Business Intelligence vs. Human Intuition

& Why You Should Welcome The Robot Overlords

Garth Sundem

In the weird, wild world outside the Petri dish, the *correct* decision is not always the *right* decision.

There's disconnect between the robot logic of business intelligence and human intuition of right and wrong. Does this disconnect imply that humans use free will to promote the koombayah ideas of fairness, morality, and goodwill toward men and most charismatic megafauna? Or is the human brain simply a cold, rational, pre-programmed computer that happens to take into account more factors than a Game Theory model?

To answer that question, let's play some games.

You and I have ten coins to split. You propose how we split the coins and if I accept the split, we both get paid. If I thumb my nose at your proposal we both go home empty-handed. This is the Ultimatum Game and it has an obvious solution: you propose a 9-to-1 split in your favor, I accept the proposal, and we both walk away with change in our pockets.

But this robot solution is not at all what happens in real life.

Commonly, if you offer me one coin to your nine, I not only turn down the offer, but I get pissed off too. Why? Because it's not fair, that's why. Why should you get nine coins when I get only one? Screw you, buddy. A litany of experiments have shown that the most commonly offered split in the Ultimatum Game is 6-to-4, and anything below 7-to-3 is more likely than not to be rejected.

Let's play another game, with a more complicated split:

Five pirates have hauled aboard a treasure chest containing 100 gold pieces, which they must split. The pirates are of increasing fierceness: E more wussy than D, D less than C, C less than B, and B inferior to the über-swarthy pirate chief A, who—like Blackbeard—twists lighted matches into his beard. Here's how it rolls in the pirate world: fierce pirate A proposes how the gold be split and then there be a vote (Arr, matey!). If the vote is tied or in favor of the fiercest pirate, they split the gold as proposed and it's game over. However, if the vote goes against the pirate king, the others chuck him overboard and the next fiercest pirate proposes how to split the gold. This continues until a proposal passes.


What do you imagine the pirate king needs to offer to ensure his survival? Maybe something along the lines of 5, 10, 20, 30, 35? Or 4, 8, 16, 32, 40? Or 20, 20, 20, 20, 20? Verily, one of these splits could prove right in the real world. But now let's imagine these pirates, in addition to being swarthy, are purely rational robo-pirates. It turns out the *correct* decision is for the pirate king to propose the optimal split of 1, 0, 1, 0, 98.
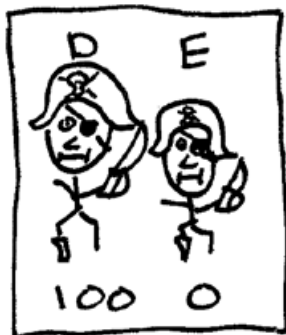
Let's reverse-engineer the logic of this seemingly illogical split:

Imagine the pirates have a jolly good time chucking everyone overboard until only pirates D and E remain. Well, D doesn't need E's vote and so would simply keep all 100 gold pieces for himself (it sucks to be the wussiest pirate).

So all C has to do to avoid getting the heave-ho is to offer E one gold piece—it's more than E would get otherwise. In other words, C would propose 1, 0, 99 to buy E's vote.
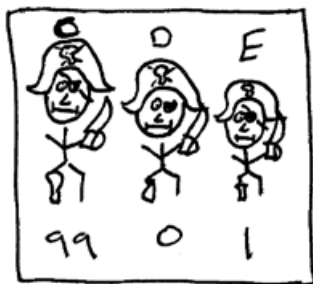
And so all B has to do is keep D happy. B proposes 0, 1, 0, 99 to buy D's vote and the all-important tie.

You see where this is going: If E and C chuck the fiercest pirate overboard, they get nothing. And so all it takes to buy their purely rational piratical votes is one gold piece each, for the optimal split of 1, 0, 1, 0, 98.
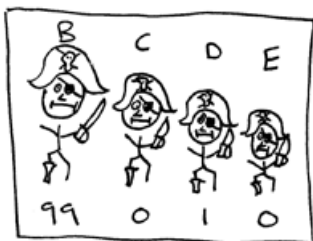
It's good to be the pirate king. Especially if you can count on rationality in your underlings.

