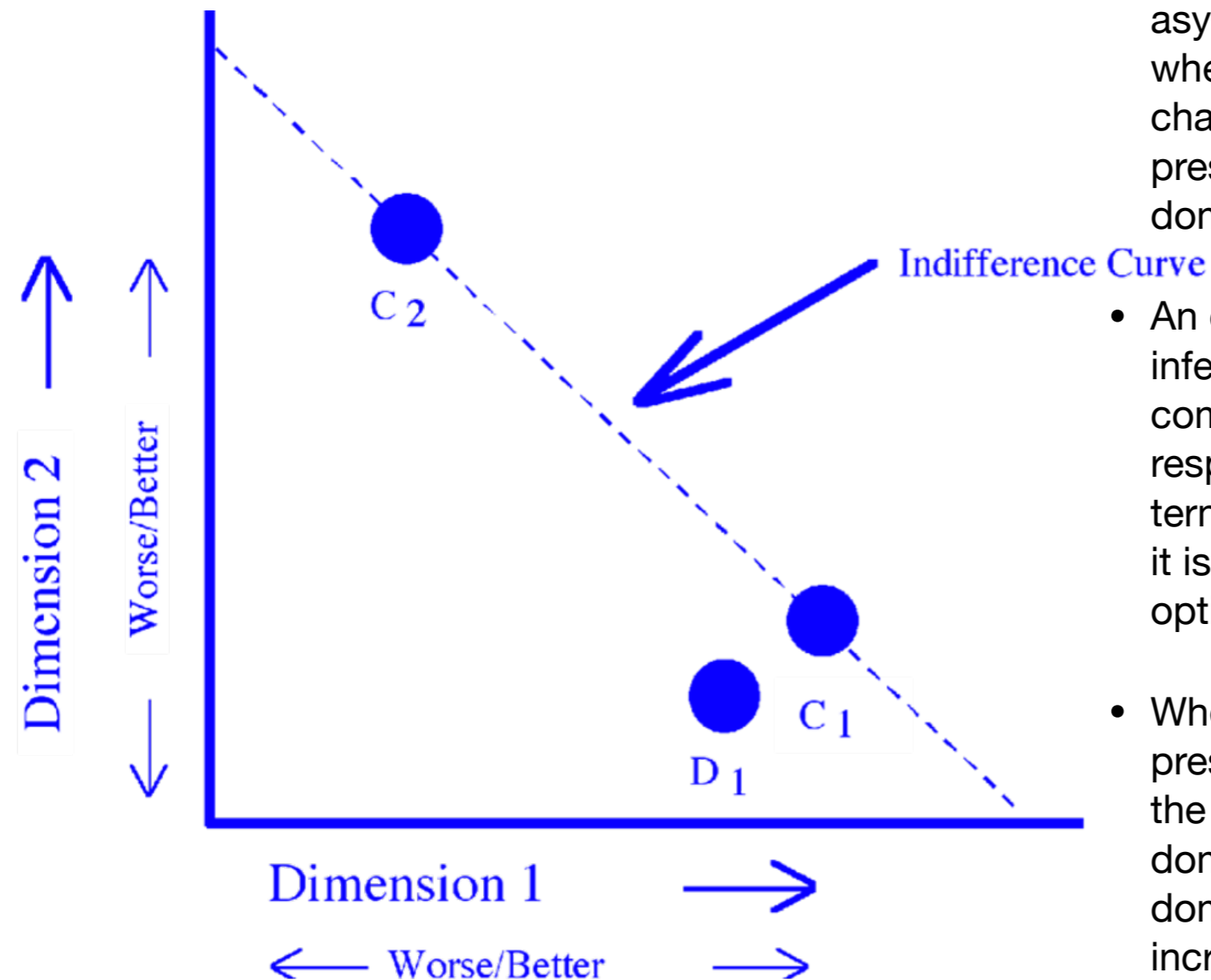
Small

$3.50

Large

$6.50

Small

$3.50

Medium

$6

Large

$6.50

Decoy effect

Dimension 2 — Worse/Better

C 2

Indifference Curve

C 1

D 1

Dimension 1

← Worse/Better →

- In marketing, the decoy effect (or attraction effect or asymmetric dominance effect) is the phenomenon whereby consumers will tend to have a specific change in preference between two options when also presented with a third option that is asymmetrically dominated.

- An option is asymmetrically dominated when it is inferior in all respects to one option; but, in comparison to the other option, it is inferior in some respects and superior in others. In other words, in terms of specific attributes determining preferences, it is completely dominated by (i.e., inferior to) one option and only partially dominated by the other.

- When the asymmetrically dominated option is present, a higher percentage of consumers will prefer the dominating option than when the asymmetrically dominated option is absent. The asymmetrically dominated option is therefore a decoy serving to increase preference for the dominating option.

SITUÁCIA A
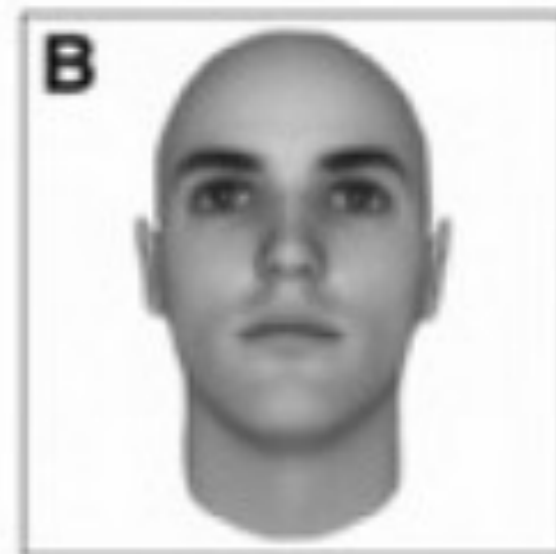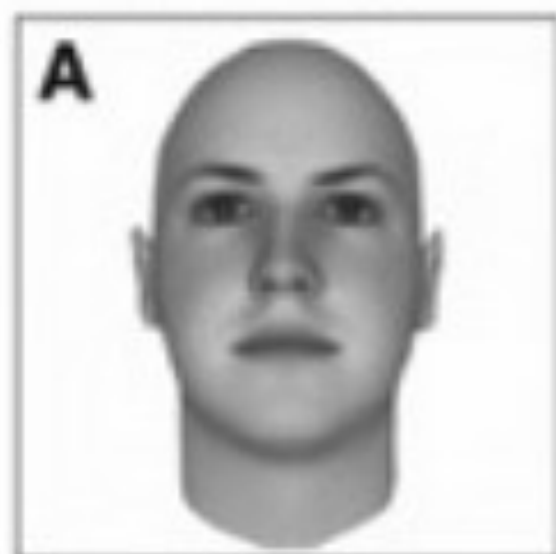
SITUÁCIA B
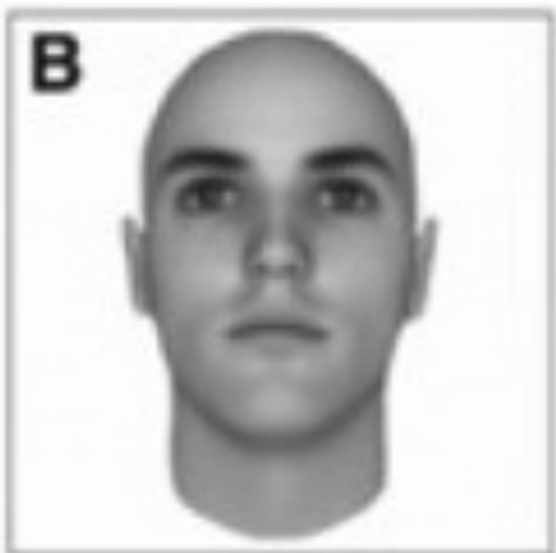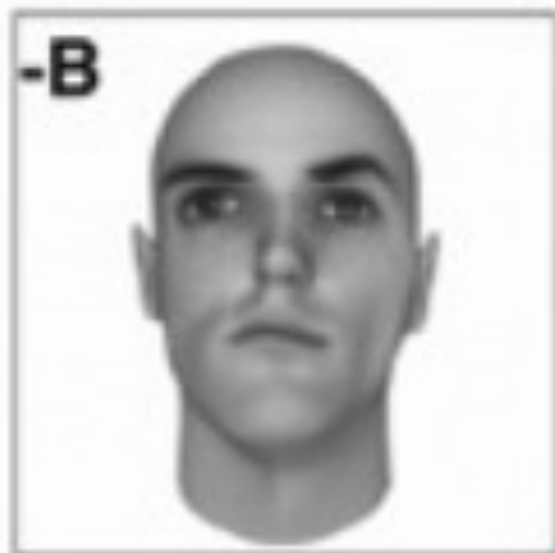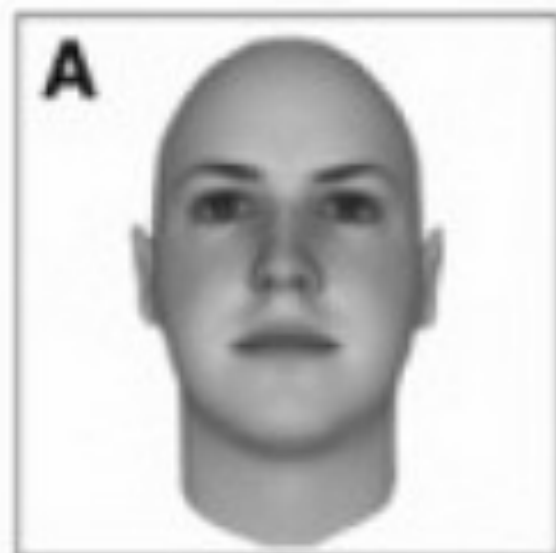
Compromise effect

