

Behavioral economics

Lecture IV - Decisions

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References:

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

Simple heuristics for complex choices

- Even the most innocuous of economic choices are in principle very complicated. For example, consider a shopper in a grocery store looking at rows of breakfast cereal and deciding which one to buy. Should she buy the cereal she usually buys? Should she try a new cereal the store has just introduced? Should she buy the cereal on special offer? Will the cereal she usually buys be on special offer next week? Will it be cheaper in another store? Should she be tempted by the cereal with the chance to win a holiday in the Caribbean?
- Clearly, most of us do not spend much time considering all these issues. Indeed, most of us simply buy the cereal that we usually buy. That way we can make a quick decision that will probably keep us happy. This is an example of a heuristic. A heuristic is any ‘rule of thumb’ or simple rule of behavior by which a person solves a problem. The shopper can solve their problem of what cereal to buy with the heuristic ‘Buy what I usually do’. “Almost all the economic decisions we make are based on such heuristics; otherwise, life would get far too complicated. This makes it important for us to know how heuristics work and what their consequences can be.
- Let’s start by taking up the story of a shopper called Anna in a grocery store deciding what breakfast cereal to buy. There is a large selection of potential choices, all with different characteristics, but we will narrow things down to the four listed in the following table. How can she decide what to buy?

Simple heuristics for complex choices

- The standard way of thinking about this in economics is to assume that Anna has a utility function that says how much utility she gets from particular combinations of money and goods. In this context we would write $u(x, TQ, HQ)$ as the utility she gets from having money x and a cereal with taste quality TQ and health quality HQ . One important point to note is that, in the standard description, utility should be a function of money wealth, and so when evaluating each choice we need to focus on how much money Anna will have after buying the cereal. To illustrate, the table works through an example in which she initially has \$100. She can buy no cereal, keep wealth \$100 and have utility 200, or pay \$1 for Budget, have wealth \$99 and utility 202, and so on.
- You might be wondering what it means to say that Anna's utility is 200, or 202. You can think of utility as a general measure of happiness or satisfaction. So, more utility is better, and Anna wants to choose the cereal with highest utility.
- In the example, we can see that Honey offers the highest utility and so looks like the best choice. It does so because it offers the best trade-off of quality for price. Anna is willing to pay the extra \$1 to \$4 that Honey costs over other choices in order to improve the taste and health quality, but is not willing to pay a further \$2 to get the highest quality. We have, therefore, a prediction of what Anna should buy: she should buy Honey.
- This is fine, if Anna knows what maximizes her utility. Realistically, however, she probably will not know. Maybe she has never tried Budget or Superior, or maybe she did try them once but has forgotten what they tasted like, her preferences have changed or the manufacturers have subsequently improved the quality. This lack of knowledge is crucial, and means that it is not enough for us to say that Anna should do the thing that maximizes her utility.

Table 2.1 Cereals for sale, and their characteristics, with 1 = low, 2 = medium and 3 = high.

Product	Price	Taste quality	Health quality
Budget	\$1	1	1
Nutty	\$3	2	2
Honey	\$4	3	2
Superior	\$6	3	3

Table 2.2 The utility of each cereal if initial wealth is \$100.

Choice	Wealth	Taste quality	Health quality	Utility
No cereal	\$100	0	0	200
Budget	\$99	1	1	202
Nutty	\$97	2	2	203
Honey	\$96	3	2	204
Superior	\$94	3	3	203

How to search

- If Anna does not know the quality of goods, or her utility function, then she can gather more information in order to become better informed; we call this search. A search heuristic specifies what Anna should do in order to become better informed. There are lots of possible search heuristics.
- The most obvious search heuristic is 'Try everything'. For example, Anna could try a different cereal every week until she has tried them all, and then subsequently buy the one she liked the most. This means she will end up knowing a lot about cereals. Potentially, however, the process will be costly. To see why, suppose that in the first week she tries Honey and can tell that she likes it a lot. If she sticks to her heuristic then in subsequent weeks she will have to buy and try cereals that are not going to give her as much utility. She would have been better off just sticking with Honey.
- In this case, search proves costly in terms of forgone utility. Search can also be costly in terms of time and money. A good search heuristic needs to trade off the benefits of acquiring more information with these costs. Characterizing optimal, or good, search algorithms has a long history in mathematics, computer science and economics. Optimal search algorithms are typically very complicated, however, so we need to think what search heuristics people could realistically use that come close to the optimum. Three such heuristics are satisficing, elimination by aspects and directed cognition.
- The basic idea behind satisficing is that a person sets some aspiration level for what they are looking for, and continues to search until they find something above the aspiration level. For example, Anna may decide she wants something that tastes good and is reasonably healthy. This determines her aspiration level, and she will keep on trying cereals until she tries Honey or Superior. Satisficing relaxes the objective from finding the optimal choice to merely finding a choice that is good enough. This means a person may not end up with the best, but they will end up with something relatively good, while avoiding the costs of excessive search.
- How close satisficing comes to the optimum will depend on the aspiration level. This is where satisficing become slightly more tricky, because it is not trivial what the aspiration level should be, or how it should change. If, for example, Anna's aspiration is to find a cereal costing less than \$7, then she may end up with Budget; the aspiration level looks too pessimistic. If her aspiration is to find a very tasty and healthy cereal for less than \$5, then she will be disappointed because no such cereal exists; the aspiration level looks too optimistic. Anna will need, therefore, to set the aspiration level appropriately and revise it as she goes along; it's just not clear how exactly she will do so.