But when are underlings rational? (A business question that deserves its own manifesto.) Well, interestingly, there is a human population that can be counted on for rationality without the influence of socially dictated fairness. Most likely to propose or accept a 9-to-1 split in the Ultimatum Game are autistic people. On the flip side, dosing people with the chemical Oxytocin, which Larry Young at Yerkes National Primate Research Center identifies as a primary chemical component in the experience of love, creates the massive irrationality of 5-to-5 splits in the Ultimatum Game.
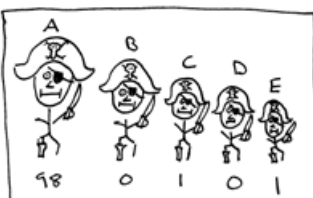
So blame fairness and love for disconnect between the optimal solution provided by business intelligence and the real solution intuited by human intelligence. But why has evolution allowed these namby-pamby ideas to overrule optimal solutions? Evolution isn't known for its inefficiencies.

To get closer to an answer, let's dive into another classic game.

You and I are thieves. Unfortunately, we're not very good thieves and we've been arrested walking down the street with bags of loot slung over our shoulders. But the police don't quite have enough evidence to convict us of the robbery. They need us to squeal on each other. This (of course) is the Prisoner's Dilemma and here's the payoff: if you squeal and I keep my mouth shut, you walk and I get ten years. The reverse is equally true. If we both squeal, we get five years apiece. If we both keep silent, we serve six months on a reduced charge.

In this oldy but goody, the best thing you can do is squeal: no matter your accomplice's actions, you're better off ratting him out (think about it: walk or five years for squealing is better than six months or ten years for staying quiet). So, of course, you both squeal and you do five years hard time. But if you'd BOTH spurned the optimal solution and kept your thieving mouths shut, you BOTH would've done six months. This is called Nash Equilibrium, in which the actions that are individually best are not optimal. A little honor among thieves would've created a society in which all (thieves) were better off.

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But the games described above have one important distinction from the real world: they're played once, and in society we play these games over, and over, and over. And our experience in one round affects how we play the next.

Game Theorists aren't dummies and are perfectly aware of this limitation. This is what led David Axelrod to run a grand scale Prisoner's Dilemma tournament. In this tournament, contestants paired off and played many rounds of the PD game, trying to accumulate low overall jail sentences over the course of the game. There was much playing of Prisoner's Dilemma by many geeks using many strategies, much generated data, and (presumably) a good time had by all.

From this much better approximation of society a dominant strategy evolved. It was called Tit-for-Tat and it was very simple: cooperate the first round and then mimic your accomplice's actions in every round thereafter. Tit-for-Tat eventually settles into a long string of six-month sentences for both players.

According to Axelrod and others who followed the tournament, the lessons of Tit-for-Tat generalize into business, parenting, and other areas of life: be predictable because predictability breeds trust, be cooperative as a default, but provide punishment for others' antisocial actions. In other words, be straightforward and kind, but don't be a pushover.

If you have any doubts about Tit-for-Tat generalizing to life, take your dissent to Trinidad and sing it to the Turure River guppies.

When a sunfish or other predator approaches a school of these pugnacious little fish, it's in the group's best interest to assess the threat—is the sunfish hungry? And so a squadron of guppy scouts approaches the predator. Like the Prisoner's Dilemma, guppies in the scouting party have two options: they can advance (cooperate), or they can refuse (defect). Advancing toward sharp teeth sacrifices individual utility for the common good, just as cooperating in the Prisoner's Dilemma sacrifices an individual's best play in order to create pro-social actions over time.

And these Turure River guppies know how to play the game of life: they use Tit-for-Tat. The guppies in the scouting party advance a little at a time, each fish taking its turn to swim toward the teeth. This is cooperation as default and it creates trust.

But if a fish refuses to take its turn, the other guppies in the scouting party do something interesting: they pull back to reposition themselves behind the timid fish, thus putting wussy-fish in front and forcing this reluctant guppy to pay an evolutionary price for its cowardice.

Sparrows do this when a flock of the little birds worries a hawk. And the ancient nations of the Mediterranean did this to protect themselves from Vikings. They called it the Hanseatic League.

Think about this in terms of human vaccinations. Every kid who gets poked runs a slight risk of ill effects (the risk of vaccination now frequently outweighs the risk of the disease itself). But it's in the group's best interest that everyone is vaccinated. Without other incentives, game theory predicts that humans would act in their individual best interests and refuse vaccines. This is why we have the equivalent of guppy enforcers: PTA associations, play groups, and peewee soccer parents whose job it is to bring back in line those who selfishly refuse the needle, just like the guppies pushing Cowardly Joe to the front lines of sunfish inspection.

And do you remember the Ultimatum Game from this manifesto's second paragraph? You still wouldn't accept a 9-to-1 split would you? Instead, you send a message with your refusal: your partner has proposed an unfair split, and had better mend his selfish ways. This is called an altruistic punishment—you give up personal utility to create utility for the group.