- Let us now go back to the scenario in which there are two or three cereals on display out of Budget, Nutty and Honey. Budget has the advantage of being cheap, Honey has the advantage of being tasty but Nutty strikes a good compromise. Maybe, therefore, Anna will buy Nutty because it's 'in the middle'. If true, this means she should be more likely to buy Nutty when all three cereals are on display rather than just two. This would be an example of extremeness aversion with compromise.

- The compromise effect dictates that a decision-maker chooses a middle option over an extreme one given a set of choice alternatives since choosing an intermediate option is easier to justify, less likely to be criticized, and is consistent with loss aversion.

Choice overload / paralysis

POSITIVE

SWEET SPOT

SUBJECTIVE STATE

NO.OF CHOICES

NEGATIVE
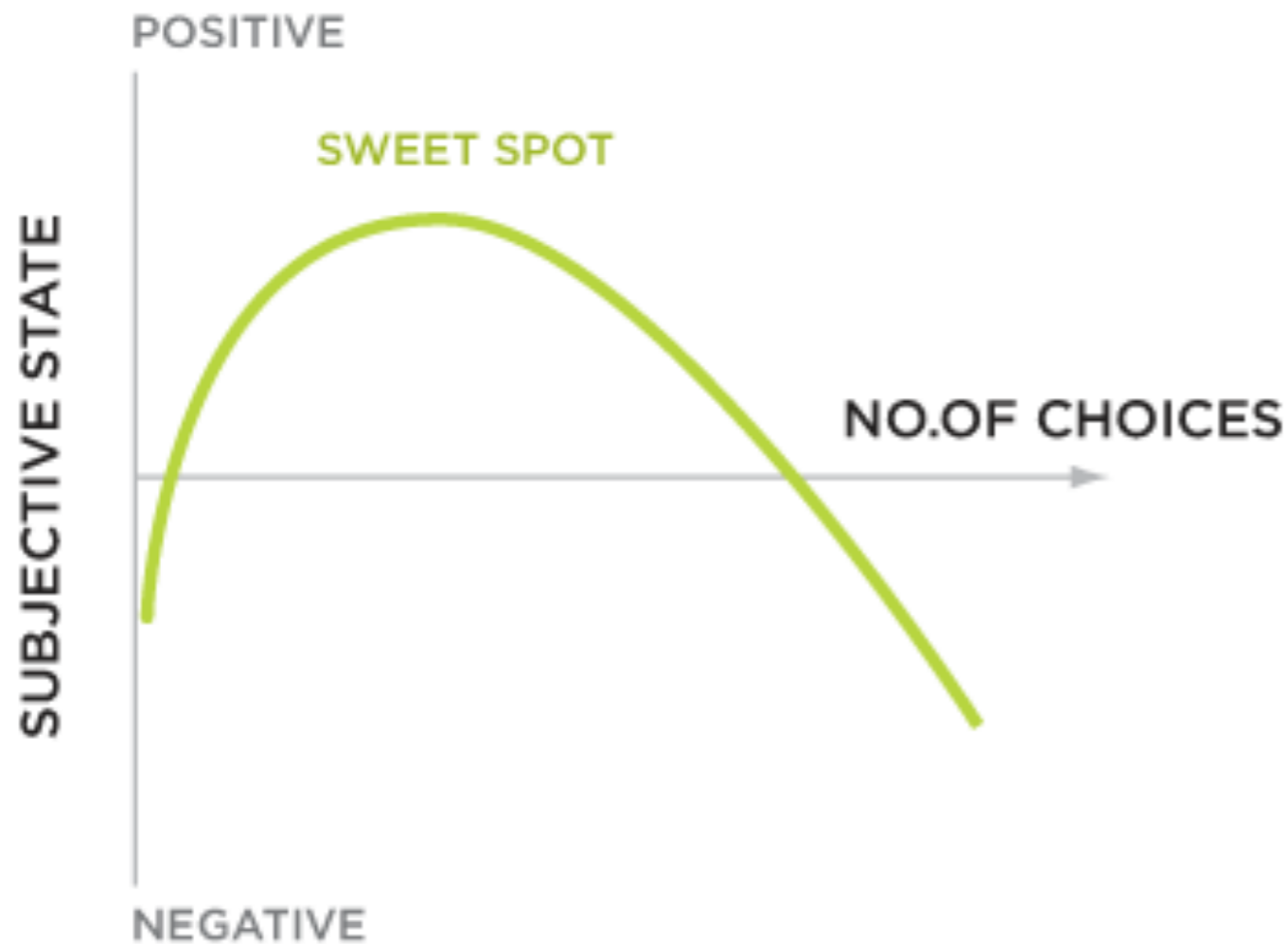
- The Paradox of Choice (Why More Is Less) - American psychologist Barry Schwartz argues that eliminating consumer choices can greatly reduce anxiety for shoppers. The book analyses the behavior of different types of people (in particular, maximisers and satisfiers) facing the rich choice. This book demonstrates to us how the dramatic explosion in choice—from the mundane to the profound challenges of balancing career, family, and individual needs—has paradoxically become a problem instead of a solution and how our obsession with choice encourages us to seek that which makes us feel worse.

- Autonomy and freedom of choice are critical to our well being, and choice is critical to freedom and autonomy. Nonetheless, though modern people have more choice than any group of people ever has before, and thus, presumably, more freedom and autonomy, we don't seem to be benefiting from it psychologically.

Context effects

- Context effects are any external factors, like the other choices on offer that influence choice. This all comes about because people are unlikely to know what maximizes their utility. We should therefore expect context effects in just about any economic choice a person ever makes.

- Some would have you believe that things such as trade-off contrast and extremeness aversion are evidence of people not being rational and not being like Homo economicus. This is not true. In a complicated world where there are lots of decisions to make it may be optimal to 'Pick the one in the middle' or 'Pick the most salient' or 'Be influenced by the other choices on offer'.

- Why context effects exist? Why is it that external factors can influence the choice someone makes? A good starting point is to focus on a subset of context effects called framing effects - which occur when essentially equivalent descriptions of the same thing lead to different choice.

Framing and choices

- That context and framing influence perception and intuition, which influences reasoning, is one of the most important ideas in behavioral economics. When we initially see something, perception and intuition kick in automatically to give us impressions of what we are looking at. This process happens spontaneously and the person has no or very little control over it.

- Every time a person makes a choice, that choice has to be framed in a particular way, and how it is framed will likely affect perception, intuition, reasoning and the choice made. Decisions based on the framing effect are made by focusing on the way the information is presented instead of the information itself. Such decisions may be sub-optimal, as poor information or lesser options can be framed in a positive light. This may make them more attractive than options or information are objectively better, but cast in a less favourable light.

- While we might think that we are choosing from options, in fact we are usually choosing from descriptions of options. Thus, by framing options in a different way, we can influence decisions. Examples: gain vs. loss, omission vs. comission, opt-in vs. opt-out, direct vs. opportunity costs
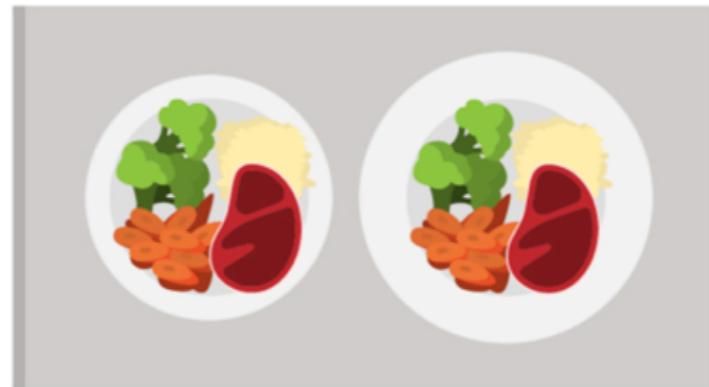
Gain vs. Loss framing

Gain Frame

If Program A is adopted, 200 people will be saved.