How to search

- A heuristic that partly addresses this problem is that of directed cognition. The idea behind directed cognition is that a person treats each chance to gather information as if it is the last such chance before they have to make a choice. Typically, it will not actually be their last chance. Directed cognition simplifies Anna's task, because she does not need to forward-plan. To illustrate, suppose she knows only the characteristics of Nutty. Using directed cognition, she should ask herself: 'Shall I try one alternative cereal, and, if so, which one?' This is a much simpler question than would be needed with forward-planning.
- The final search heuristic we want to look at, for now, is that of elimination by aspects. The basic idea of elimination by aspects is to consider the aspects of possible choices one by one and sequentially eliminate choices that fall below some aspiration level. For example, if Anna's aspirations are to buy a medium taste and health quality cereal for under \$5, then on the price aspect she would eliminate Superior, and on the quality aspects eliminate Budget. This would leave a choice between Honey and Nutty.
- Elimination by aspects is different from the previous two heuristics in that it compares across aspects, such as price, rather than across choices, such as Honey or Nutty. Conceptually it is simpler to compare across aspects, because there is likely to be a simple ordering from best (e.g. least expensive) to worst (most expensive). The problem is that comparing across aspects presupposes that the person has information about all the possible choices. With aspects such as price and health quality this is plausible, because the prices and ingredients will be displayed on the box. With an aspect such as taste quality it is difficult to know the differences without trying them all. Elimination by aspects can take us only so far, therefore, in explaining search, but it does offer vital clues on how a person can choose what to try next and what to not try at all.
- With an aspect such as taste quality it is difficult to know the differences without trying them all. Elimination by aspects can take us only so far, therefore, in explaining search, but it does offer vital clues on how a person can choose what to try next and what to not try at all.

How to search

Table 2.3 Five search heuristics with a very brief statement of how they can help with search.

Heuristic	What it does well	What it does not do so well
Try them all	Make the person well informed	Minimize the cost of search
Satisficing	Say when to stop search	Say what choice to try next
Directed cognition	Suggest what choice to try next	Give a forward-looking plan of search
Elimination by aspects	Say what choices not to try	Say when to stop searching
Search for x minutes	Give certainty how long search will last	React to success or failure in search

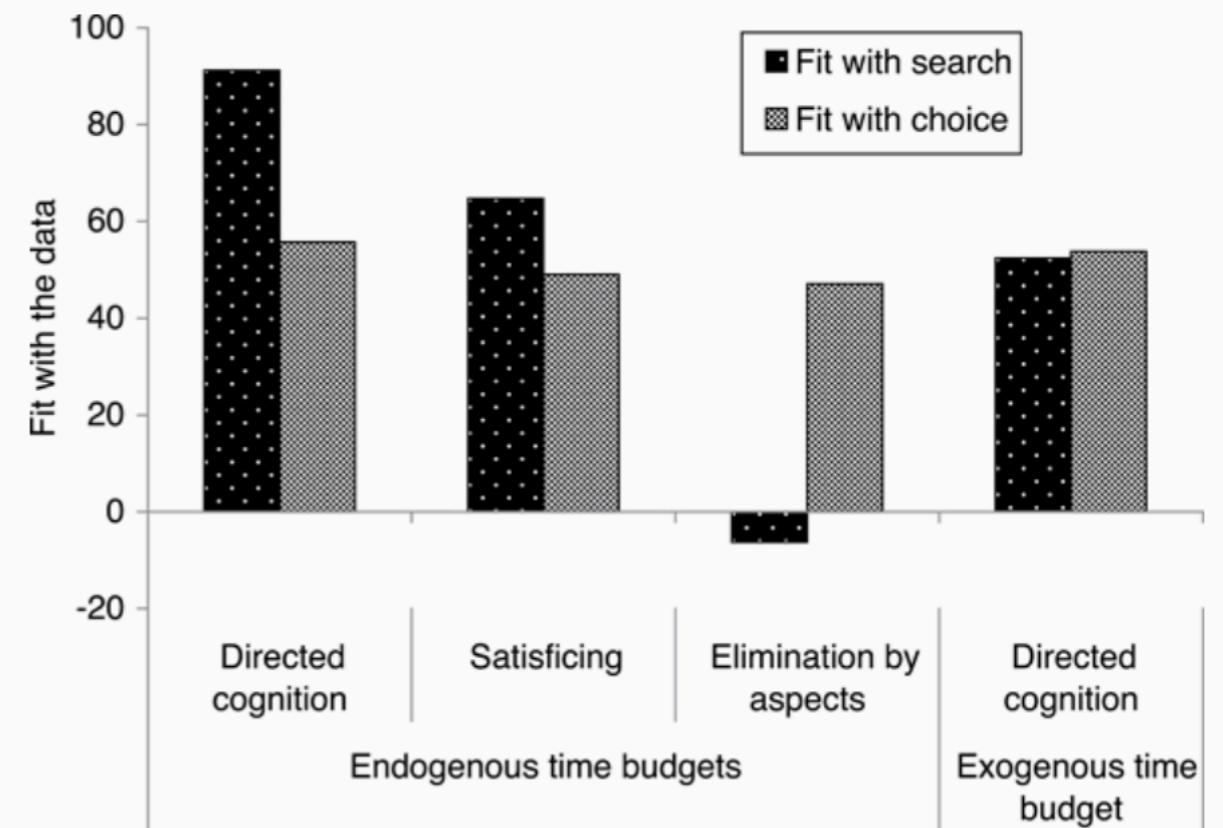


Figure 2.1 How well search heuristics fit the observed search and choices in a search experiment. The fit is measured relative to what could have been expected by chance. Directed cognition and satisficing give the best fit.

Source: Gabaix *et al.* (2006).

