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PERSONAL DEVELOPMENT
Battling Cognitive Bias

By Mary Pat Campbell


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New Case Study: A Change in Plan

by Frank Grossman

This article is the second in a series describing a hypothetical workplace dilemma, and inviting SOA members to submit their comments and suggested solutions which will be summarized and published in the following issue of The Stepping Stone. *All member submissions will be received in confidence, and any identifying details removed prior to their inclusion in the discussion of the case.*

Kate the FSA works part-time as the in-house benefits actuary for a manufacturing firm, reporting directly to Susan the VP of HR. Kate also has an indirect reporting relationship with Henry the CFO. The firm has roughly 1,000 employees and Kate is the sole actuary on staff.

The firm sponsors a contributory defined benefit pension plan with a career average earnings benefit formula. The pension plan's investment strategy is fairly conservative, and the fund is invested in fixed income instruments and stocks. The plan trustees have become increasingly apprehensive about the plan's funded ratio, particularly given the financial market turmoil over the past couple of years. Kate saw an opportunity to estimate the pension plan's shortfall risk (i.e. the chance that the plan's funded ratio would deteriorate, requiring additional future contributions) using stochastic techniques. Henry agreed with Kate's view, and asked her to undertake the necessary work and write a report for the senior management team, copying the plan trustees.

Kate completed her work, which confirmed that there was appreciable shortfall risk. The plan trustees welcomed her analysis, and after some debate they concluded that the plan's investment strategy was still appropriate from a long-term perspective, but recommended a modest increase in future contributions. Senior management agreed, and proposed that the contribution increase be shared by both the plan sponsor and plan members. Kate participated in several employee town hall meetings with Henry and Susan, during which the case for increased contribution rates was outlined and Kate presented a summary of her findings (with copies distributed to attendees). During these meetings, Henry stated that the higher contributions would "more fully fund" the plan benefits—even though Kate wasn't keen on this jargon and had previously mentioned this to Henry.

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Editor's Note: This article originally appeared in the April 2010 issue of The Stepping Stone.

While often in actuarial work we find suboptimal behavior on the part of policyholders (an understatement sometimes … one can find all sorts of crazy behavior in transaction records), we assume that we, as actuaries, do not suffer many of the irrationalities one finds in the general public. In our own fields, at least, we follow good decision-making and problem-solving procedures, right?

To this I say: *what makes us think we're better than scientists?*

Time and time again, one hears stories where a commonly seen effect is ignored by scientists for years as "noise," "coincidence" or "irrelevant." Only later, other people without these built-in preconceptions can make real breakthroughs.

For example, in the article "Accept Defeat: The Neuroscience of Screwing Up," author Jonah Lehrer recounts the story of Arno Penzias and Robert Wilson, who had been trying to make a detailed map of the Milky Way. They had built a very sensitive radio telescope, and in tuning it up, discovered some "noise" wherever they pointed their telescope. Their original assumption was that there was something wrong with their setup or their equipment, and thus spent a long time troubleshooting something that wasn't actually trouble.

But that background radiation never went away.

For a year they simply ignored that "noise" to make the measurements they had set out to make. Luckily, they did decide to really look into it, and considered the "noise" to be a very real signal—this "noise" was evidence of the Big Bang, and Penzias and Wilson later shared the Nobel Prize in Physics because of this discovery.

How often has this happened to you—you entirely miss a solution to a problem, because you have already decided on an answer and ignore all signals outside of your expectation?

Being aware of the biases built into our brains can help us combat them. One can't fix what one doesn't know is broken. Given there are so many biases, I will concentrate on two, and possible remedies for them.

CONFIRMATION BIAS

Definition: *the tendency to seek evidence that confirms one's preferred explanation or solution, and avoid evidence that contradicts or disconfirms it.*

Though science has some processes that are supposed to prevent this, it happens all the time. One may prematurely hit upon an explanation and solution, and then one actively seeks further evidence that cements one even more strongly to that position. Alternative solutions are ignored or discounted.

Confirmation bias doesn't necessarily mean explicitly ignoring contradictory or disconfirming evidence. Usually, all that is involved is not deliberately seeking out anything that would show flaws in the predetermined decision. Kevin Dunbar, who studies how scientists actually do science in the lab, had found many times that scientists would go to a certain point to explain away anomalous results, but would simply label such results as outliers or throw them away and not publish them. Imagine if Penzias and Wilson kept masking out that universal background radiation?

Another example of this bias can be found in Professor Michael A. Robert's study of the 2003 Columbia space shuttle disaster. Managers at NASA had already decided that foam strikes weren't dangerous to the shuttles, and set up a system that would keep confirming that decision while not seeking out anything that might show those strikes to be dangerous.

Launch cameras weren't maintained properly, so they couldn't get a good estimate of how much damage had occurred to Columbia upon launch. Previous foam strikes didn't end in disaster (but they were much smaller than the strike that ultimately destroyed Columbia). One engineer did think there was a danger, but he was actively ignored by the mission managers, while an expert who didn't think the strikes were a problem was consulted.

They didn't want to hear there was a problem, and thus there was no problem.

Then the shuttle disintegrated upon reentry. That's a problem that's hard to ignore.

SUNK COST EFFECT

Definition: *the tendency to take into account investment (of time, effort, money, other resources) already spent in deciding whether to continue a particular course of action. The previously spent resources are the "sunk costs."*

Of all the cognitive biases, you would think this one would be the easiest for the economically literate to battle. We know that if resources have already been spent, we cannot go back in the past and un-spend them. So any decisions about our future efforts should ignore what has been done in the past. Our cost/benefit analyses should include only those costs that have yet to be paid (and, likewise, the benefits that we haven't already received).

