BIAS

#12 Overconfidence

Perhaps no challenge is more prevalent in interpretation, judgment, and decision-making and more potentially disastrous than the *overconfidence* bias. Literature and observations by myself and R&A colleagues suggest it is the bias that most contributes to poor predictions. As my colleague Pete Rose has succinctly said to indicate this bias: "Often in error, seldom in doubt"!

***WHAT IS IT AND HOW DOES IT WORK***

The *overconfidence* bias is our tendency to overestimate the accuracy or likelihood of our own interpretations, judgments, predictions, or abilities.

Overconfidence tends to be an innate character in us and serves an advantageous purpose. For example, if you are going to a job interview, projecting abundant confidence in your abilities and talents may help portray you as a highly competent candidate for the position. Overconfidence can also give people the will to succeed, providing them with both initiative and drive to complete difficult tasks or take sizeable risks.

When making judgments under uncertainty people combine both <u>strength</u> (i.e., outcomes, observed results from data) and <u>weight</u> of the evidence (i.e., sample size, reliability, or credibility of data), using both components to help them finalise decisions. However, we usually place a much greater emphasis on the strength of the evidence with little consideration of the weight, often ignoring rules of probability and statistics.

For example, suppose we wish to evaluate evidence for the hypothesis that a coin is biased in favour of heads over tails. When we assess the coin tosses, the proportion of the outcomes (e.g., the number of heads flipped) our trials will reflect the strength of the evidence. For example, if we flip 5 heads in a row, we see that as strong evidence that the coin is biased towards heads). However, when making this judgment, we tend to ignore or down-weight the number of flips we have made, which represents the weight of the evidence.

We tend not to consider that confidence may not convey accuracy, and in fact there is often a poor correlation between the two. We think that if we are confident about something, then there is a good chance it will happen. Unfortunately, people's confidence ratings are pretty much unrelated to their accuracy. Note that confidence is subjective whereas accuracy is objective. One study (Oskamp, 1965) shows that individuals confidence increased with the amount of information they were provided, but their accuracy did not!

Many of the other cognitive biases that we have discussed, such as *availability*, *anchoring*, *confirmation*, and *information*, will contribute to and exacerbate the *overconfidence* bias as they tend to emphasise the strength of the evidence and give the appearance of increased confidence.

***POOR PREDICTIONS OF UNCERTAINTY***

We systematically overestimate our knowledge and our ability to predict. There is often a significant difference between what people *actually* know and what they *think* they know.

Narrow ranges of predicted outcomes are a symptom of the *overconfidence* bias, particularly when uncertainty is high (i.e., weight and knowledge are low).

Studies and practical trials show that when people are asked to provide a range of answers to a series of general knowledge questions, with the requirement that they be 80% confident that the correct answer will fall within their predicted range, their accuracy is very poor. Generally, I get 20-40% correct answers (rather than the expected 80%) when I do this exercise in the Mitigating Bias course, and this has been repeated in many other studies. Even those that are aware of this exercise and have done it before still do not perform well.

Why are the predicted ranges always too narrow? Because people think they know the answer, and this will likely be compounded by other cognitive biases which will tend to bound their answers.

***IMPACT ON OIL AND GAS INDUSTRY***

The *overconfidence* bias is endemic in the oil and gas industry, influencing our interpretations, estimations, assumptions, and decision-making. Welsh et al (2007) undertook an assessment that shows as our overconfidence increases, we substantially erode value.

There are countless examples where the *overconfidence* bias is widespread within our industry. To name just a few:

- Strong opinion of prospect or opportunity
- Resource estimation (particularly minimum) is too high, with a narrow range
- Chance of Geologic or Commercial Success assessment is too high
- Justification for data interpretation too confident
- Underestimated costs and time for project completion*
- Portfolio outcome predictions
- Production targets are too high

Particularly in areas of high uncertainty, experts tend to be more overconfident than generalists as they tend to believe their model and observed results rather than the weight of the evidence. Experts also do not get fast and accurate feedback (or sometimes no feedback at all!) of their predictions and thus can be poorly calibrated. This can exacerbate an assessment and lead to overconfidence.

*An aspect of the *overconfidence* bias is the Planning Fallacy, which we will address in a future blog article.

***OVERCONFIDENCE VERSUS OPTIMISM***

One area I want to touch upon is the difference between 'overconfidence' and 'optimism' as they are two different concepts. The terms are often incorrectly used interchangeably, much like the terms risk and chance. We have defined overconfidence above; optimism is a belief that a positive outcome will occur. This is when the *optimism* bias, in which people are over-optimistic and underestimate the possibility of undesirable outcomes, comes into play. Although both are a universal human tendency, the *overconfidence* bias has the greater negative impact on our assessments and decisions.

In our industry, particularly exploration, it is essential to be optimistic given the high failure rate of opportunities; it would be difficult to work in this business if one were always pessimistic. For example, geoscientists working in a frontier basin trying to develop a new play would struggle if they approached the opportunity negatively.

However, being optimistic does not necessarily imply that one is overconfident. For example, the failure rate for the restaurant business is about 60% in the first year and over 80% after three years (Bellini, 2016). To open a new restaurant, one clearly needs to be optimistic. Yet, if they approach the business with open eyes and understand the base rate for success, they are not being overconfident.

An example in exploration would be when the geoscientist assesses the resources of a prospect with an appropriate range yet is optimistic based upon their evaluation that the higher end of the resource prediction has a decent possibility. In this evaluation they are not overconfident as they have described the opportunity with a wide range of possibilities, but they are optimistic of a positive outcome.

A note of caution, though. Combining both the *overconfidence* and *optimistic* biases (i.e., narrow predicted range leading to resource overestimation) is perhaps the deadliest combination. Beware!

***WHAT CAN I DO***

Given the *overconfidence* bias prevalence in the oil and gas industry, it is essential to be aware of your natural tendency to be overconfident. One of the successful mitigation strategies is to consider several different scenarios and ensure that your predictions have a sufficiently wide range of possible outcomes. When making an assessment, stop and consider why your judgments may be wrong. Regularly gather feedback on your estimates (performance tracking) and calibrate your predictions and confidence with the actual outcomes. Then capture and apply any learnings to help improve your future performance. This is one of the reasons why weather forecasters tend to be particularly good in the predictions – they get almost immediate feedback in their forecasts and in turn update their models.

***REFERENCES***

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Welsh, M., Begg, S., and Bratvold, R., 2007, "Economic Impact of Cognitive Biases on Oil and Gas Decisions", SPE 110765, 2007 SPE Annual Technical Conference and Exhibition, 11-14 November 2007, 7pp.

***UNTIL NEXT TIME***

The next article in this series will explore the notion of framing and how the *framing* bias can influence decisions.

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Stay safe and healthy.

*Marc Bond*

*Rose & Associates*