

Biases

Heuristics and Biases

Bias means systematically ignoring or misusing information in reaching a judgment – which implies a systematic error in the final choice. This is then related to the search for information.

Indeed, we have seen that the shopper does not know what maximizes her utility. This lack of knowledge means she needs to search for more information about what she likes and dislikes.

While one search in order to become better informed he/she can be influenced by all sorts of **external factors** that **affect its perception and then its reasoning.**

Classification of cognitive processes¹

¹Daniel, Kahneman. "Thinking, fast and slow." (2011).

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 (system 1: intuition).

Particularly for the kind of choices of interest in economics, one usually uses reasoning to think through options and make a more deliberate, informed judgment (system 2: reasoning).

However, initial perception and intuition will inevitably influence the starting point for her subsequent reasoning.

Perception	System 1: intuition	System 2: reasoning
These systems are fast, automatic, effortless and may depend on current emotions. Thoughts come to mind spontaneously and generate impressions of the attributes of objects.		This system is slow, effortful, deliberate and not so dependent on emotion. It can generate impressions and judgments.

Context and framing effects

An external factor like the **choices on offer** or **the way things are framed** can **influence choice**.

Indeed, the context and frame influence initial perceptions and intuition which influences reasoning.

Context effects may lead to the violation of basic principles of rational choice that are assumed in standard economic models as the **regularity condition**, i.e. the addition of a new alternative cannot increase the probability of choosing a member of the original set (otherwise, systematic error = bias).

Conflicting vs Non-Conflicting choices

A set of choices is **conflicting** if one choice is better on one aspect and a different choice better on some other aspect.
A set of choices is **non-conflicting** if one choice is better on all aspects.

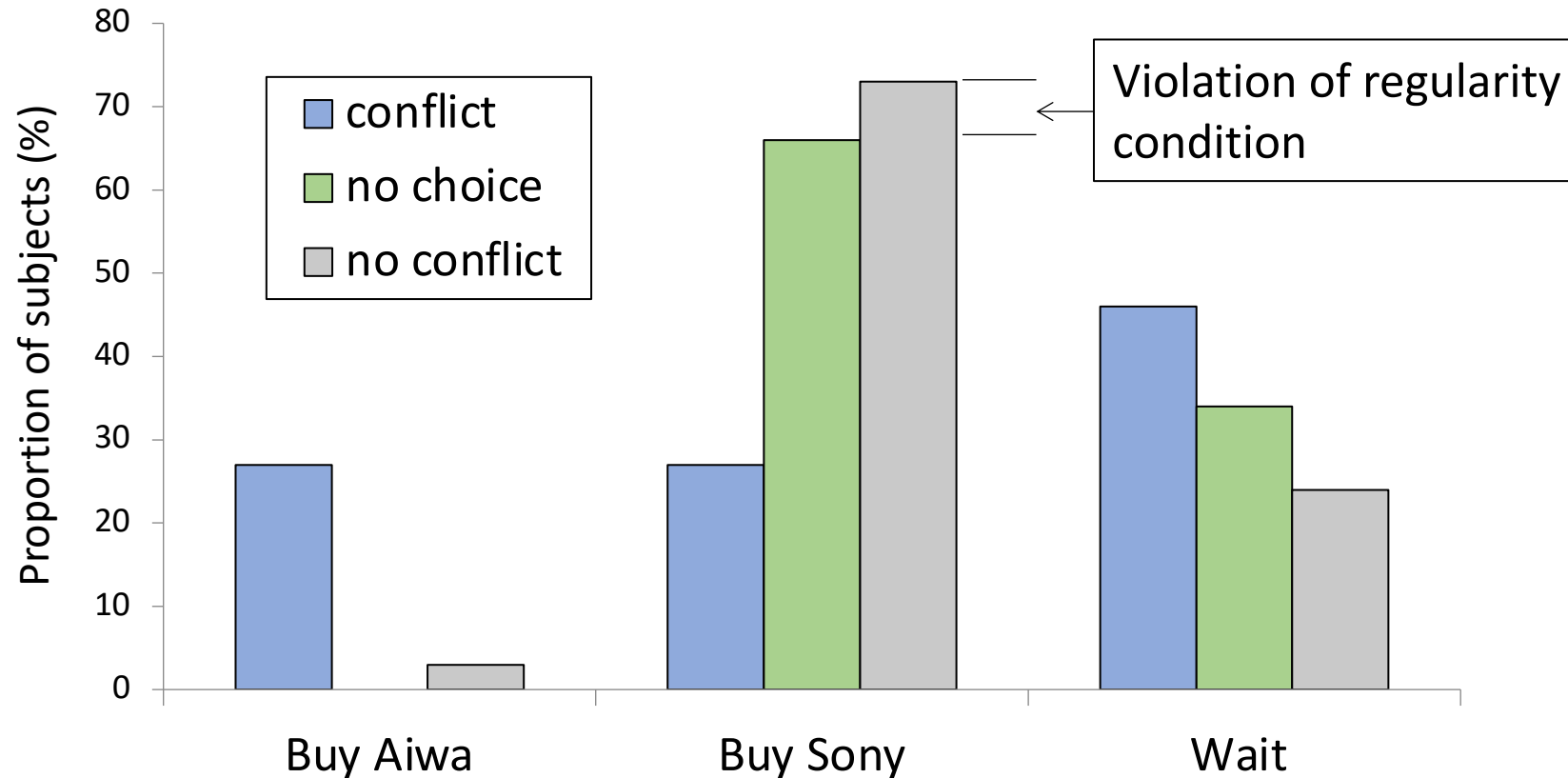
In Tversky and Shafir (1992) subjects were asked to imagine they want to buy a CD player.

