BIAS

#5 Evolution

UNDERSTANDING AND OVERCOMING BIAS

In an earlier blog article, we noted that our cognitive biases are 'normal', and that we all have them. This leads to a natural question: Where do these biases come from? Is there perhaps an evolutionary basis to our biases? Let's explore.

***BIAS AND EVOLUTION***

On the surface, our cognitive biases are somewhat puzzling. If they can lead us to poor decisions, that would suggest they are a design flaw, and so why would they have survived as we evolved? However, from an evolutionary perspective we are not interested on how accurate or logical our cognitive abilities are, but rather how well they solve a particular problem and how solving this problem contributed to our survival through natural selection. Viewed in this way, if a cognitive bias positively contributed to our evolution, it would not be a design *flaw*, but rather a design *feature*![1]

***HEURISTICS***

Let's take a simple example. As humans, we are particularly good at pattern recognition. So, let's say we are walking in the forest and we see the bushes rustle and we think we see a tiger, and we decide to take an alternate route. However, this might not be optimum way as if we would have continued in the original direction, we might have discovered something important, such as a source of water. However, from an evolutionary perspective nine false positives (i.e., think we see a tiger, but it is an illusion) is a much better strategy than one false negative (i.e., don't think it is a tiger, but it is!). Hence for our survival, it is best to go another way!

Because information processing time and capacity are limited, we use a series of mental shortcut strategies, known as *heuristics*, to help us quickly solve problems, form judgments, make decisions, and evaluate the world around us. This is our *reflexive* (as opposed to *reflective*) thinking.[2] We rely on these unconscious shortcuts to reduce the complexity of tasks. They have served us well, as 'good enough', faster, and less use of cognitive energy is a more adaptive strategy for survival.

A good example of how we use heuristics is when we cross the street. If you were to use your *reflective* thinking you would look one way, estimate how far away and how fast any vehicles are traveling and incorporate any other danger you observe. You would then need to look the other way and do the same estimations, which of course might invalidate your first assessment as a car could be approaching and so you would need to re-look in the first direction; a process continuing ad infinitum. You would never cross the street! Rather, you use your *reflexive* thinking, quickly recalling past experiences and apply your intuition to safely cross the street.

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Let's take a closer look at a few of our cognitive biases and see how they serve an adaptive function that could explain their role in natural selection. Interestingly, research has shown that many primate species share similar biases as humans. For example:

- *Anchoring* bias – enhances our superior ability to make relative judgments
- *Availability* bias – supports our ability to make rapid judgments when time is limited
- *Confirmation* bias – strengthens our ability to persuade others and "win" arguments
- *Information* bias – uses less cognitive energy
- *Overconfidence* bias – improves our ability to succeed in difficult situations

Heuristics are a lot like a Swiss army knife – each part solves lots of problems generally well, but not optimally (have you ever tried to use the saw blade on the knife?!). Research estimates that we are exposed to 11 million pieces of information at one time, but we can functionally only deal with 40. Hence, our heuristics have distinct advantages (i.e., reducing time and effort required to make reasonably good judgments and decisions) and yield fairly good outcomes.

***IF THESE ARE SUCCESSFUL EVOLUTIONARY STRATEGIES, THEN WHAT'S THE BIG DEAL?***

Heuristics are good strategies to employ, yielding answers that are approximately correct or more likely to work; but often 'fairly good' is not good enough. Our world has transformed from the 'simpler' world of our ancestors, and we are dealing with far more complex problems in which our heuristics let us down and are often not the best answer nor lead to good decisions. We can think of these heuristics as the foundation of our cognitive biases.

For example, the *anchoring* bias is a heuristic where we anchor our evaluation on some reference value, and then shift up or down to reach an answer that seems plausible. The problem is that we usually do not shift our estimate far enough away from the anchor value. Think about buying a car. The dealer shows you the Manufactured Suggested Retail Price. Dealerships enhance their profits as you immediately anchor on that value and then negotiate downwards, but almost always never sufficiently enough to an advantageous price. Dealers take great strides not to inform you what they paid to have the car in their showroom.