How to search

- To get a feel for how people search we can look at the results of a study by Gabaix and co-authors (2006). In the study, subjects were asked to choose between eight options with the payoff of each option the sum of ten numbers. One of the numbers was visible, but to find the value of each of the other nine numbers the subjects had to click on the screen. To relate this back to our earlier example, imagine that the price is visible, but to find the health quality Anna has to pick up the box and look up the ingredients. Software called Mouselab can track what information subjects choose to look up and gives us some idea how subjects searched.
- We see that directed cognition does a good job of fitting how subjects search, while elimination by aspects does less well. In terms of fitting choice, all algorithms do roughly as well as each other and the choice is what we would have expected around 50 percent of the time. A 50 percent success rate at predicting what subjects will choose is much better than we could have done by guessing (remember there were eight possible choices), but still not as high as we might like. It looks as if we are missing something.
- One thing that becomes apparent is that subjects were not as selective in what information they looked for as the three heuristics suggested they should have been. In different ways they looked up both too much and too little. First, the too much: if one choice ranks poorly on the visible aspect, then it pays to not search for other information about that choice. For example, if Superior is too expensive, then there is little point in looking at the health quality. Subjects tended to look up more information than we might expect in such instances. Next, the too little: it does not matter how long the search has gone on; if the search has not yet uncovered something useful, it pays to carry on searching. Subjects seemed to stop searching if they had looked up a lot of information, however, even if that information had not been very informative.
- Putting these observations together suggests a fifth search heuristic: a person decides how much time to spend on search and then searches for that long. This may mean that Anna would search too long, if she initially tried something she liked, or search too little, if she has yet to try anything she really likes. But it does mean search will last a definite length of time, and this may be a useful thing.
- Now that we have looked at some heuristics it is worth briefly expanding on their role in decision-making. The ideal heuristic is simple and effective: simple in the sense that it can be performed relatively easily, particularly when compared to what would be required to make an optimal decision; effective in the sense that its use typically results in a choice close enough to the optimal decision that extra effort is not justified. The best heuristic strikes the right balance between simplicity and effectiveness.







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.