- Some subjects were given the conflicting choices of a Sony player for \$99 and a top of the range Aiwa player for \$169.
- Some were given the non-conflicting choice of the Sony player for \$99 or an inferior Aiwa player for \$105.
- 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.

In this situation we see a violation of the regularity condition.

- More people buy the Sony when the choice is non-conflicting than when it is conflicting.
 - **More choose the Sony when the choice is non-conflicting than when there is no choice at all.**
- This latter results **violates the regularity condition.**



Source: Shafir, Simonson, Tversky (1993)

It seems that the presence of an inferior option increased the likelihood of buying the Sony.

This suggests that one alternative can look more or less desirable depending on what it is compared to.

Hence, the options available (i.e. context) influence our perception of these options, this is one of the occasions where a context effect arises.

Trade-off contrast hypothesis

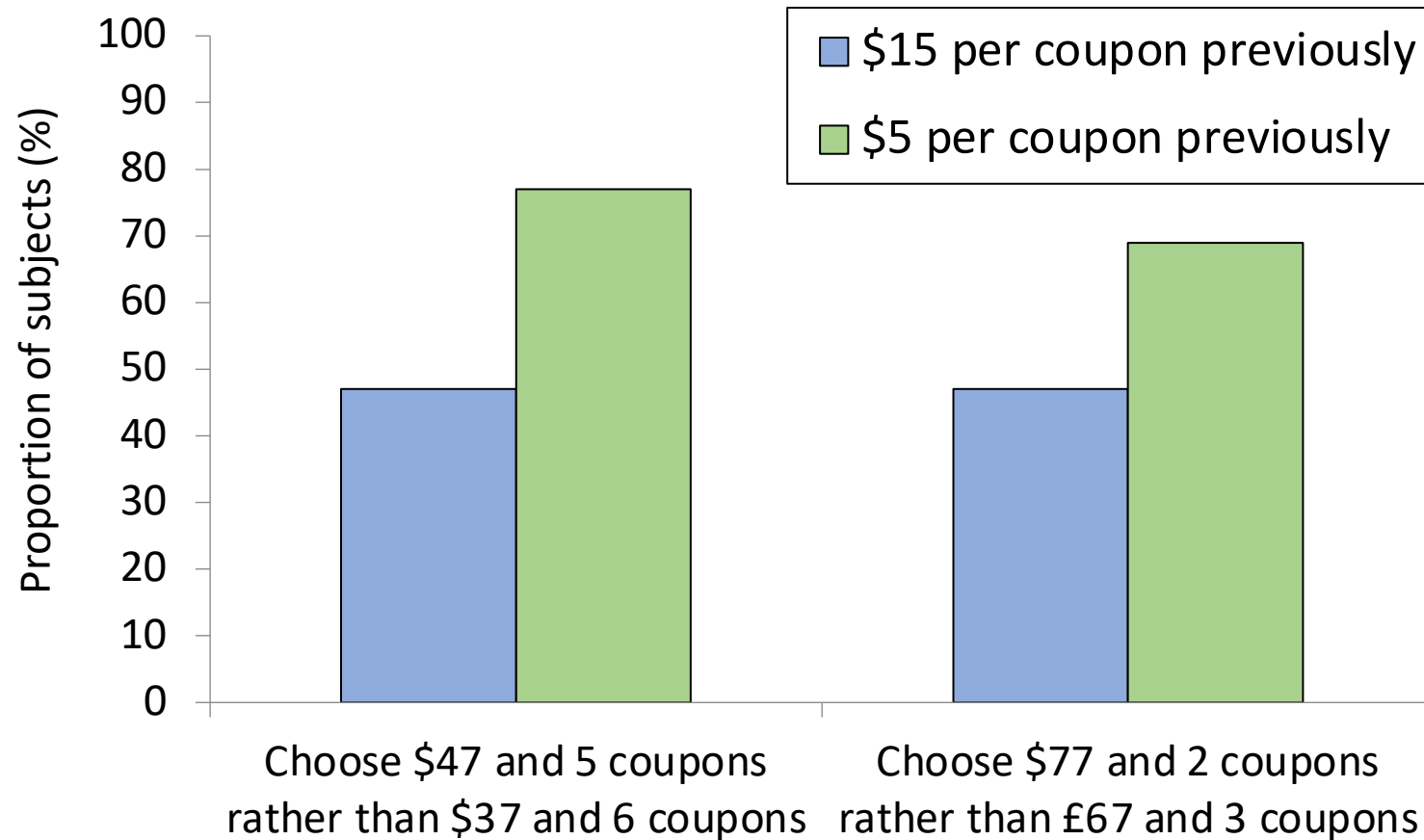
A slightly different possibility is that **particular aspects of an alternative can look more or less desirable depending on what they are compared to.**

