BIAS

#11 Irrationality

***ARE WE IRRATIONAL?***

Literature on cognitive biases is littered with phrases saying what irrational creatures we are. There is even a popular book titled Predictably Irrational implying that we are indeed irrational.

Let's step back. When is a decision "irrational"? I believe that irrational decisions occur when decisions go against or are counter to logic and reasoning. But then that begs the question, what do we mean by 'logical'; and more important, is logic just a natural state or does it come from a particular perspective?

Daniel Kahneman, who won the Nobel Prize in Economics, found that cognitive biases impede our choices and decisions. Economic theory assumes that all our rational choices and decisions should be maximising our wealth (which economists describe as 'utility'). For example, many consider the act of buying equities when the stock market is peaking and then selling them when the market declines sharply as irrational behaviour. Yet, from an individual's perspective, is that an irrational decision?

***LOSS AVERSION***

*Loss aversion*, the tendency to prefer avoiding losses to acquiring equivalent gains, is a very powerful bias and can sometimes lead to irrational behaviour. In countless studies of human behaviour, of which I see almost without fail in the Mitigating Bias course exercises, people will almost always be relatively conservative seeking a gain but will make significant efforts to avoid an equivalent loss. To check that you have this bias, think back at some economic decision you have made, and how you felt when you made a gain and when you made a loss; I will expect you more vividly remember the loss than the gain (and the associated feelings you had), even if the gain was a greater amount than the loss!

Kahneman and Tversky (1979) suggested that losses lead to a more extreme emotional response than gains, where we value losses at about 2 to 3 times than gains of the same value. In other words, the response to positive and negative events is notably asymmetric, where the subjective 'pain' is significantly greater than the subjective 'pleasure'. For example, you will have a stronger negative feeling when you unexpectedly lose $100 compared to the positive feeling associated with a $100 gain. Marketing efforts use this to their advantage, manipulating how the situation is framed (note, the *framing* bias will be considered in a later blog article).

The following figure (adapted from Bertrand Jayles, 2017) nicely shows the dichotomy between gains and losses, and associated positive and negative feelings, respectively.

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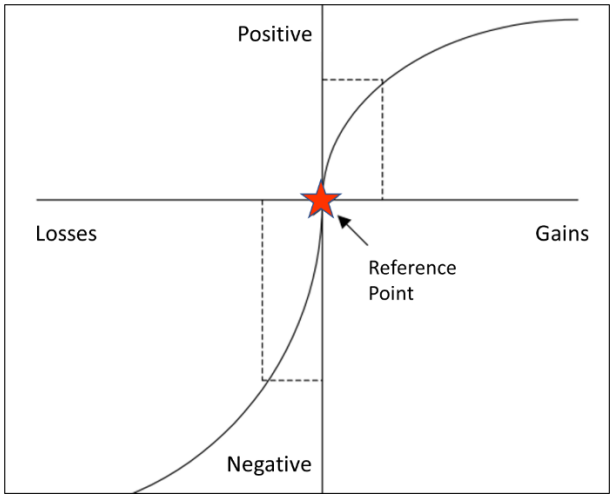


The X-axis represents the gains and losses; and the Y-axis signifies the positive or negative feelings one has given a certain gain or loss. Two things are significant. One, as Kahneman and Tversky suggest, the pain of a loss is stronger than the equivalent gain (note the lower rectangle is longer than the upper rectangle, but each have the same width). Second, the positive feelings toward a gain diminish as the gains increase, whilst the pain continues to increase (yet at a certain point, that too levels off). Rational economic theory, though, states that it should be a straight line with an equal slope through the reference point; and hence, the deviation of the curved line from the straight diagonal line, called a utility curve, is a measure of how inconsistent we are.

The graph shows why people tend to be 'risk averse' when they are deciding among potential gains or positive outcomes (i.e., one would rather have a sure thing than take a gamble for added gains) as the satisfaction of the additional gain is relatively less. Yet they are 'risk seeking' to avoid losses (i.e., one would rather gamble to avoid a loss rather than take a sure loss) as the first loss pain is relatively much greater than any subsequent losses.

***YOU ARE AN IRRATIONAL PERSON? PERHAPS NOT!***

In an earlier blog we touched on the evolutionary basis of cognitive biases and how they actually may be a design *feature* rather than *flaw*. Let's take a look at these ideas in the context of loss aversion. As humans, we are designed to avoid risk as a good strategy for our survival. Yes, it is important to have enough food to sustain us and we will work hard to produce this; but if we lose our source of food (for example, all our crops fail or the village nearby steals our food), we will be extremely agitated.

Let me use a simple realistic evolutionary example. Say you need two bread loaves to survive. You start with one loaf. I then give you a second loaf. You will certainly feel 'pleasure' with this gain. I then give you another loaf. As I continue giving you loaves, you probably will get to a point where any extra loaves really do not make a whole lot of difference in your feeling (assuming you do not sell or give them away to those in need). I think this is why economists suggest there is an optimum amount of wealth, and any additional amount levels off in terms of your satisfaction.

Now, let's explore the loss. You have one loaf, and I take it away. You will certainly feel pain. I then dictate you owe me another loaf, and your pain becomes severe. As I continue this, your pain level continues rising in significance. I suppose at a certain point you just don't care anymore, and hence the levelling off. Simply put, a loss of food could cause death, while a gain of food would not!

Standing back from this example, is loss aversion irrational? I would suggest not, as you are programmed to avoid loss preferentially over seeking a gain for your survival.

***IRRATIONAL? YES, BUT IT IS COMPLEX***

Yes there are occasions where I think we can clearly identify irrational behaviours due to judgments and decisions impacted by cognitive biases. There are countless examples where individuals make poor decisions in the E&P industry due to loss aversion. For example,

- Avoiding countries with higher-than-average political risk (when the goal is to grow your resource base)
- Not drilling wells with a low chance of success (when those projects are associated with larger resources)
- Drilling appraisal wells to confirm your current understanding (rather than reducing the uncertainty of your current view to understand the best development plan)
- Establishing consistent production (rather than trying to maximise production)

However, it is not as clear cut when we factor in our goals and objectives. Because of our evolution, many of our actions and decisions may in fact be rational in another context.

Hence, I do not subscribe to the hypothesis that humans are just plain irrational creatures in all of their actions! Rather, we need to understand when this irrationality may lead to sub-optimal decisions, and work to mitigate against such biases as *loss aversion*; these are addressed in more detail in the Mitigating Bias course.

Ariely, Dan, 2008, Predictably Irrational: The Hidden Forces That Shape Our Decisions, Harper Collins.

Jayles, Bertrand, 2017, "Effects of Information Quantity and Quality on Collective Decision in Human Groups", PhD Thesis, University of Toulouse, 144p.

Kahneman, D., & Tversky, A., 1979, Prospect theory: An analysis of decision under risk. Econometrica, vol. 47, 263-291.

***UNTIL NEXT TIME***

Next time we will explore the *overconfidence* bias, one that is endemic in the oil and gas industry and perhaps best describes why our predictions often fail to meet outcomes.

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