If Program B is adopted, there is a 1/3 probability that 600 people will be saved, and 2/3 probability that no people will be saved.

Loss Frame

If Program C is adopted, 400 people will die.

If Program D is adopted, there is a 1/3 probability that nobody will die, and 2/3 probability that 600 people will die.

Gain vs. Loss framing

Everyday price is $1.50; drops to $1.00 on colder days.

Gain vs. Loss framing

Everyday price is $1.00; increases to $1.50 on hotter days.

Omission vs. Commission

- Please read about Paul and George and assess who would feel worse in these situations:

- Paul owns shares in Company A. During the past year he considered switching to stock in Company B, but he decided against it. He now finds that he would have been better off by $1,200 if he had switched to the stock of Company B.

- George owned shares in Company B. During the past year he switched to stock in Company A. He now finds that he would have been better off by $1,200 if he had kept his stock in Company B.

- Who feels more regret?

  - A.Paul

  - B.George

Decision number	Option A	Option B
1	2 points with 30% probability 1 point with 70% probability	3 points with 30% probability 0 points with 70% probability
2	2 points with 40% probability 1 point with 60% probability	3 points with 40% probability 0 points with 60% probability
3	2 points with 50% probability 1 point with 50% probability	3 points with 50% probability 0 points with 50% probability
4	2 points with 60% probability 1 point with 40% probability	3 points with 60% probability 0 points with 40% probability
5	2 points with 70% probability 1 point with 30% probability	3 points with 70% probability 0 points with 30% probability
6	2 points with 80% probability 1 point with 20% probability	3 points with 80% probability 0 points with 20% probability

Choice with risk

- Economic choices are almost always made with some uncertainty as to what the outcome will be. A person buys groceries without knowing for sure how tasty they will be. He buys a new car without knowing how it will perform or how long it will last, a plane ticket without knowing whether the plane will be delayed, house insurance because he does not know whether his house will be burgled, and he invests in shares without knowing whether they will increase or decrease in value. In the last lecture we saw that uncertainty can lead to choice arbitrariness and all the consequences that entails. In this lecture we will look in more detail at some other important consequences of risk.

- Before we get started there is one distinction that needs to be explained. We say that someone faces a situation of risk if they know what could happen and how likely it is. An example would be someone who bets $10 on the toss of a coin; they know that there is a 50:50 chance it could be heads or tails, and, if it's heads, they win $10 and, if it's tails, they lose $10. We say that someone faces a situation of uncertainty if they do not know some of the possible outcomes or how likely they are. An example would be someone booking a plane ticket, who is unlikely to know all the possible delays or problems that could happen to change their experience of the flight.

- Most of the situations we face are ones of uncertainty. Even the toss of a coin could be biased in many different ways. It is more difficult to model situations of uncertainty than ones of risk, however, and without knowing the consequences of risk we cannot get very far thinking about uncertainty. It is traditional, therefore, to focus on situations of risk which makes our task manageable.

- Imagine, I offer you to play a game, which goes as follows. We will toss a coin. If it lands on heads, you win 100 euros. If it lands on tails, you win 200 euros. How much euros (maximum) would you offer me to play this game?

Expected Value Hypothesis

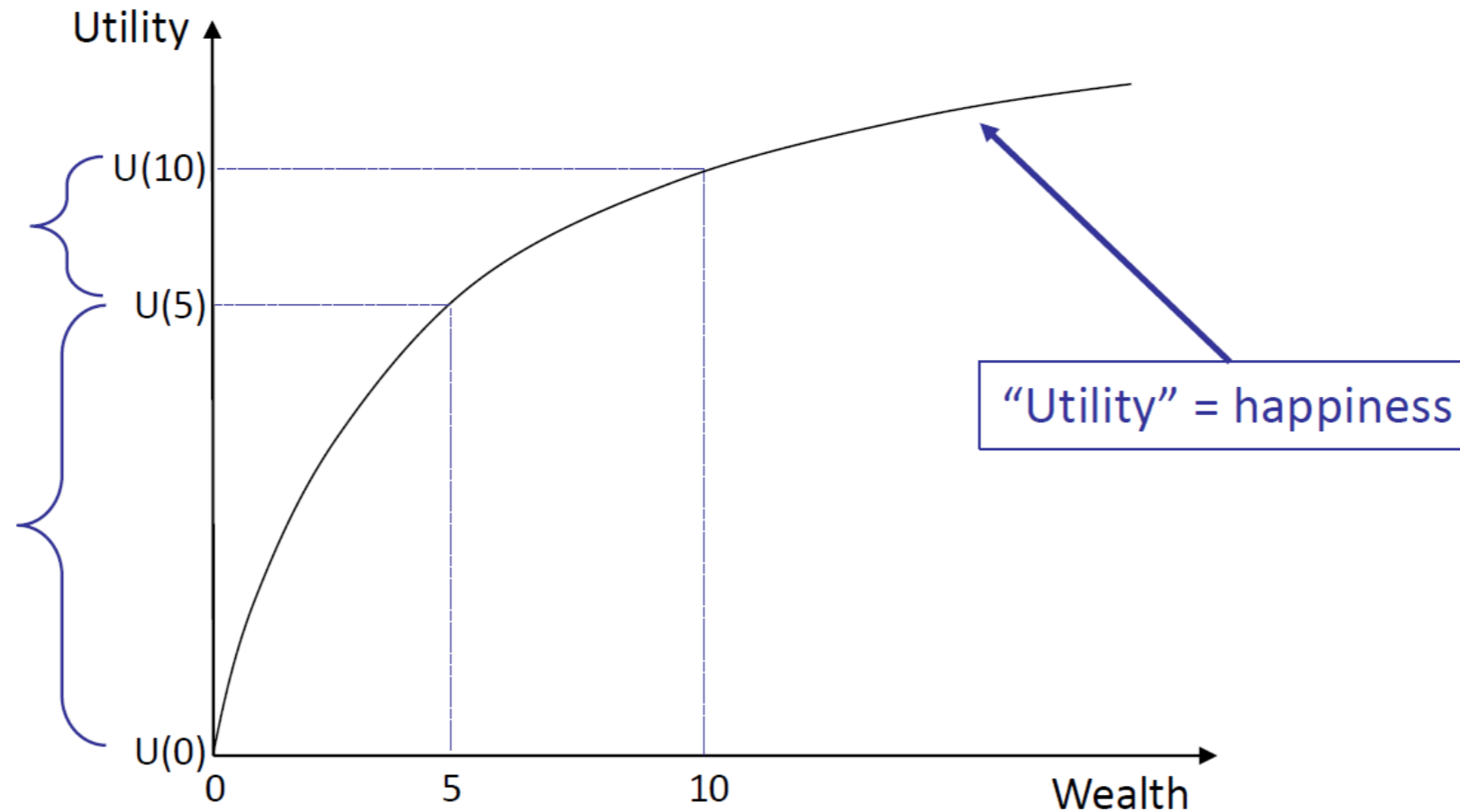$EV = P(H) \times V(H) + P(T) \times V(T)$

$EV = 0.5 \times 100 + 0.5 \times 200$

$EV = 50 + 100$

$EV = 150$

Would you pay 150 euros to play?