In particular, the trade-off contrast hypothesis suggests that a product with a desirable quality appears cheaper if contrasted with a product where the quality is more expensive. Simonson and Tversky (1992) show evidence in support of this hypothesis:

- Subjects were asked to choose between coupons and cash, where each coupon could be redeemed for books or CDs at local stores.
- In a **background stage** subjects were exposed to choices where a **coupon cost either \$15 or \$5.**
- After this they were all exposed to the same **choices where a coupon cost \$10:** the first choice offered to subjects was \$47 and five coupons, or \$37 and six coupons (the extra coupon costing \$10).

Those exposed to a background stage where coupons cost \$15 were more likely to choose the extra coupon, while those exposed to a background stage where coupons cost \$5 were not.

This evidence is consistent with the tradeoff contrast hypothesis; the \$10 coupon looks cheap, or expensive, depending on whether coupons previously cost \$15, or \$5.



Source: Simonson and Tversky (1992)

Attraction Effect

Attraction effect (or **asymmetric dominance effect**), first presented by Huber et al. (1982)*, 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.

*Huber, Joel; Payne, John W.; Puto, Christopher (1982). "Adding Asymmetrically Dominated Alternatives: Violations of Regularity and the Similarity Hypothesis". *Journal of Consumer Research*. **9** (1): 90–98

Consider this example:

Product	Price	Taste
Budget	\$5	2
Nutty	\$3	1
Honey	\$4	3

Consider the introduction of the third option «Budget».

«Budget» is inferior to «Honey» in all aspects, while it is better than «Nutty» for taste and inferior for price.

When «Budget» is introduced in the choice set, the market share of «Honey» increases. Hence, «Budget» will be avoided, but can be used to increase the sales of «Honey»; one possible explanation is that this will look like a better deal when compared with a totally inferior option.

Compromise Effect (or extremeness aversion with comprise)

Consider this case

Product	Price	Taste
Budget	\$1	1
Nutty	\$3	2
Honey	\$4	3

Budget has the advantage of being cheap,

Honey has the advantage of being tasty, but Nutty strikes a good compromise.

One might be prefer to buy Nutty just because it's 'in the middle'. If true this means the shopper should be more likely to buy Nutty when all three cereals are on display than just two.

This would be an example of compromise effect (or **extremeness aversion with comprise**).

Extremeness aversion with Polarization

There is another possibility: it may be that the presence of Honey or Budget on display **emphasizes the importance of quality**.