Separate vs. joint evaluation

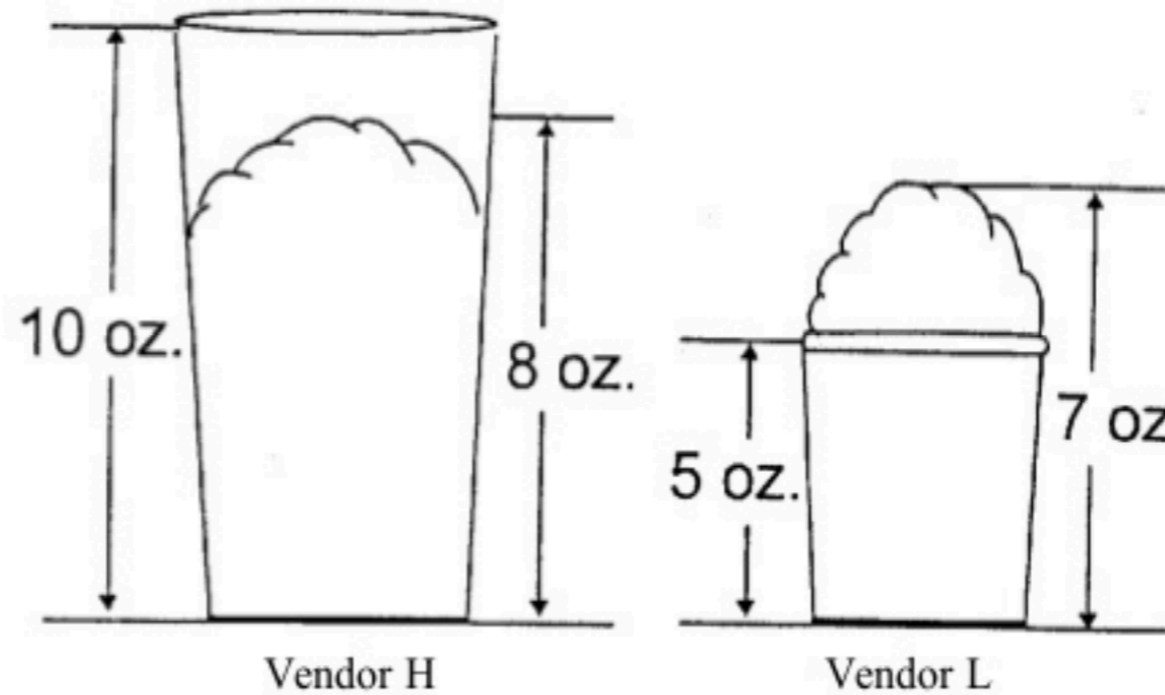


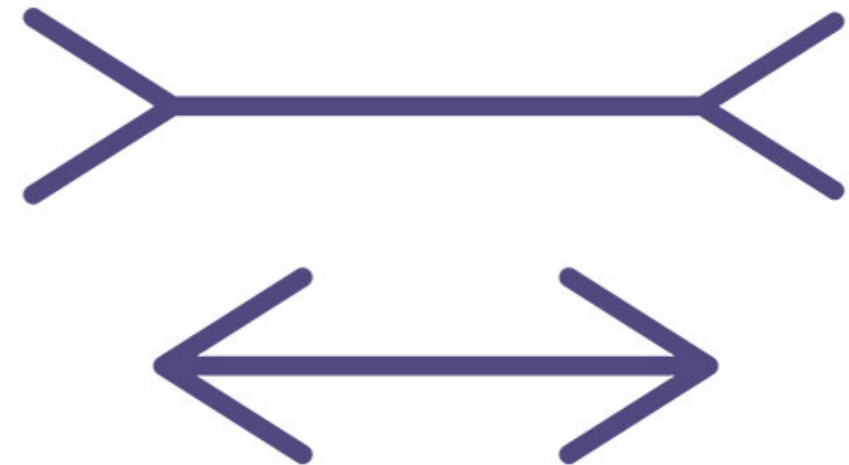
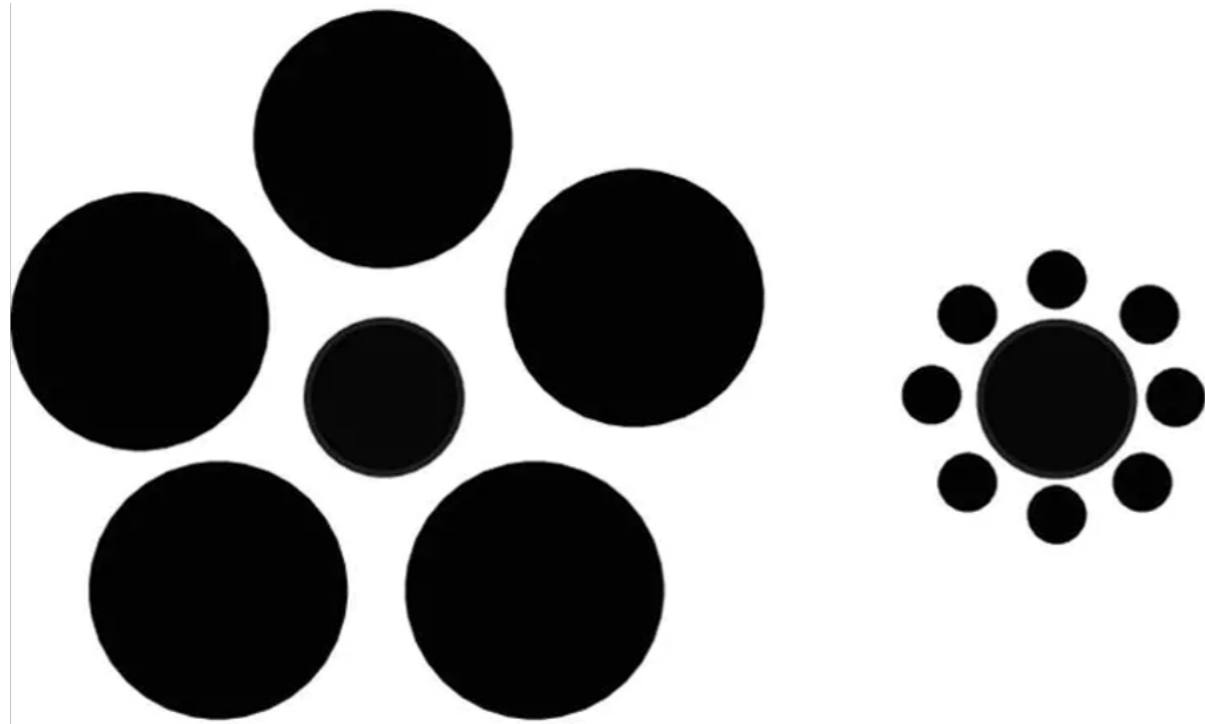
Exhibit 1. Drawings in Study 2

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

Evaluation Mode	Vendor H's	Vendor L's
Separate evaluation	\$1.66	\$2.26
Joint evaluation	\$1.85	\$1.56