Utility of Money

"Utility" = happiness

Implications of the graph:
- More money is undoubtedly better than less: U(10) > U(5), *BUT*
- The incremental (marginal) value of an additional dollar gets smaller as our wealth increases: U(5) − U(0) > U(10) − U(5)

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Risk Aversion

These two distances are the same

U(15)
U(10)
U(G)
U(5)

Utility

5   G   10   15   Wealth
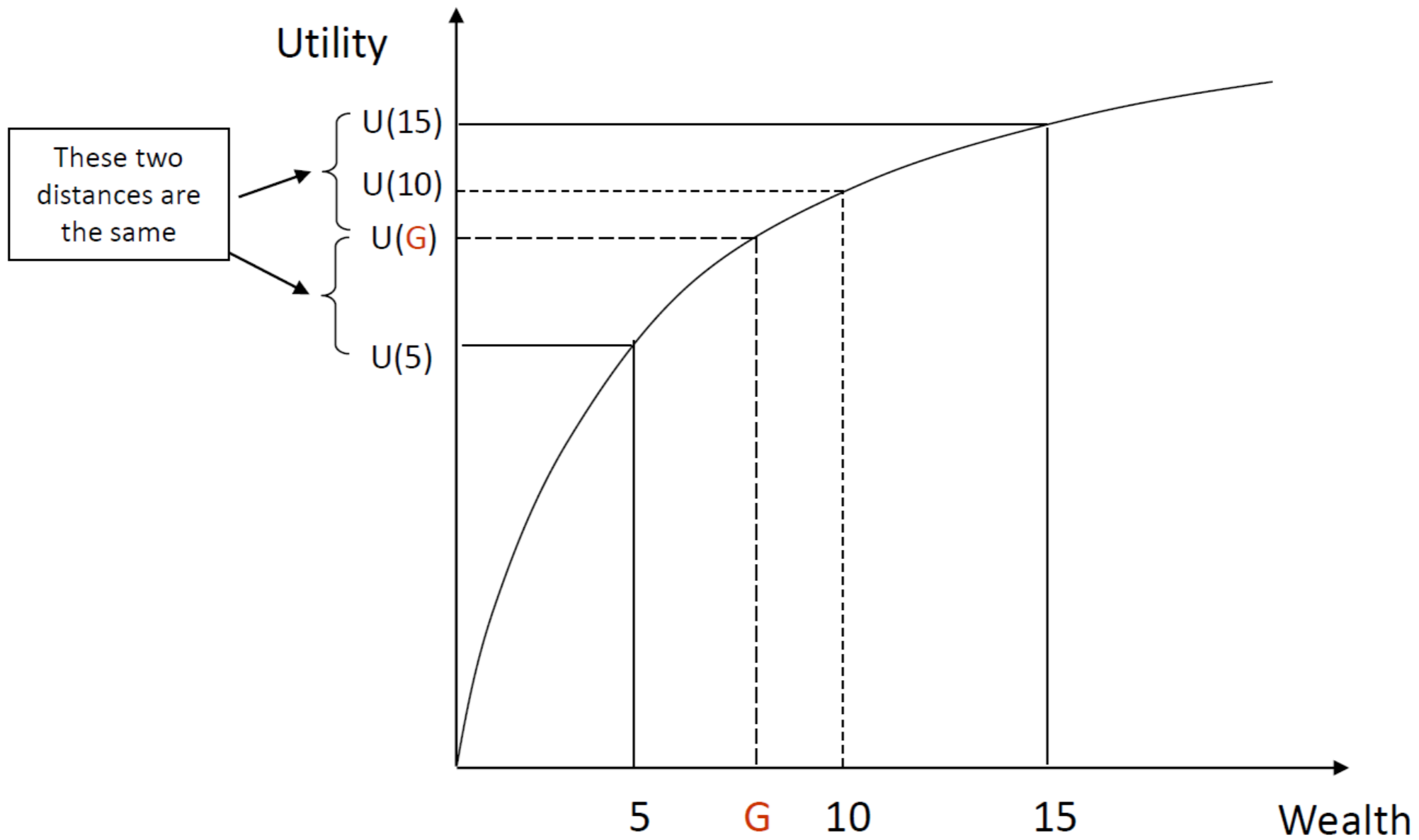
$$U(G) = \tfrac{1}{2} U(5) + \tfrac{1}{2} U(15) \quad < \quad U(\tfrac{1}{2} \times 5 + \tfrac{1}{2} \times 15) = U(10)$$

The probability-weighted sum of the utilities for each outcome…

…Is less than…

…the utility of the expected value of the outcomes

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Risk preferences

- The prospect that gives the highest expected utility will depend on the shape of the utility function.

- Someone is risk-averse if they prefer a certain amount of money to a prospect with the same expected value; they would rather avoid risk.

- Someone is risk-loving if they prefer a risky prospect to the expected value of the prospect for sure; they would prefer risk.

- Someone is risk-neutral if they are indifferent between risky prospect and the certain prospect with same expected value.
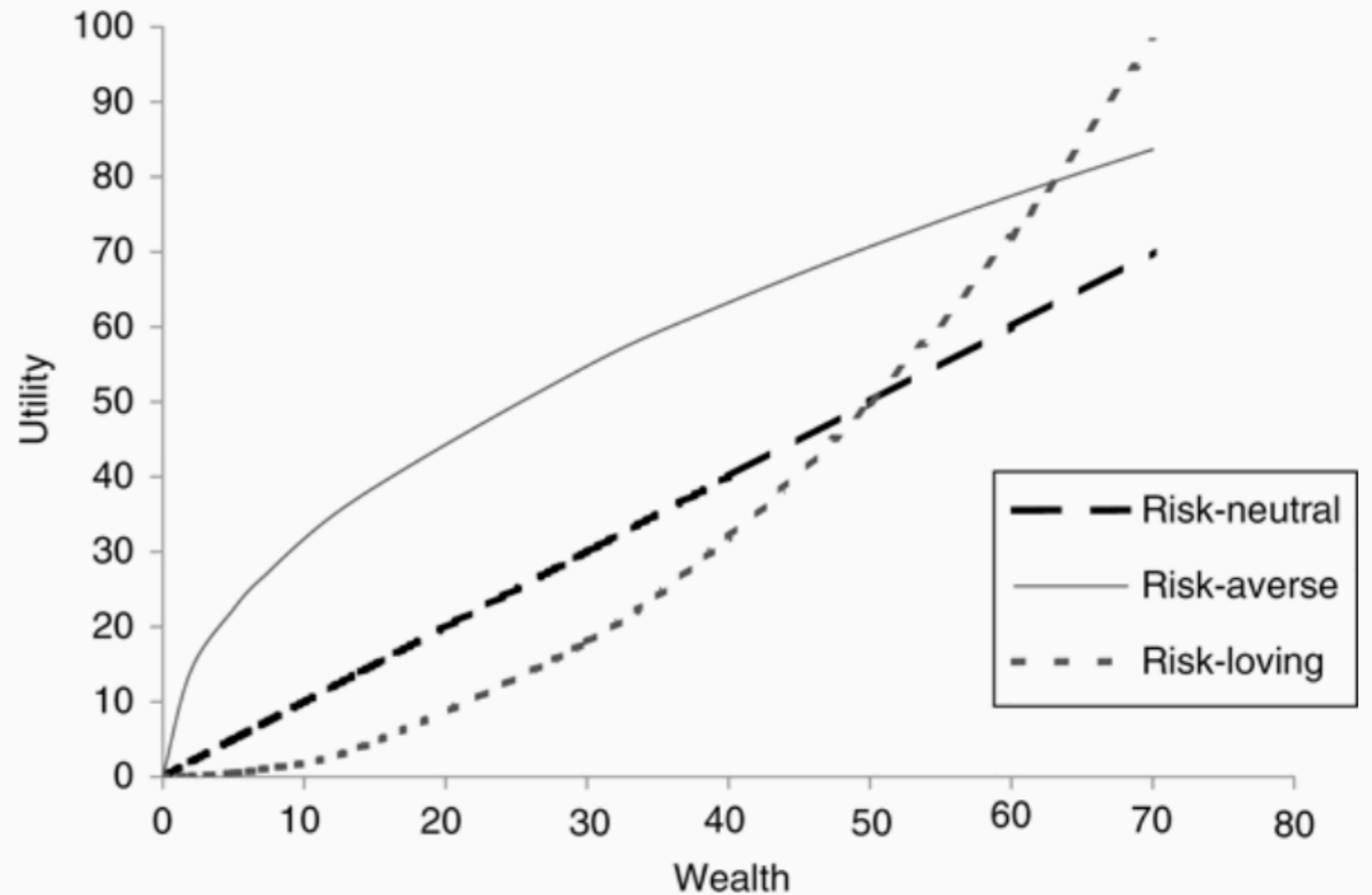
Figure 3.1 Three possible utility functions: one is concave, which would imply Alan is risk-averse, and one convex, which would imply Alan is risk-loving.

The problem with the Expected Utility hypothesis

	Yesterday	Today
Your wealth	1 million	2 million
Your friend's wealth	3 million	2 million

- Do you feel the same as your friend?

- Here is where the psychology enters the picture!

- Prospect Theory – Kahneman & Tversky (1979), Econometrica!

More on Risk Aversion

Please choose between Option A ($50 for certain) and Option B (an equally weighted gamble of either $100 or $0). Which do you prefer?

Option A

| $50 | For certain |

Option B: flip a coin

| $0 | If heads |

| $100 | If tails |

Please choose between A & B

What happens if we increase the stakes a little?