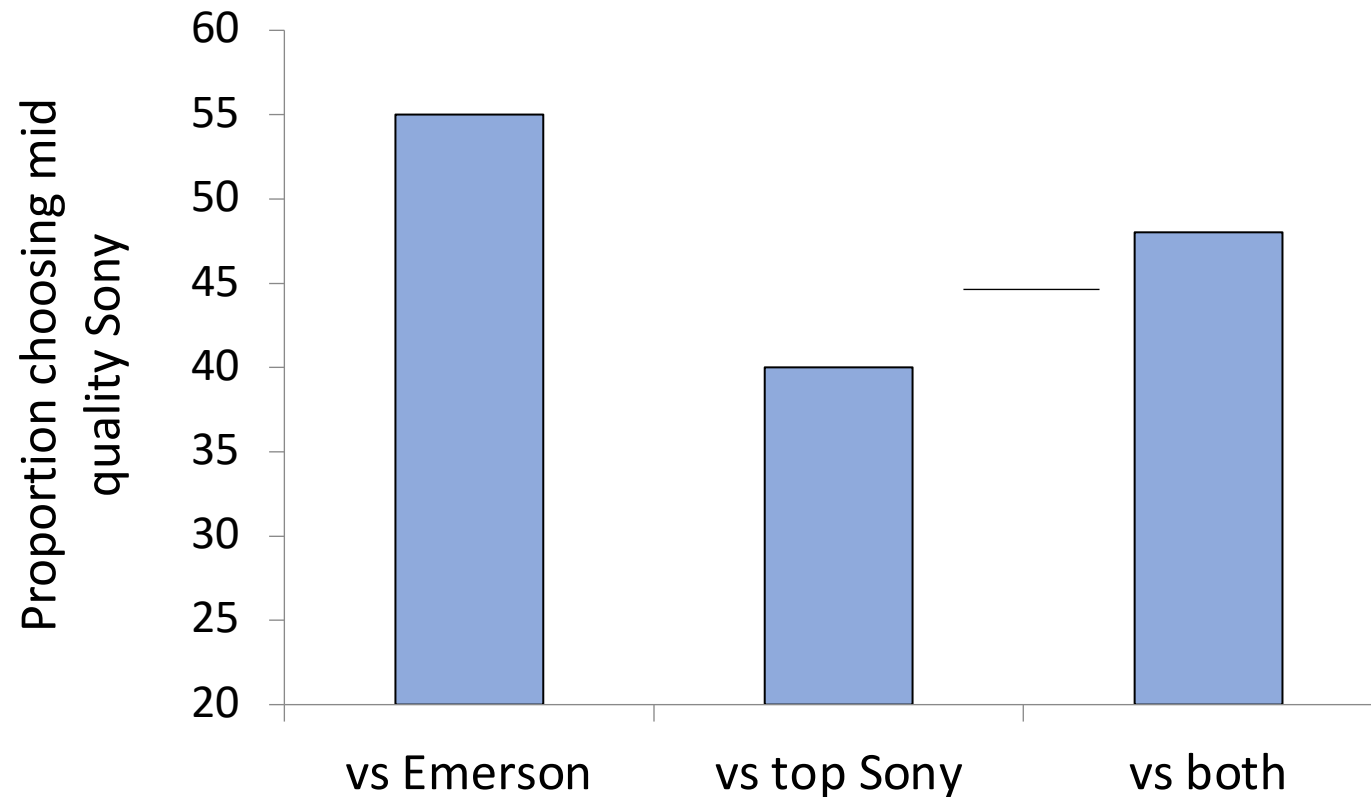
So, the presence of Honey on display increases the likelihood Anna will buy Nutty (compromise effect), but the presence of Budget on display might decrease the likelihood Anna will buy Nutty, because she switches to Honey. In this latter case we have extremeness aversion with polarization.

Simonson and Tversky (1992) show evidence of the extremeness aversion with compromise and with polarization respectively when low-quality item and a top-quality item is introduced:

Subjects were given information about three radio cassette players, a mid-quality Emerson, mid-quality Sony and top-quality Sony.

In this bar chart we see the proportion choosing a mid-level Sony player when the alternative was an Emerson player, a top-quality Sony player, or both the Emerson and Sony.