However, this is extremely hard to battle, because oftentimes one's ego is bound up in a past decision. Ignoring those sunk costs may make it more likely to make a rational decision to walk away from something that is a poor bet going forward, but then it would also mean admitting that a previous choice made was wrong. How often has one seen a project limp, bleeding money to the bitter end because someone had made a big bet and couldn't admit it hasn't panned out?

Consider the tragedy on Mount Everest in 1996, which ended in death for many climbers due to a bad decision influenced by several cognitive biases.

One of the safety rules formulated by expert climbers was that if one couldn't get to a certain point on Everest by a certain time in attempting to summit, you were to return to camp. But the climbers had worked so hard and paid so much to get to the summit, they felt they couldn't turn around even though they'd overshoot the time deadline by two hours. They ignored their own safety rule due to sunk cost effects.

Sometimes, the only way to have an impartial review of a project or decision is to bring in other people who were not involved in the original decisions.

There were other biases also at play, such as the recency effect, where the climbers were biased by recent weather experience on Everest, and overconfidence, where the lead climbers had so many successes, they underestimated the chances for trouble. For further explanation, check out Michael A. Robert's lectures on "The Art of Critical Decision Making."

POSSIBLE REMEDIES

All is not lost—there are ways to lessen the effect of cognitive biases in our own work.

1. Awareness

As noted before, if you aren't aware these can be problems, you're not going to be able to combat them. One method is to look at examples of these biases from famous cases, as one isn't personally involved in them and can cast a more rational eye on them.

2. Review the Past

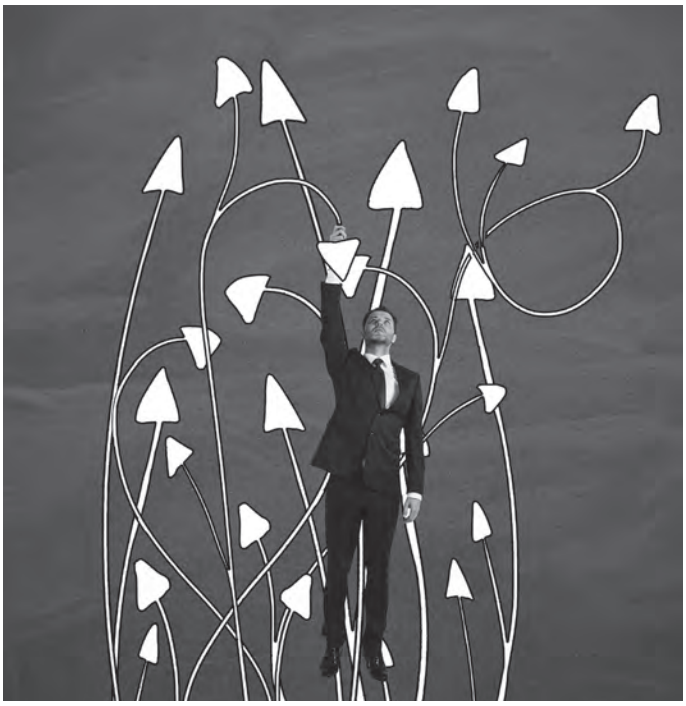
This may be a harder step. This involves reviewing your own past work and decisions, and trying to seek out these tendencies. Not everyone is as equally affected, and finding out which biases are your particular weaknesses can help you focus your efforts in the future.

3. Change the People

Sometimes, the only way to have an impartial review of a project or decision is to bring in other people who were not involved in the original decisions. The sunk cost effect is easy to avoid if one wasn't the person who sunk those costs to begin with. Bringing in outside consultants can be useful, but again one needs to be careful that those hiring the consultants and deciding on their pay (and whether said consultants will be hired for future projects) aren't going to influence the consultants to come up with a foregone conclusion.

4. Change the Group Dynamics or Composition

As opposed to taking outside people to replace the ones who make the decision, sometimes it's enough to mix up insiders with diverse areas of expertise and experience.



In researching scientific problem-solving, Kevin Dunbar noted a difference in two labs, both of which had the same experimental problem that needed solving. One of the two labs solved their problem much more quickly—the lab that had a more diverse composition in terms of expertise. The faster-solving group had biochemists, geneticists, graduate students, and molecular biologists; they all had different training and different perspectives going into the problem-solving process. The slower-solving group was composed solely of E. coli experts; they shared the same assumption sets and the same training.

It's hard to suffer confirmation bias when group members have different positions they're trying to confirm. Individually, people may have problems, but as long as they're not all aligned in the same direction, the diversity of thought can help solve problems better.

5. Check Assumptions and Actively Seek Disconfirming Evidence

Perhaps you are not solving in the group, but alone. Your perspective is all you've got, and so some of the above fixes may not be open to you. However, if you turn your implicit assumptions into an explicit list, and actively try to see if your assumptions are wrong, you can combat confirmation bias. It does require active discipline and a willingness to find your assumptions flawed.

The above recommendations come from the material in Lehrer's and Roberto's work. I have my own recommendation in dealing with sunk costs, though not easily implemented. What really helps in treating sunk costs as sunk is having had to cut one's losses in the past for something really big. If you've had to change course—change a career, drop out of graduate school (the decision I made after six years of graduate work)—doing it a second time becomes that much easier, at least in my experience.

While it's less painful to learn from other people's mistakes, learning the lesson directly makes it more likely to stick. ■

Mary Pat Campbell, FSA, MAAA, PRM, is vice president, insurance research, at Conning in Hartford, Connecticut. She can be reached at *marypat.campbell@gmail.com.*

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