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Meeting the Big Data challenge: Don't be objective

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English: Binary Data Česky: Binární data (Photo credit: Wikipedia)

In a previous posting, I discussed the relationship between Big Data and Small Bets (Experiments). In this posting, I will dig more into this first challenge; Jeanne Liedtka, my colleague at U.Va.'s Darden School of Business, will join me in a subsequent posting to consider in more detail the second. Again, my advice appears counterintuitive.

Big Data has enabled the use of analytical techniques, many of which have been around awhile. Not surprisingly, it has itself spawned the development of even more analytical approaches. Some of these are quite different in kind from traditional data analysis, placing more emphasis on trajectories and speed of response than historical relationships. But increasing what you *can* do does not help you decide what you *should* do.

When we think of "Big Data" and "Analysis", we often think of "rational" or "objective" decision making. Data and rational analysis offer the hope that we can be less subjective in our consideration of alternatives and potential courses of action, thereby freeing us from the many biases we bring to the table. We can tilt even more away from intuition and toward analytical rigor. "Let the numbers speak for themselves" is an oft heard mantra.

I argue that the existence of Big Data and more rational, analytical tools and frameworks places *more*—not less—weight on the role of intuition.

Recently, the Corporate Executive Board developed a tool it calls Insight IQ and used it to assess the tendency of managers to rely on intuition versus analysis. They found that 19% of over 5,000 managers in major global corporations are "Visceral decision makers" that rely almost exclusively on intuition. (I suspect this figure is actually too low, based on other research and

questions I have about the validity of the test. But let's not get hung up on this point; there is far more to be gleaned from this field of inquiry.) Insight IQ proceeds to split roughly in half the remaining managers between "Unquestioning empiricists" who rely entirely on analysis and "Informed skeptics" (clearly the right answer to the test) who find some way to balance intuition and analysis.

But how do you balance intuition and analysis? A clue comes from a study reported in 2006, conducted by brain researchers at the Institute of Neurology at University College London. The study involved giving a number of subjects a series of choices involving the desirability of gambles. In a classic application of the well-known decision bias of "framing", the exact same gambles were sometimes posed as what you stand to "gain" and sometimes as what you stand to "lose". By exposing the subjects to many such gambles, the experimenters were able to measure how much the framing "influenced" the choices of individual subjects; i.e., how consistent were subjects when identical gambles were framed differently. From this, they were able to construct what they called a "rationality index": subjects who were able to by-and-large resist the framing—i.e., they made consistent choices across gambles irrespective of whether they were described as gains or losses—scored high on the index, while those who were heavily influenced by the framing—more risk averse when gambles were couched as gains, less so when they were couched as losses—scored low.

But what was even more revealing was the real point of the experiment. While the subjects were making choices, their brain activity was being monitored using an fMRI. While everyone was at least somewhat susceptible to the framing bias, those who scored high on the rationality index (think "Unquestioning empiricists") were characterized by a statistically significant increase in brain activity in the prefrontal cortex, the seat of rationality and reasoning; no surprise there. Those who scored low (think "Visceral decision makers") were characterized by a statistically significant increase in activity in the amygdala, the seat of emotions; again, not surprising. But here is what *was* surprising (at least, to me): those who scored in the middle part of the index—somewhat susceptible to framing, but able at times to overcome it—were characterized by a statistically significant increase in activity in yet a third part of the brain, the cingulate cortex. This part of the brain is associated with one's ability to address conflict. So what characterized "Informed skeptics" was that the gambles generated conflict, arguably between their emotions (intuition) and their rational thinking.

But wait a minute: weren't the "Unquestioning empiricists" actually the "winners" in this experiment? Shouldn't we all aspire to be "Unquestioning empiricists"? I would argue no. The experiment was narrowly defined in a way that the "rational" answer—avoiding the bias of framing across trials—was indeed the "correct" answer. In the real world, we rarely encounter a situation that can be completely modeled with an analytical (rational) model, so the correct answer to the model cannot purport to be the definitively correct answer to the real world situation. We invariably have to use our intuition to "fill in the gaps" between the model and the world.

This is one reason why I think so many CEO's say they are far more likely to rely on intuition than analysis in making decisions. Almost by definition, the issues they deal with are complex and multi-faceted, impossible to completely model or holistically analyze. My experience is that every CEO I know DOES

use analysis, but what is far more visible to them is how they have to rely on intuition to fill in the gaps, and this is what they self-report.