Option D

| $500 | For certain |

Option D: flip a coin

| $0 | If heads |

| $1,000 | If tails |

Please choose between C & D

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Risk-Seeking Behavior

Now suppose that you have been kidnapped. Your (rather unusual) kidnapper tells you that you can choose between the following two options to obtain your freedom. (Assume that you have sufficient financial resources to make good on your agreement in either case):

Option A

Pay the kidnapper $500

Option B

Toss a fair coin
- Pay $0 if Heads
- Pay $1,000 if Tails

Loss Aversion

Here's a different type of game. In this situation, you aren't choosing between gambles with different levels of risk – you are choosing whether to play the game at all.
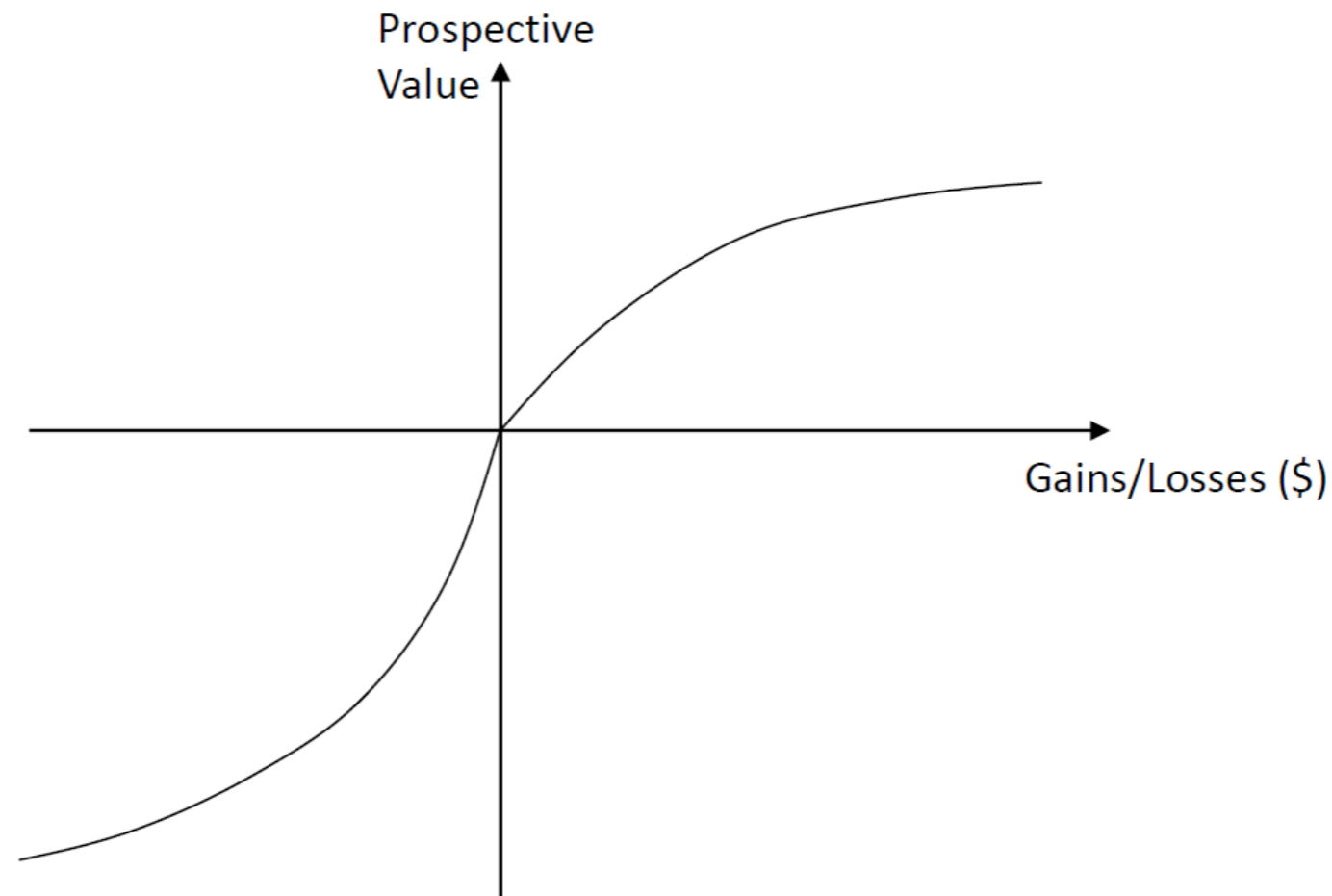
In this game, you toss a fair coin: if it lands Heads, you *win* $2,000; but if it lands Tails, you *lose* $1,000. Would you like to play this game? If you DO choose to play, you may play it only *once*.

Would you like to play this game?

| WIN $2,000 | If heads |

| LOSE $1,000 | If tails |

Do you want to play this game?

Prospect Theory

We will use the "Prospect Theory"* utility function as a more realistic model of how we respond to gains and losses:
  - risk aversion over gains (just like expected utility)
  - risk *seeking* over losses (*unlike* expected utility)
  - loss aversion (*unlike* expected utility)

*Proposed by psychologists Daniel Kahnemann & Amos Tversky in the 1970s
  Provides insights on human behavior that are not reflected in expected utility theory

Prospect Theory
Risk Averse over Gains

Prospective Value

Gains/Losses ($)

0   10   20

Concave (risk averse) over gains:

- A second $10 gain (on the horizontal axis) provides less *additional* value (as seen on the vertical axis) than the first $10 gain
- Further incremental gains add even smaller amounts of extra "value"