But here's a very important turning point: you do so because you're part of the group.

And so you can expect to benefit. How much will you benefit? Well, in the long run, your altruistic punishment maximizes your utility, by ensuring that you gain more than you lose.

This concept of "gain more than you lose" is true in human decision making to the point of being quantifiable. In the 60's, the geneticist William Hamilton formalized an [Altruism Equation,](#) which states that we help someone when the cost to us is less than the benefit times our genetic relation to the person in need. For example, you'd give your brother a dollar if it would allow him to earn more than two dollars. To justify the same dollar, a cousin would have to earn more than eight subsequent dollars. Slightly more esoterically, you would jump into the icy Bering Sea to save your drowning brother only if you intuited that you had a better than 50/50 chance of surviving. To do the same for a cousin, you'd risk only a 12.5% chance of death.

In everyday situations, it gets a little messier, but the song remains the same (no good manifesto is complete without referencing Zeppelin). You've likely heard of [bystander apathy](#) in which a crowd of people walks past a man being mugged in broad daylight. Why don't bystanders intervene? In addition to the potential cost to self, benefit to self (heroism!), and relatedness to the victim (how demographically similar are you and he?), witnessing a person in need from the vantage point of a crowd allows all crowd members to share responsibility, reducing your own burden of responsibility—you don't have to help, because certainly someone else will. This can make it easier to flag down help for your flat tire on the near barren expanse of the Trans-Alaska Highway than it is on the side of the 405 in LA during rush hour: certainly, someone else will help, right?

But we digress.

Actually, the digression isn't as far afield as it might seem. All these examples spiral toward one conclusion, like coins rolling in the giant funnel of your local science museum: from trust to morality to altruism to empathy to cooperation, human decisions follow a very defined set of rules. We act or do not act based on the sum of the factors around us and within us.

Human intuition IS business intelligence. Only, BI makes the factors explicit while the factors that humans use to create their decisions remain, in part, hidden (for now). The temperature of the drink you're holding affects how much you like people you meet. Thinking of the last two digits of your social security number makes you price unknown wine higher or lower depending on the digits. Students in possession of Duke Blue Devil tickets valued them at $2,400 while students without tickets valued the same tix at $170. Initially pricing the iPhone at $599 made it seem like a steal at $299. During the Discovery Channel's Shark Week, visits to Florida beaches decline. You would help a brother in ways you wouldn't help a cousin.

Let me be clear: I believe in chance and the randomness of destiny. There's nothing that preordaines you will witness a crime in broad daylight or win a lottery for Blue Devil tickets or happen to be in a restaurant showing Shark Week or have a high social security number or be presented with many, many of the decisions you make. And certainly the factors that our brains compute into decisions are individually determined—based on culture, demographics, and the very unique experiences of our very unique pasts—and so in the same external situation, you wouldn't necessarily make the same decision as me or anyone else.

But your decisions, actions (and thoughts?) based on the stimuli you encounter are proving increasingly determined not by some independent sense of free will, but by the very defined interaction of the factors themselves.

We have met the robot overlords and they are we: you are Human 2.0. ⏎

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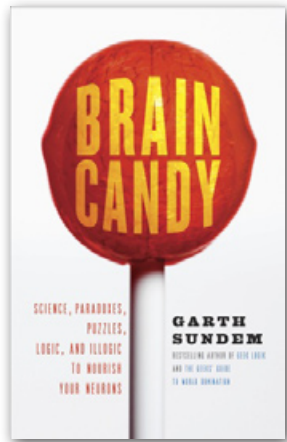
ABOUT THE AUTHOR

Garth Sundem works at the intersection of math, science and humor, with a growing list of bestselling books including *Geek Logik: 50 Foolproof Equation for Everyday Life*, *The Geeks' Guide to World Domination: Be Afraid*, *Beautiful People*, and *Brain Candy: Science, Puzzles, Paradoxes, Logic and Illogic to Nourish Your Neurons*. In addition to bookstores, you may have seen Garth's work on the Science Channel where he is a frequent on-screen contributor, or in magazines including *Congressional Quarterly*, *Wired*, *Seed*, *Sky & Telescope*, *Publisher's Weekly*, *Men's Health*, and *Esquire*. He is a frequent keynote speaker, specializing in interactive topics of business intelligence, data mining, and data-driven decisions. You can visit him at www.garthsundem.com or on Twitter @garthsundem.

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