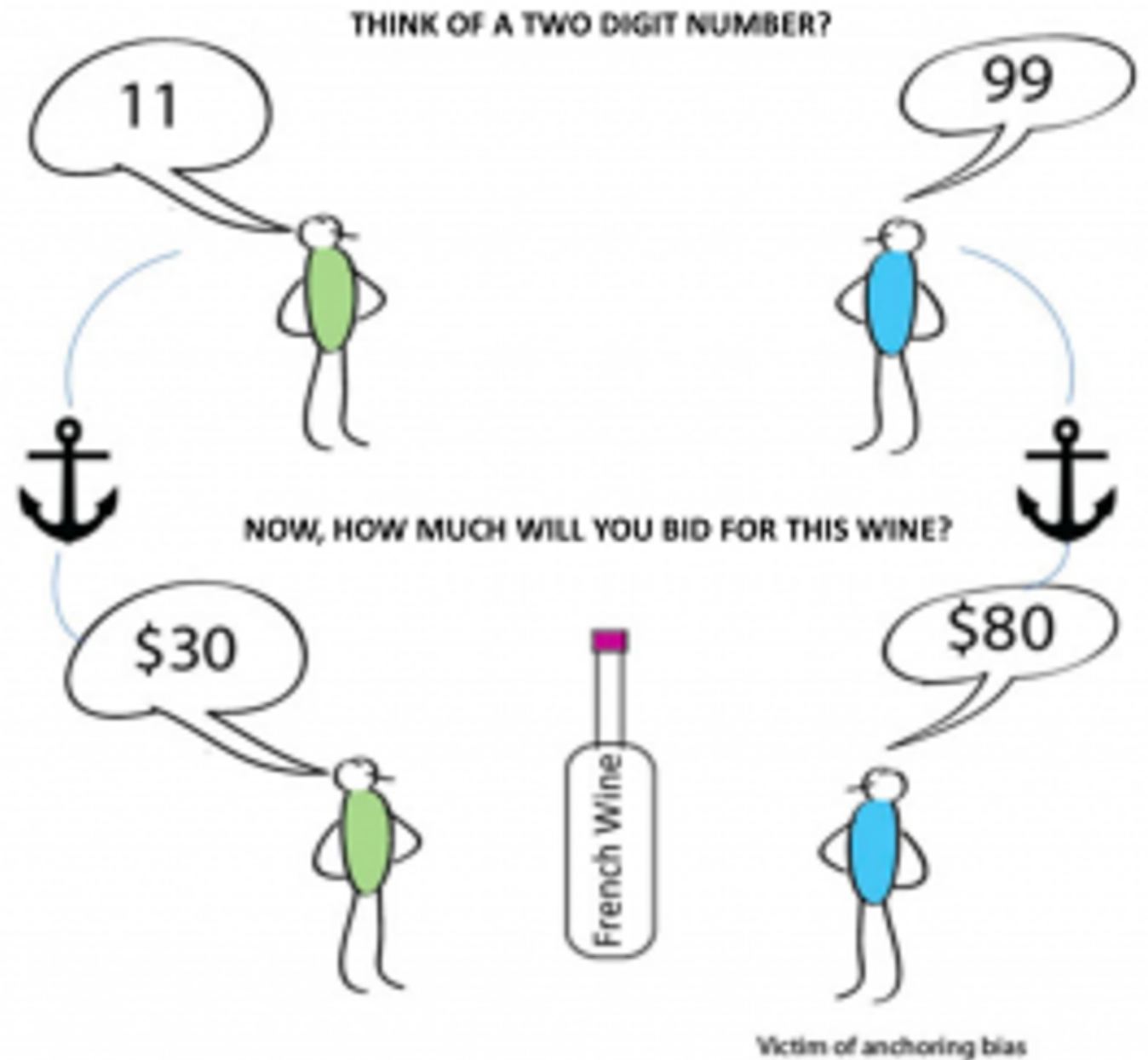
Everything is relative

Context matters



Anchoring effect

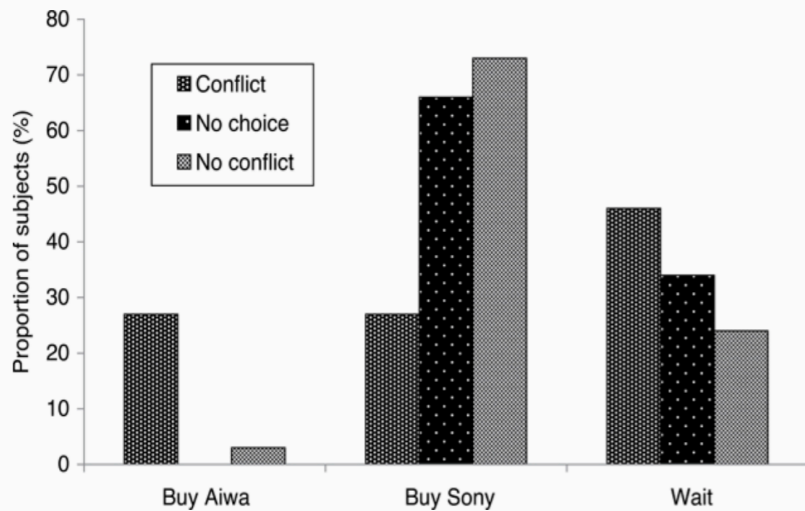
- Suppose that on going into the grocery store Anna is stopped and asked to do a survey. One question they ask is whether she would be willing to pay \$8 for a new cereal they are trialing. After that, Superior may look relatively cheap at \$6. If the question had said \$4, then maybe Superior would look expensive. This is an example of an anchoring effect, when a person's choice is influenced by some prior cue or anchor. This might look like a trade-off contrast. In trade-off contrast, however, two or more different products are compared, while, with the anchoring effect, a person's thoughts on a particular product are influenced by some prior event.
- To illustrate how the anchoring effect can happen, we shall look at part of a study by Ariely, Loewenstein and Prelec (2003). 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 were asked whether they would pay more than \$25. They were then asked how much they would be willing to pay. The last two digits of a social security number are random, but did matter. 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.