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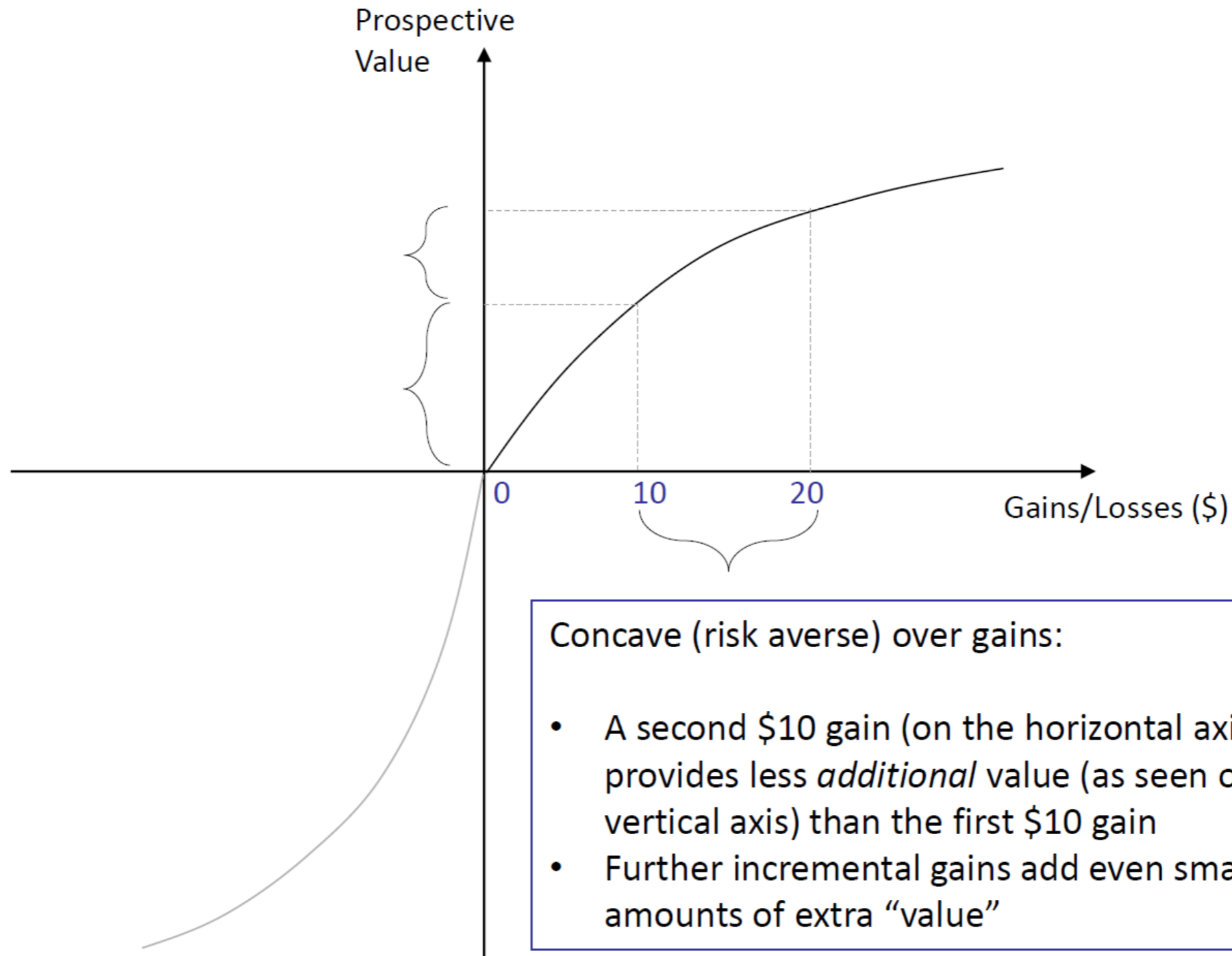
Note: graph is not precisely to scale
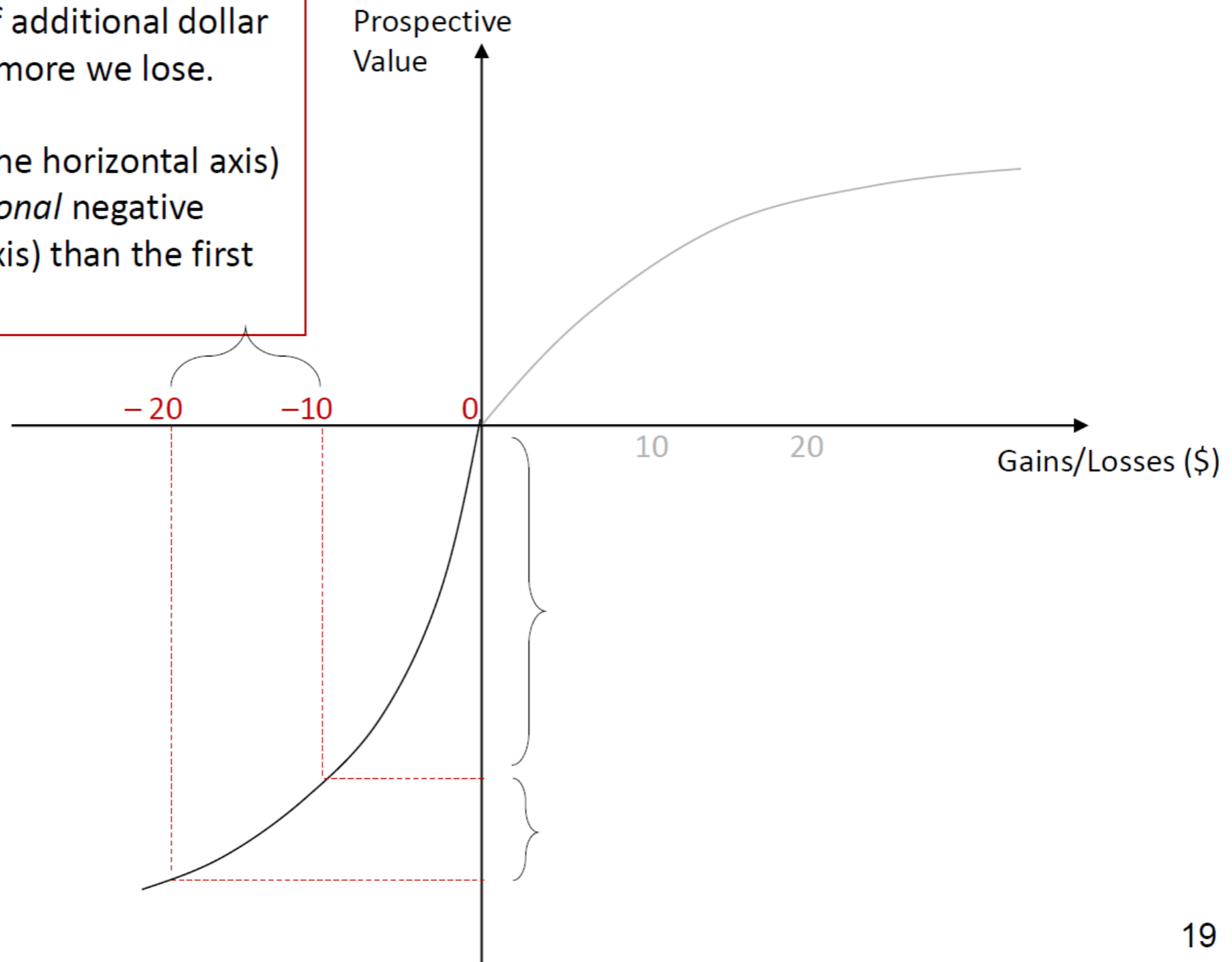
Prospect Theory
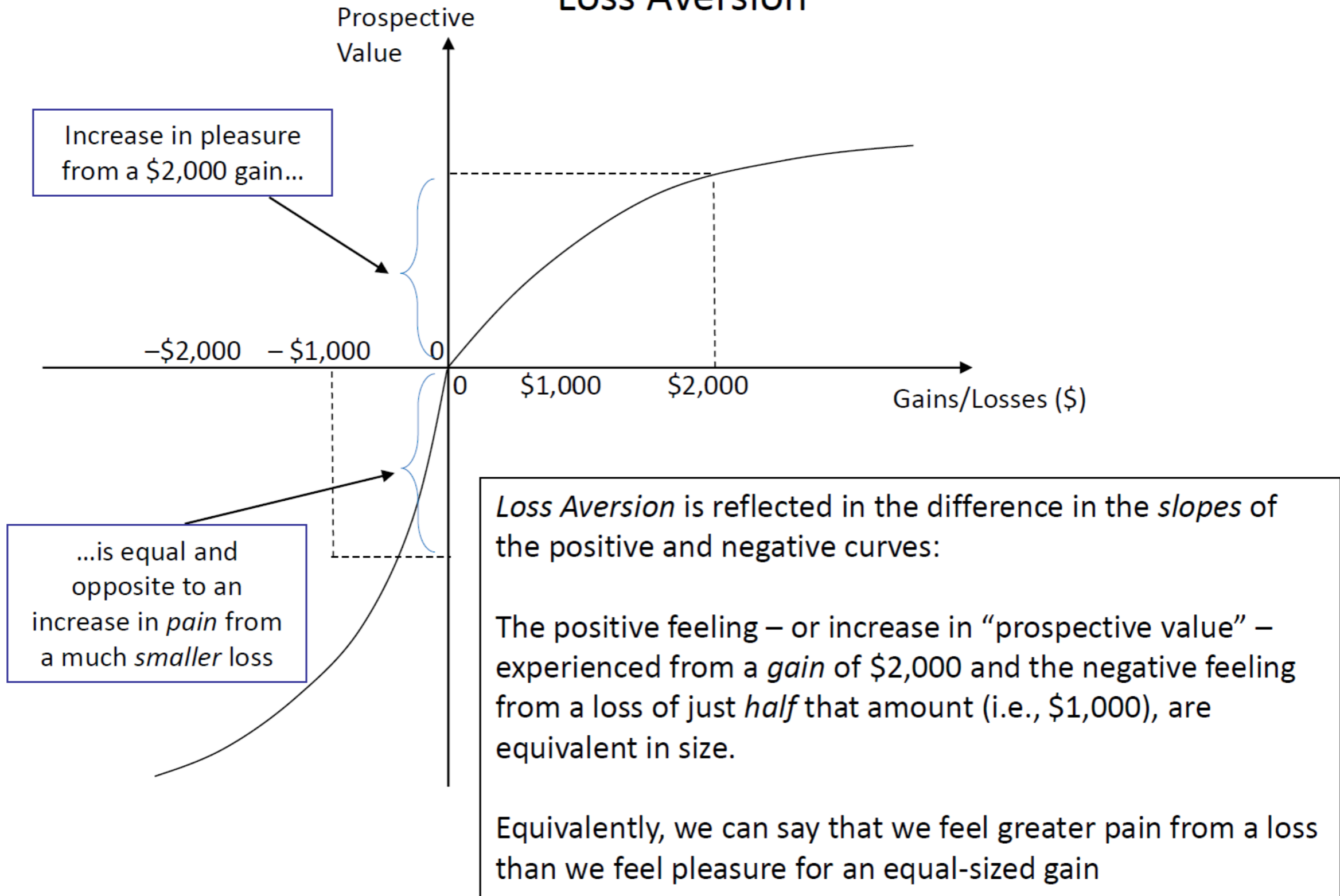## Risk Seeking over Losses

Convex (risk *seeking*) over losses:

The *incremental* pain of additional dollar losses gets smaller the more we lose.

A second $10 loss (on the horizontal axis) translates to less *additional* negative value (on the vertical axis) than the first $10 loss.