- Adding the Emerson (bar 2 vs bar 3) increases the proportion choosing the mid-quality Sony compared to the top-quality Sony (extremeness aversion with comprise).
- Adding the top-quality Sony (bar 1 vs bar 3) decreases the proportion choosing the mid-quality Sony compared to the Emerson (extremeness aversion with polarization)



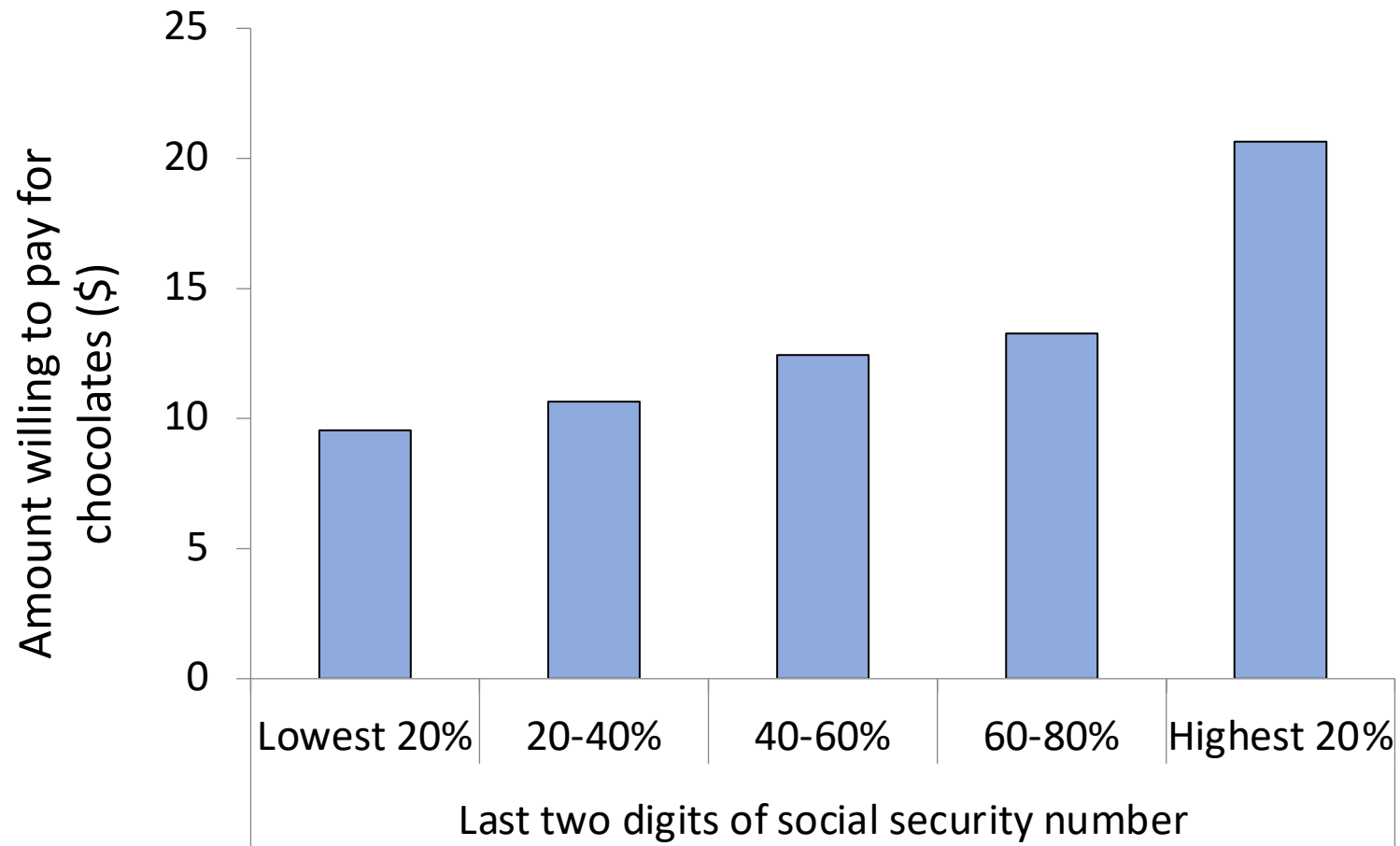
Source: Simonson and Tversky (1992)

Anchoring Effect

When person's thoughts on a particular product are influenced by some prior event. For example, Ariely et al (2003) show this effect:

- Subjects were first asked whether they would buy a box of Belgian chocolates, and some other items, for more than the last two digits of their social security number. For example, if the last two digits are 25 they are asked whether they would pay more than \$25 (anchor).
- They were then asked how much they would be willing to pay (willingness to pay elicitation).