Anchors and values - Tom Sawyer Effect



Choice arbitrariness



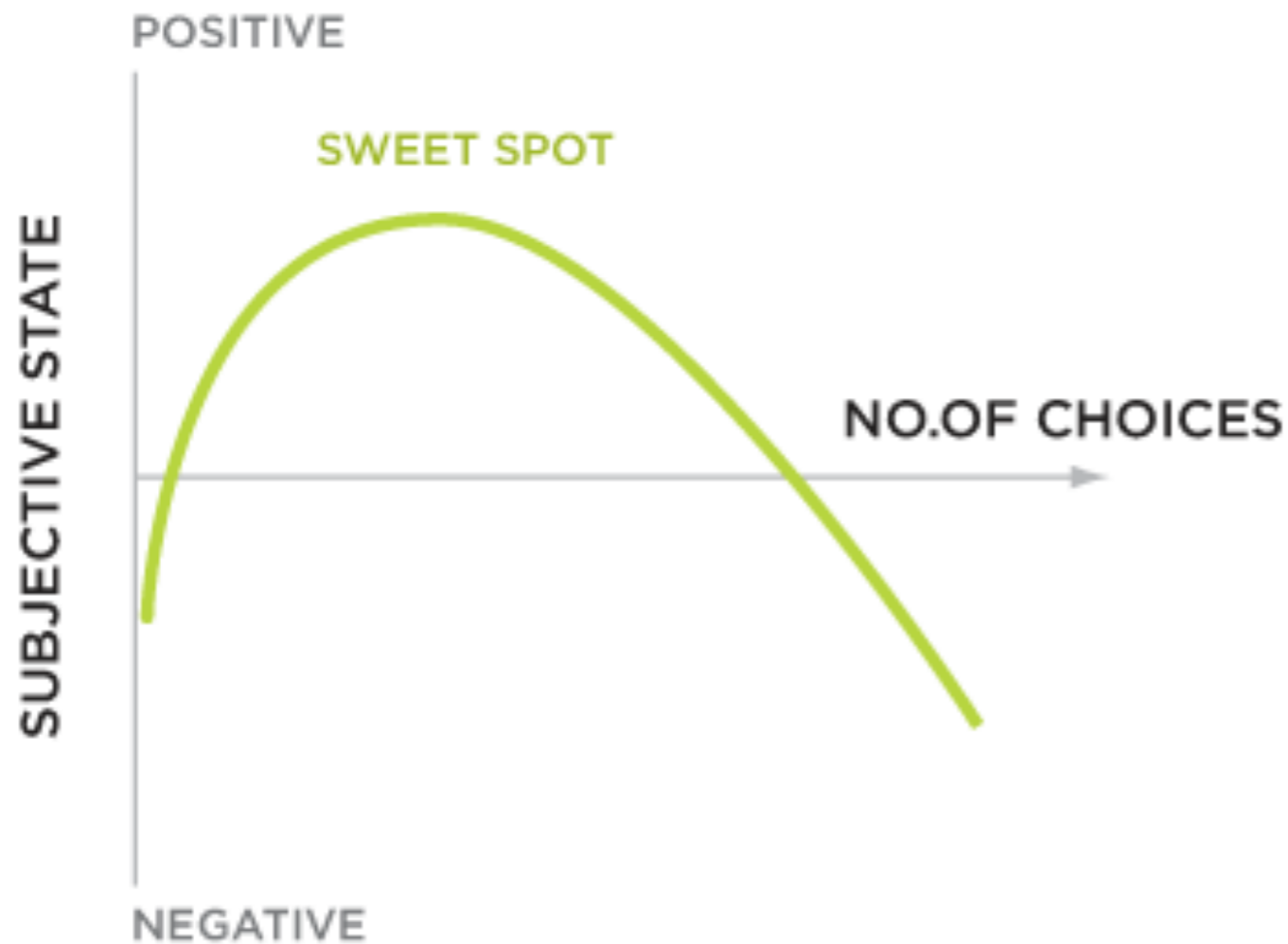
In the process of search, Anna is going to face some fairly arbitrary choices. That's because she does not yet know what maximizes her utility but still has to choose something. For example, she may have narrowed her choice to Nutty or Honey, and there is no real reason to try one ahead of the other. Which one to try first? Her choice will be arbitrary, and she might as well toss a coin to decide. Arbitrary does not, however, have to mean random. For instance, Anna might be attracted by the bright red packaging of Honey or the '50 percent off' sticker on Nutty, or she might choose Budget because she just saw it advertised on TV. In each of these cases choice is systematic. The crucial thing is that choice is influenced by factors that just happened to be like that and could have been different: this is choice arbitrariness. Let's look at some examples.

We will start by looking at the 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. For example, Budget is better on the price aspect but Superior is better on the health quality aspect, and so these are conflicting choices. A set of choices are non-conflicting if one choice is better on all aspects. For example, if Superior were on sale for \$0.50 then there would be a non-conflicting choice.

- 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.



Choice overload / paralysis



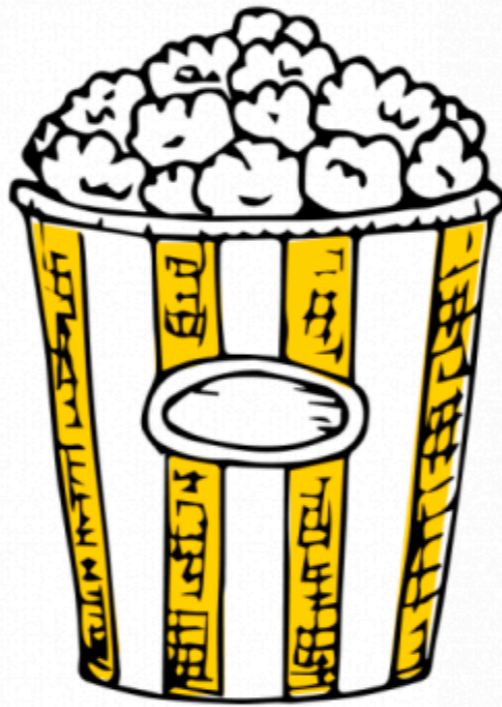
- The Paradox of Choice (Why More Is Less) - American psychologist Barry Schwartz argues that eliminating consumer choices can greatly reduce anxiety for shoppers. The book analyses the behavior of different types of people (in particular, maximisers and satisfiers) facing the rich choice. This book 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.