Prospective Value

− 20   −10   0   10   20   Gains/Losses ($)

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Prospect Theory
Loss Aversion

Prospective Value

Increase in pleasure from a $2,000 gain...

−$2,000   − $1,000   0

0   $1,000 $2,000

Gains/Losses ($)

...is equal and opposite to an increase in *pain* from a much *smaller* loss

Loss Aversion is reflected in the difference in the *slopes* of the positive and negative curves:

The positive feeling – or increase in "prospective value" – experienced from a *gain* of $2,000 and the negative feeling from a loss of just *half* that amount (i.e., $1,000), are equivalent in size.

Equivalently, we can say that we feel greater pain from a loss than we feel pleasure for an equal-sized gain

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Expected Utility (EU) versus Prospect Theory (PT)

Expected Utility Theory

Utility

Function is *increasing* and *concave*

Wealth

Prospect Theory

Prospective Value

Function is steeper over losses than over gains

Function is *increasing* and *concave* over *gains*

Function is *decreasing* and *convex* over losses

Gains/Losses
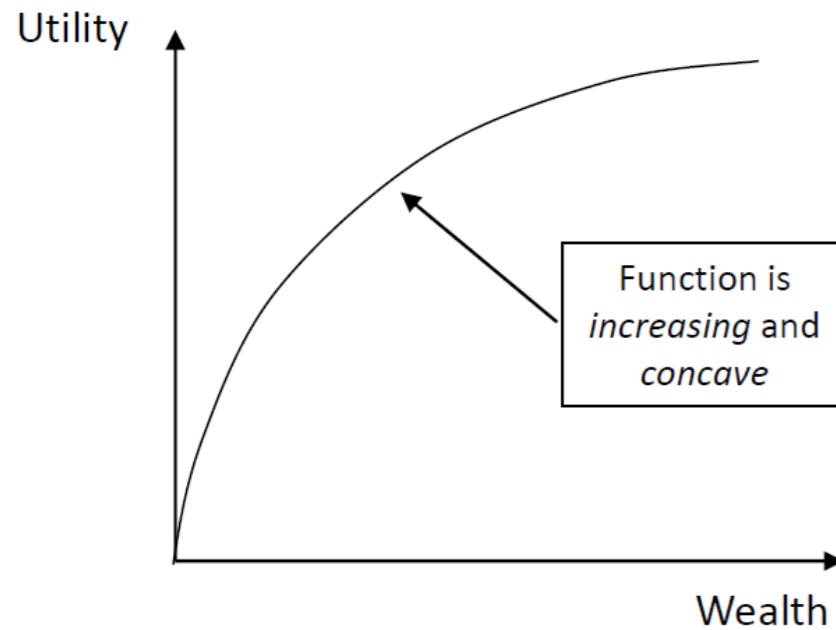
Reference Point

- Utility is measured as a function of absolute wealth

- Marginal (incremental) utility decreases as wealth increases (risk aversion)
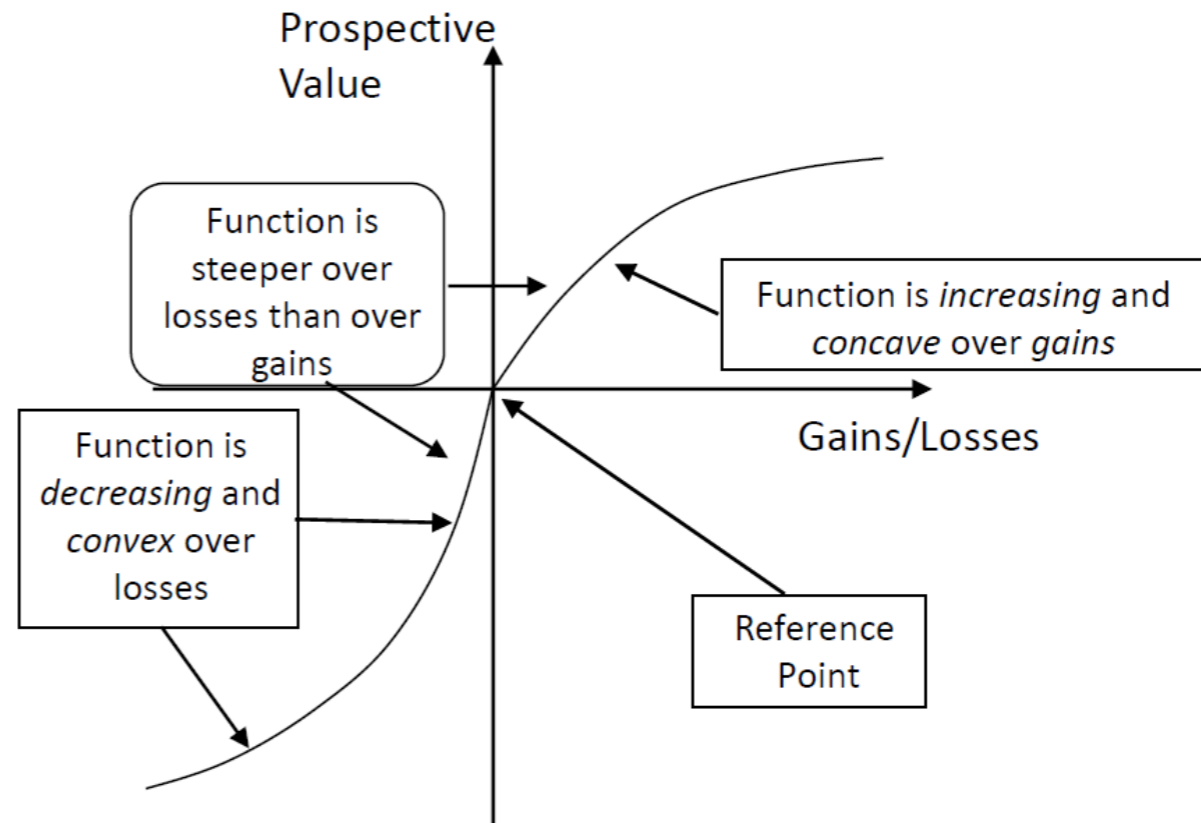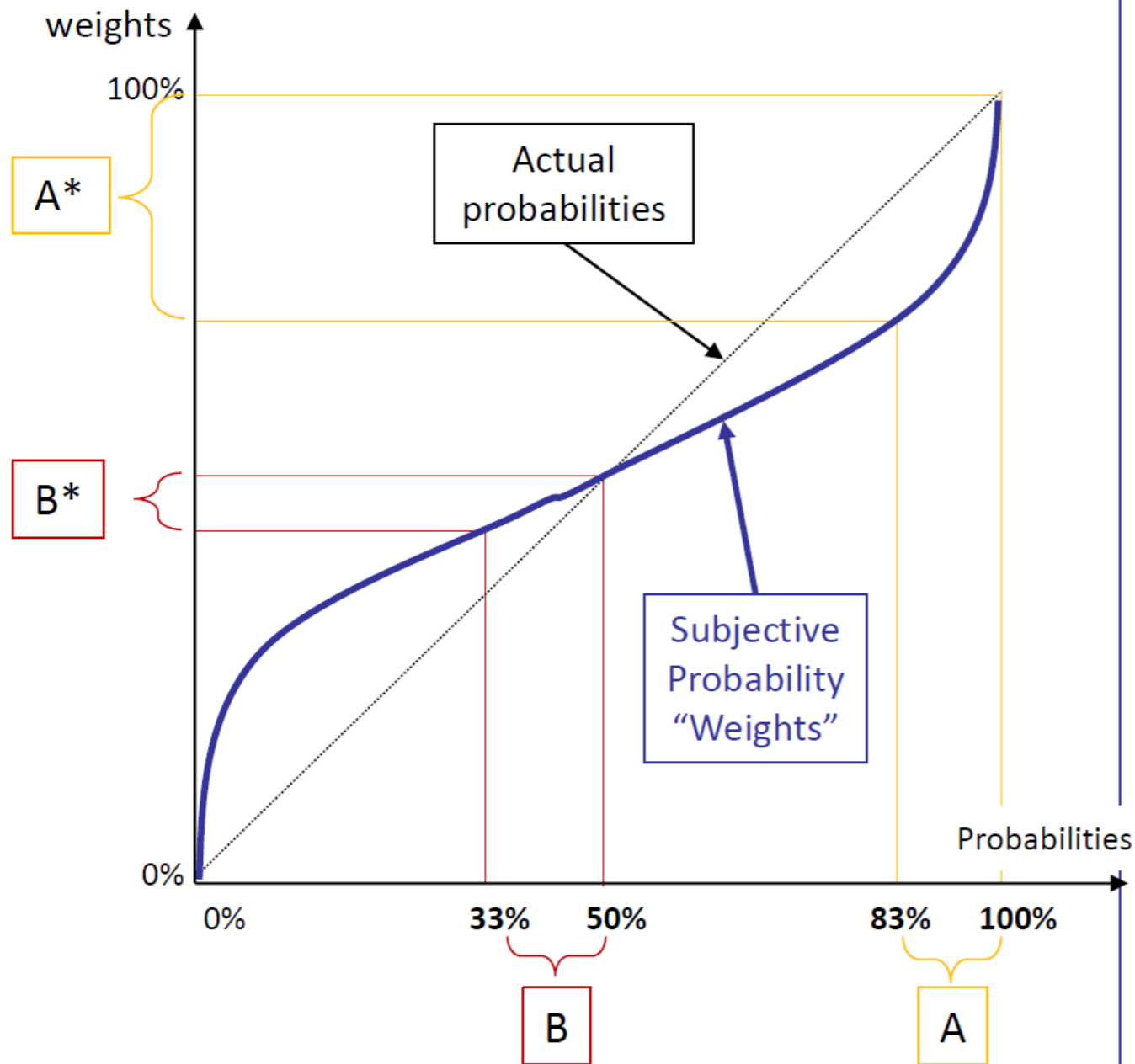
- Value is measured over gains and losses relative to a reference point