On average those asked whether they were willing to pay, say, \$55 subsequently said they were willing to pay a higher price than those who were asked to pay, say, \$15.
The digits of their social security number have an effect.



Source: Ariely, Loewenstein, Prelec (2003)

Heuristics and Biases : evidence against rationality?

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' - heuristics that may originate that biases.

But heuristics people use are not always well adapted (in some cases they are not just well adapted to some of the things experimenters have us do in the lab!).

Prelec et al. (1997) show that context effects as attraction effect and compromise effect can be partially be accounted by (rational) inference of information (*The Role of Inference in Context Effects: Inferring What You Want from What Is Available*):

- If you do not have perfect information about the attributes, it makes sense to rely on inference from the options offered.
- Consumers will frequently be uncertain about the specific values of attributes they most prefer but will be more certain about how their preferences tend to compare with other consumers in the population (see the **poncho example**) (I do not know how long should be a poncho, but I know if I am a small, medium large size).

Relative comparison are much more natural for us!

Reference Dependence

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**.

Two persons get their monthly report from a broker. Carol is told that her wealth went from \$4 to \$3 million dollars. Amanda is told that her wealth went from \$1 to \$1.1 million dollars. Who is happier?

Standard in economics is to measure utility using a utility function $u(x)$ where x is money and the more money, the higher is utility.

- Outcomes are judged in absolute terms - \$3 million is better than \$1.1 million. **$u(3 \text{ million}) > u(1.1 \text{ million})$**
- Outcomes are judged in relative terms. \$3 million is a \$1 million **loss** while \$1.1 million is a \$0.1.

We can use a **value function** $v(x - r)$ to measure gains and losses.

Carol would get $v(-\$1 \text{ million})$ and Amanda would get $v(\$0.1 \text{ million})$. With this formulation it seems that Amanda should be happier *because* $v(\$0.1 \text{ million}) > v(-\$1 \text{ million})$.

Reference dependent utility function

$$u^r(x) = \eta u(x) + v(x - r).$$

Total utility is now a weighted sum of utility from total wealth and the utility from a relative gain or loss.

With this we can capture that one could be potentially happier because she has more wealth and potentially less happy because her wealth has decreased.

Loss aversion

Judging things relative to a reference point raises the important distinction between gains and losses.

Usually people are loss averse: losses are worse than gains are good!

Formally, **a person is loss averse if a loss causes a bigger fall in utility than a similar sized gain causes an increase in utility.**

So, losing \$ g is worse than not gaining \$ g .

$$-v(-g) > v(g).$$

Why reference dependence is important?

The reference point can be influenced by perception and intuition, and as we have seen perception and intuition can be influenced by the context or even on how the options are framed.

Endowment Effect

The endowment effect is a cognitive bias where people tend to overvalue goods they own compared to identical goods they don't own.

Study by List (2004): Experiment conducted at a sports card show, offering participants a choice between a coffee mug and a chocolate bar.

Ownership Perception: Those physically given a good were less likely to trade it, illustrating the endowment effect.

Experienced Traders: Experienced traders tend to exhibit a reduced endowment effect.

The endowment effect is driven by reference dependence and loss aversion, where owning a good creates a sense of loss if given away, which is weighed more heavily than the potential gain.

Ownership and trading of goods are central to economics, making the endowment effect an important cognitive bias to consider.

Mental Accounting

Mental accounting is the process of coding, categorizing and evaluating choices and outcomes.

The primary component of mental accounting is to put any spending or income into separate accounts for specific purposes.

You might have for example a mental account for expenses related to go to the theater:

- Question one. Imagine that you have decided to see a play where admission costs \$10 per ticket. As you enter the theater you discover that you have lost a \$10 bill. Would you pay \$10 to watch the play?
- Question two. Imagine that you have bought the ticket to see a play where admission costs \$10. As you enter the theatre, you discover you have lost the ticket and there is no way to recover it. Would you pay \$10 for another ticket?

In both cases the loss is \$10.

Tversky and Kahneman (1981) report that 88 percent of subjects asked question one said they would pay, but only 46 percent asked question two said they would pay.