Compromise effect

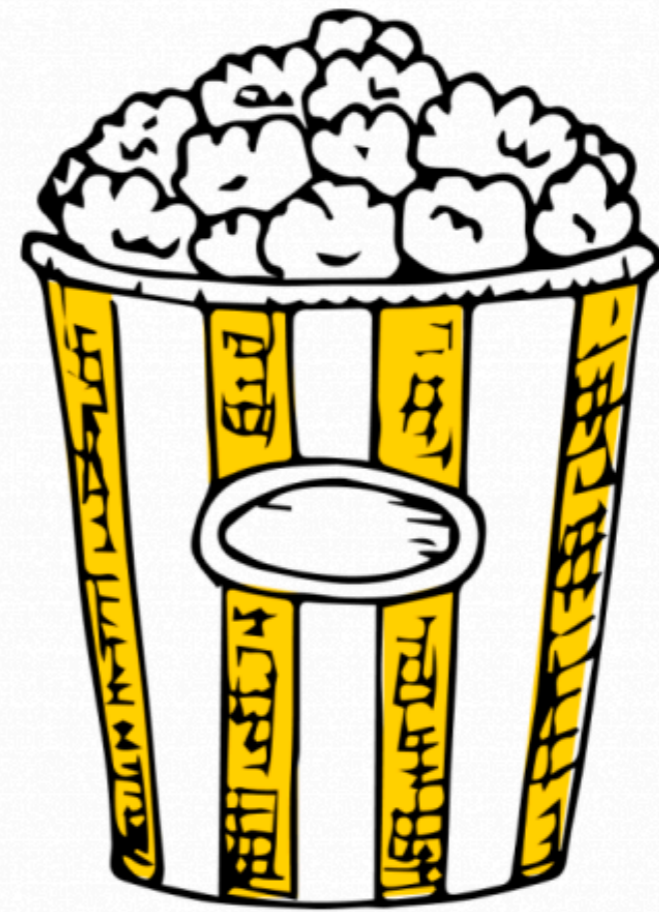
- Let us now go back to the scenario in which there are two or three cereals on display out of Budget, Nutty and Honey. Budget has the advantage of being cheap, Honey has the advantage of being tasty but Nutty strikes a good compromise. Maybe, therefore, Anna will buy Nutty because it's 'in the middle'. 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.



Small
\$3.50

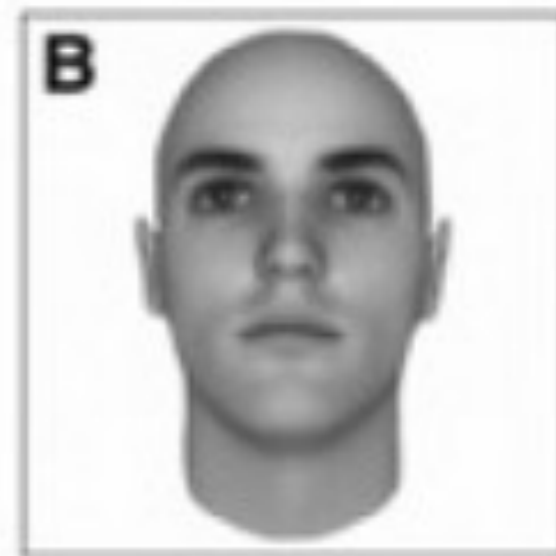
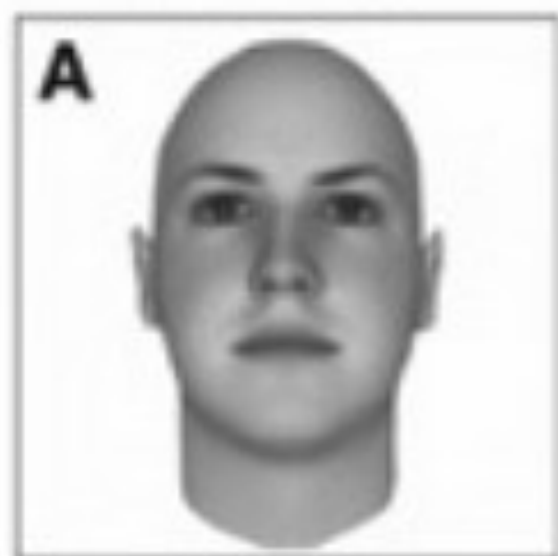


Medium
\$6

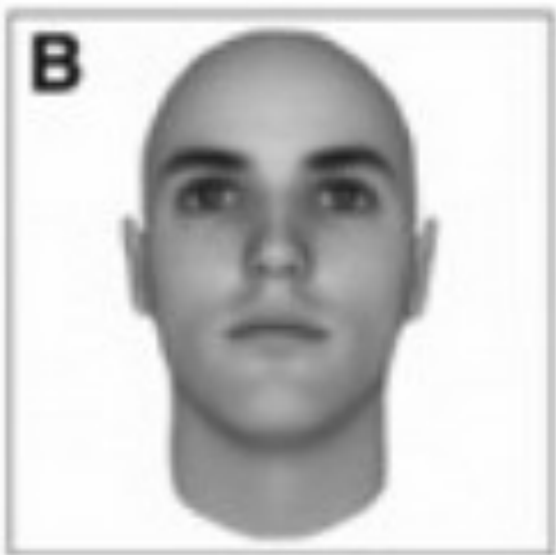
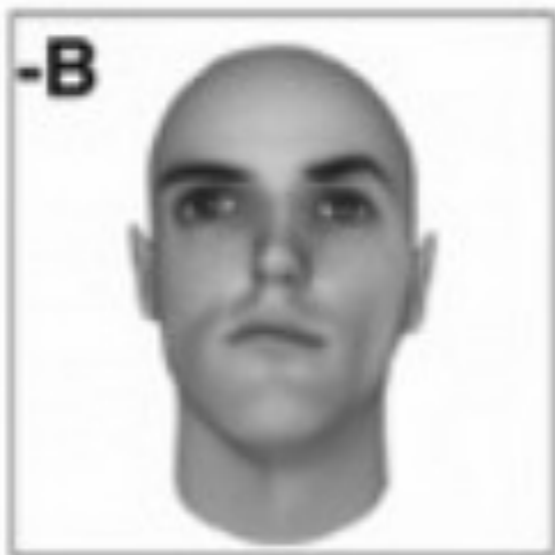