When it comes to risk, we are particularly good at assessing it. However, we struggle estimating uncertainty, which we characterise by expressing in a range. But let's think about this from an evolutionary perspective. I most certainly care if there is a tiger in the bushes (risk); but do I really care about whether the tiger may or may not be hungry (uncertainty)?

My observation assuring prospects for clients is that we are very good at understanding risk, from which we can estimate a probability of success. Post-well analysis of yearly (or multi-year) exploration drilling programs shows that many companies often effectively estimate the success rates from their chance assessment.

However, from an uncertainty perspective, our ranges for prospect size is way too narrow and optimistic, with results often significantly below predictions. Too narrow a predictive range suggests the *overconfidence* bias, which is the tendency to overestimate the accuracy of our own interpretation, judgment, or ability. This bias is endemic within our industry, and we see it in our data interpretations, resource estimation, and timing in project planning, for example.

This overconfidence can be exacerbated and reinforced by many other cognitive biases, such as the *anchoring* and *confirmation* biases to name a couple. For example, one may anchor their upper and lower bounds of their resource assessment too close to their perception of the 'best estimate', resulting in too narrow of a range. The *anchoring* bias could be reinforced by the *confirmation* bias

(our tendency to seek data that only confirms our interpretation), thus supporting the more optimistic geologic model.

There are several mitigation strategies that we can employ, but one very good one is to undertake reality and plausibility checks of our interpretations, assumptions, and estimation.

***DOES THAT MEAN I AM A PRISONER OF MY BIASES?***

When I teach my Mitigating Bias course, I am often asked why I don't give strategies to get rid of the biases. First, we never could get rid of them as they are useful, evolutionary strategies as noted above. Second, given that these biases (and hence, *heuristics*) have a positive function, we need to learn when these biases negatively influence us and then learn strategies to mitigate. My experience is that these will be in environments that are uncertain and complex, which pretty much sums up the hydrocarbon industry!

Good decision making comes from the successful interplay between *reflexive* and *reflective* thinking strategies. An example to show this is to think of the Chess Grandmaster. They can look at a chess board position and immediately analyse, saying for example, "checkmate in two moves". They are clearly using their *reflexive* thinking when they make that observation. However, it is backed up by years of training, study, and play (i.e., *reflective* thinking), giving the Grandmaster proficiency and skills.

***BIAS AND CREATIVITY***

I would like to leave you with an idea to consider: **Do cognitive biases enhance our creativity or do they impede it?** (I'll use the definition of creativity as "using imagination to create new ideas", such as the hydrocarbon potential in a new play or basin).

At first glance, it would seem that our cognitive biases limit and inhibit our ability to come up with creative and innovative ideas and solutions. For example, if I am always looking for data to confirm my hypothesis (c*onfirmation* bias), I will miss other alternatives. Or I might rely on my past experiences and prior knowledge (*availability* bias) which may limit my ability to think divergently.

Yet perhaps, like the crossing the street example, if I am so focused on my *reflective* thinking, perhaps I might miss the 'big' ideas. Many people believe that too many rules, that can come from invoking our *reflective* thinking, can stifle creativity; and perhaps to the contrary, specific biases may help me to be creative. For example, the *availability* bias may help me to focus on successful geologic play types; the *information* bias may get me to ignore the low base rate associated with analogs of an opportunity; and the *overconfidence* bias can motivate me to portray the upside in a play.

What do you think? Enhance creativity or impede creativity? Post a Comment.

***UNTIL NEXT TIME***

[1]Take a look at a publication by Haselton et al (2015) about the Evolution of Cognitive Bias, which I found to be quite interesting.

[2]Please see my earlier blog article that discusses *reflexive* and *reflective* thinking.

On my next blog article, I will explore one bias that particularly annoys and frustrates me when I observe it – *confirmation* bias!

Stay safe and healthy.

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