So, the best we can hope for is to be "Informed skeptics". It seems possible to conclude from this research that one key to effectively combining intuition and rational thinking starts with the ability to "see" conflict. It is not so much that "Visceral decision makers" and "Unquestioning empiricists" resolve conflict in keeping with their core predilections, but that they don't even see the conflict to begin with, or if they do, the battle is completely one-sided. For "Visceral decision makers", this could well be because the rational analysis lacks sufficient *meaning* to challenge their intuition. For "Unquestioning empiricists", the emotional part of their being may not be sufficiently strong or "respected" to challenge their "religion" of rationality. (Given the role in energizing our ability to make decisions, it is not surprising that "Unquestioning empiricists" are often associated with people who want to analyze everything to death and have difficulty "pulling the trigger" on a decision.)

So what does this have to do with Big Data and the question of what analytical approach to apply? If we accept that *informed skepticism* is the best general approach to decision making, then this research suggests that the key to conducting good analysis lies in its ability to generate conflict. For conflict to exist, there must be at least two points of view, or *stories*, between which we are undecided as to which to believe.

It is possible, I suppose, to launch Big Data analysis with *no* stories, and to be on the outlook for analytical results that support two apparently conflicting ones. But this strikes me as being at the least highly inefficient, as well as providing little guidance as to what analysis to perform ("If you don't know where you're going, any road will get you there"—or not, as the case may be). Far better to *start* with a story and then to ask yourself the most important and least asked (in my opinion) question in decision making: *what could change my mind*? In other words, can I find in my Big Data analytical support for a conflicting story to my own?

There are two counterintuitive aspects to this approach. The first is that we specifically do *not* look for analysis whose results might *support* our story, but the exact opposite: we look for analysis whose results are most likely to *refute* our story and thereby create conflict. The problem with looking for supporting analysis is that we can probably find it (we have Big Data and a myriad of analytical techniques). When successful, we have done nothing to create conflict. While it is probably equally true that in looking for refuting analysis we can also always find it, think of the power if we choose such an approach and find that it *doesn't* refute our story! We have much more confidence that perhaps our story is in fact the correct one. If not, we are now in the world of conflict that is critical to balancing our intuition and rational thinking.

The second, perhaps more counterintuitive aspect of this approach is that it says it is better to NOT be "objective". By objective, I mean to invoke the notion of "don't let your personal preconceived views influence your judgment; let the facts speak for themselves". This approach argues it is better to actually *have* a "preconceived" point of view, and then set about refuting it. As to the danger of "anchoring" on this preconceived story (a well-known decision making bias), (1) it is better to have a visible anchor than an invisible one (that you can't do anything about) and (2) this approach explicitly requires you to challenge this anchor once you have adopted it.

The analogy that comes to mind is choice of source of television news. In the pre-cable era (think "pre-Big Data"), we only had a few options—CBS, NBC and ABC. Since each strove to be balanced (*actually* balanced, and irrespective of how balanced it actually was, the editorial slant was basically the same across the networks), we could allow it to shape and form our opinions. Today (think "Big Data"), we can find a source of news that fits precisely with what we believe, that reinforces our point of view rather than challenges it (we can find data and an analytical approach to support whatever we believe). However, if we really want to challenge ourselves to be both more confident in our beliefs and more effective in our interactions with others, we should choose to watch news shows that *disagree* with our point of view. Hence, liberals should watch Fox News, and conservatives MSNBC. If your views remain intact when challenged (think "conflict"), you are both more sure of and more able to defend your beliefs.

Some support for this approach of first establishing a belief and then challenging it can be found in a recently conducted experiment performed by Jack Soll and Rick Larrick. Subjects were asked to estimate the number of coins in a jar, using intuition (short time frame) and/or analysis (more time). They found that subjects who used both intuition and analysis did better than subjects using either alone, and furthermore, subjects who used intuition first did better than subjects who used analysis first. In this admittedly narrow domain, it appears there *is* value in first generating a belief, and then testing it analytically.

In conclusion, the choice of how to analyze Big Data should almost *never* start with "pick a tool, and use it". It should invariably start with: pick a *belief*, and then challenge it. The choice of appropriate analytical tool (and data) should be driven by: what could change my mind? This requires both (1) a belief (I sound pretty Bayesian here, no?) and (2) a clear understanding of how the results of applying a specific analytical tool might refute that belief. This requires the ability to see clearly *a priori* the conflict that would be created by possible results of the analysis. (An organizational implication of this might offer a way to more effectively use the diversity of having both "Visceral decision makers" and "Unquestioning empiricists" in the organization: analysts can use intuitionists to help generate a belief, and then use the need to create conflict for the intuitionists to guide their analysis. This of course will require both substantively appropriate analysis and the ability to meaningfully communicate the results back to the intuitionists.) If the results successfully conflict with your belief, wrestle with the conflict or move on, perhaps with new ideas spawned by the analysis you just conducted. If not, or if so and you still deem the belief viable, move on the next step: how do I construct a small experiment to determine if my data-supported belief is, in fact, real. Or, in other words, how do I help resolve the conflict my Big Data and analysis has generated?