Large
\$6.50

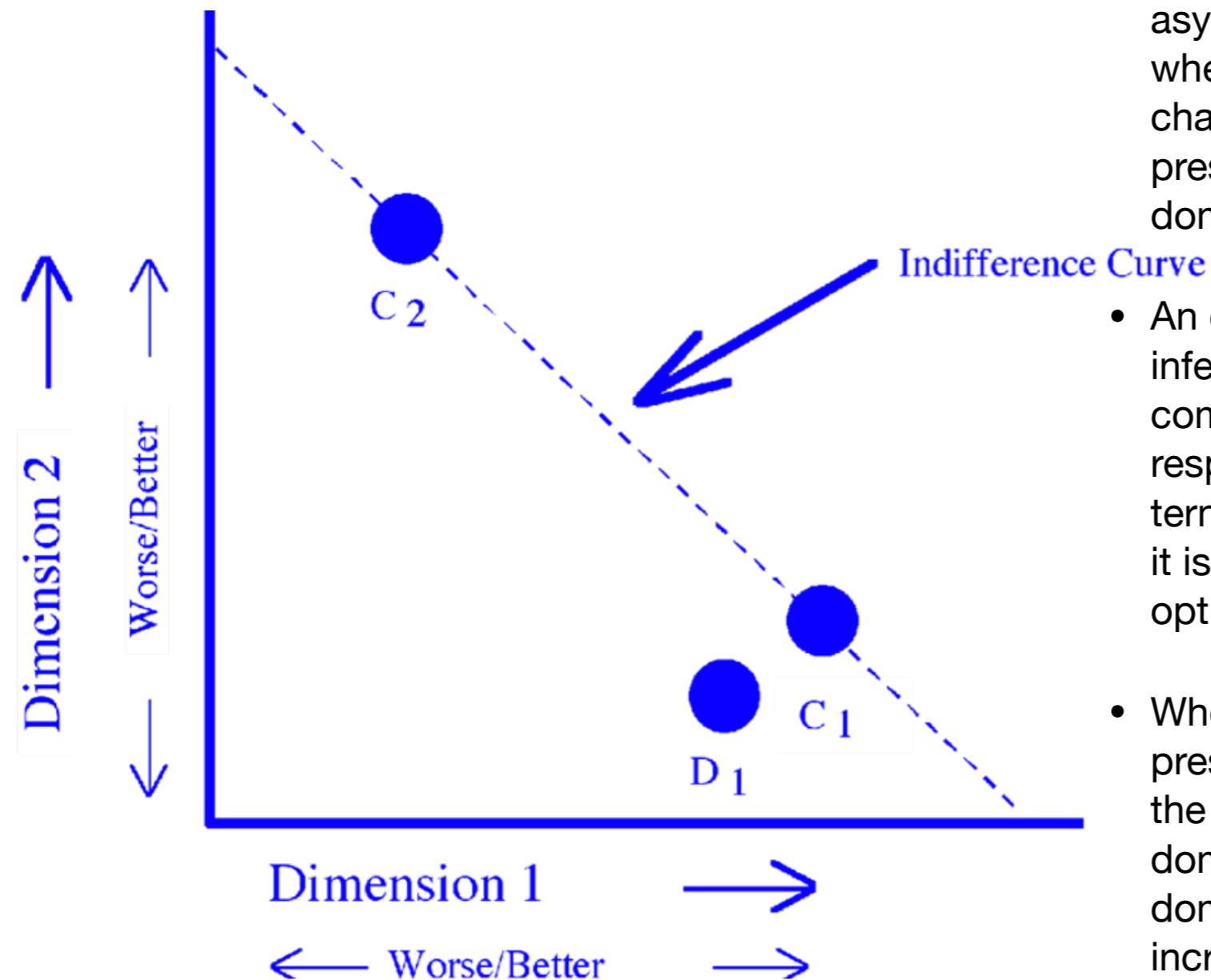
SITUÁCIA A



SITUÁCIA B



Decoy effect



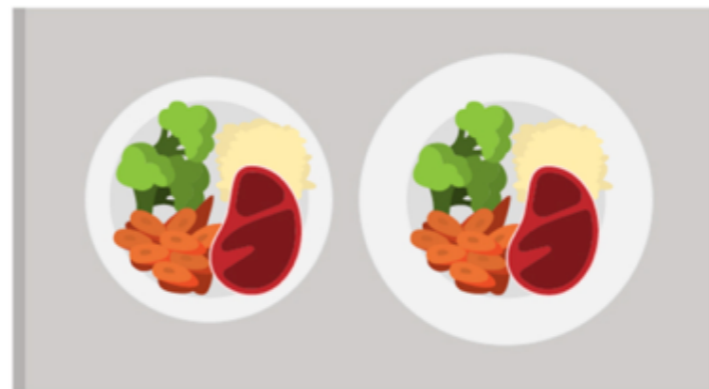
- In marketing, the decoy effect (or attraction effect or asymmetric dominance effect) is the phenomenon whereby consumers will tend to have a specific change in preference between two options when also presented with a third option that is asymmetrically dominated.
- An option is asymmetrically dominated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

Context effects

- The psychological effects we have looked at are the consequences of choice heuristics, such as ‘Pick the one in the middle’ or ‘Pick the most extreme’. They result in choice arbitrariness. Put another way, they cause context effects, a general name we shall give to any external factors, like the other choices on offer that influence choice. Recall that 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. This means choice arbitrariness and context effects are important.
- 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. commission, 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.

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

- www.kiero.sk/garp.php



THINKING
HURTS

- 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.