- Marginal (incremental) value decreases over gains but increases over losses (risk aversion for gains, risk seeking for losses)

- Value function is steeper over losses than over gains (loss aversion)

See the Lecture: Expected Utility vs. Prospect Theory

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Probability Weighting Function

On this graph, "true" probabilities are on the horizontal axis, while our "subjective weight" interpretation is reflected in the dark blue curve, with values on the vertical axis.

- Look at the *actual* change in probability from 100% to 83% (marked $\boxed{A}$ on the horizontal). This probability decrease of 1/6 (17%) takes us from *certain* death to merely *probable* with the removal of one bullet from the fully loaded gun. Our *subjective* response ($\boxed{A*}$ on the vertical axis) to this change is noticeably larger than the objective probability change.
- Our emotional response to the change from certainty to probability is also significantly greater than our response to the change from 50% to 33% probability (distance $\boxed{B*}$ on the vertical), even though it has the same 17% reduction $\boxed{B}$ in true probability terms.

Subjective Probability & the Certainty Effect
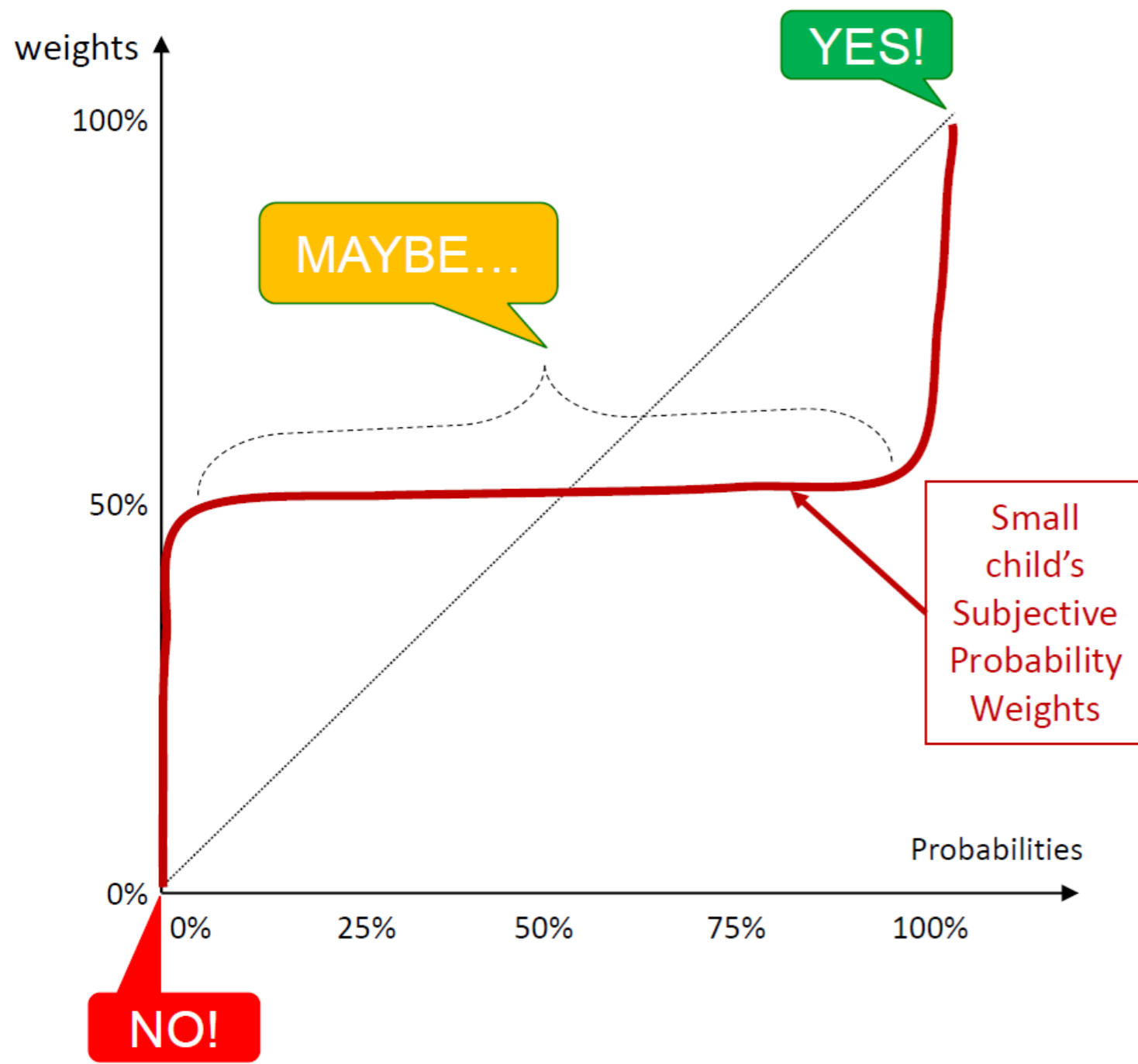
Further examination of the graph helps us to see, more broadly, that we tend to be more sensitive to probability changes that take us from *certainty* to *probability*, than we are to probability changes in the middle of the range.

At the extreme, imagine the small child's weighting function: when asking for a treat (an icecream; an afternoon at the park) she understands the responses "yes" and "no", corresponding to 100% (certainly) and 0% (certainly not). All other probabilities are viewed generically as "maybe."

Probability Weighting:
Glossary of characteristics

- We tend to *overweight* low probability events, especially events that are especially "front of mind" or "salient" to us at a particular time (think fear of flying following 9/11)

- We tend to *underweight* high probability events, especially those that are sufficiently common that they tend not to be reported in the media (think automobile accidents)

- We tend to be less sensitive to changes in probability in the middle of the range (e.g., 30% to 40%) than changes that move us from probability to certainty (10% to 0%, or 90% to 100%): the *Certainty Effect*

Disappointment and regret

Fourfold Patter for Risk Aversion or Risk Seeking

	Significant Gains	Significant Losses
High Probability	**Risk Averse** (under-weigh potential benefit) Fear of dissapointment Take unfavorable settlement Refuse preventative care Science Denialism?	**Risk Seeking** (under-weigh potential harm) Desperate to recoup loss Reject favorable settlement Continue gambling Seek risky pseudoscience
Low Probability	**Risk Seeking** (over-weigh potential benefit) Hope for large gain Reject favorable settlement Start gambling Supplements, acupuncture, Chiropractic?	**Risk Averse** (over-weigh potential harm) Fear of large loss Take unfavorable settlement Buy insurance Unwarranted diagnostic testing

Table 3.23 The fourfold pattern of risk attitudes in litigation.

	Low probability	Medium to high probability
Gains	**Risk-loving** (scenario C) Will go to court unless offered a generous settlement	**Risk-averse** (scenario B) Happy to settle out of court
Losses	**Risk-averse** (scenario A) Happy to settle out of court	**Risk-loving** (scenario D) Will go to court unless offered a generous settlement

- Most decisions are intuitive.
- Intuition is just a recognition.
- People think in stories.
- Emotions convey priorities.
- Best decisions are easy decisions.
- Losses loom larger than gains.
- Everything is relative.
- Context matters.
- We do not choose from options, but from descriptions of options.
- It is better to test than to argue.