

## Heuristics, Contingency, and the Limits of Knowledge

There are more things in heaven and earth, Horatio, than are dreamt of in your philosophy.

— William Shakespeare, *Hamlet*

The trademark of human intelligence, in contrast to the ‘intelligence of nature’ or artificial computation, derives from the human ability to learn ‘heuristically.’ Heuristics present themselves as the most ingenious tricks and tools of the human mind. A heuristic is an “end finder,” that is, a short, dirty little program not meant to make a thorough or complete analysis but aimed only at some definite end state. They are brilliant little short-cuts; selective techniques that allow us to leap over seemingly impossible amounts of ‘computation.’ Where a computer will get stuck on some difficult problem, tying its endless loops into a Gordian knot of mathematical profusion, the human mind—like Alexander the Great—slashes through the problem with the cutting blade of a heuristic.

Difficult to explain because it embodies so much, a heuristic develops a relatively simple pattern or template to effectively reduce a much larger phenomenon. The concept of an instinct, or a fixed-action pattern, is not too far from a heuristic. But, whereas an instinct applies to a behavior, a heuristic is a mental instinct—an inherent principle of the human mind. Adjectives like ‘elegant’ or ‘parsimonious’ lend themselves to describing a heuristic. If a heuristic were expressed in horticultural terms it would resemble the Zen-inspired Japanese garden rather than the weed-infested, vine-entangled yard, for a heuristic applies the criterion of minimalism—the perception of ‘just enough’ and ‘everything in its place’ emerges. Rather than requiring every bit of a phenomenon be accounted for, a heuristic will match up some important details of a phenomenon—the bends of a river for instance—and connect them into a

larger whole without tracing each convolution of the shore, as a computer would.

The benefit of an elegant heuristic lies in its speed. A smallish hunter-gatherer circa 250,000 B.C.E. could not afford a cumbersome analysis of all-available exits and stratagems when avoiding the attack of a razor-clawed tiger. A fearless computer would crunch all the available data and present the most successful and accurate solution to the scenario; such a computer would get mauled in this emergency. In contrast, the primitive hominid, fueled by real terror, evolved to make quick, relatively successful decisions. After all, a quick, relatively successful strategy is better than a perfect strategy arrived at too late. When it comes to life and death seconds and fractions of seconds count. The few unlucky 'experiments' who, through their particular 'intuition,' leapt headlong towards the tiger quickly weeded-themselves out of the gene pool. The 'heuristic' of the intrepid few did not pass on to the next generation. On the brighter side, those apemen whose intuition instructed a quick flight up the closest tree or others who, huddling with their companions, wove their limbs together to appear all the larger and more menacing to the tiger, fortunately passed on their quick-witted genes to us. The adaptability of heuristics, the utility of intuition, lies in the speed they apply towards a crisis situation.

The physically slow, hairless, and thin-muscled ape survived time and again through the speed of an elegant nervous system that employed a surplus of heuristics. Heuristics possess drawbacks, unfortunately. In contrast to a human brain, a computer – given no time constraint – would analyze *all* the data. A computer provides the *best* solution through the methodical study of the problem. The result of a complete analysis and the application of the carefully-wrought solution provides the ideal response to any given situation. We know the truth of this fact from our own experience: when a group of people face a major dilemma and have surplus time they study, assess, and labor over the details of a decision. We know through experience that the best decisions require

a great deal of time and precision of thought. Heuristics, for all their speed, do not provide as much accuracy or success as a labored study does. To sum up: we're programmed for shortcuts but the largest problems do not yield themselves to pithy solutions.

Why all this discussion about the programming language of the human brain? Understanding ourselves and our methods, we can perceive our condition and our 'explanations' in a much clearer light. To return to the discussion of contingency: nature, the 'natural intelligence,' does not use heuristic shortcuts.

The defining difference between the human and the inhuman is that the human contemplates time while the universe does not. Enclosed in a tiny space called 'life', a space tightly wedged between the immobile boundaries of birth and death, the person perceives time while nature, free from time limitations and liberated from any limits of scarcity, knows no such restrictions. Like an infinitely powerful computer, the universe blandly goes about its business: it develops, over a few billion years, a mass of organized life here; scatters some energy and in a moment and a flash of destruction – all is gone. One experiment ends and another begins, no love lost. The 'intelligence' of nature experiences no distress or any other human emotion over such annihilation. Emotions evolved from the distinctly human (or, to be fair, animal) reality of time scarcity and through the constraints the animal nervous system met in the boundaries of its contingent environment – the universe knows them not.

Nothing possesses more wealth than the universe, nothing possesses so much freedom. Nature cannot comprehend the scarcity so dear to our careful, calculating intellects and it cannot appreciate the value of a meaningful, efficient shortcut when it has absolutely no need for such things. Nothing so differs from the human mind as the 'intelligence' of nature. The law of the universe, the procedure of nature, lies in its contingent acts and motions: one thing happens, an epoch that we would measure in billions of years passes, and something else

occurs. Another nameless moment passes, a few billion years say, and this rapid paradigm changes into something else entirely. No limits, no conscience, no time, no scarcity – such things help to define and explain the ineffable nature of the universe but such attributes could not be further from the experience of the human person.

Born of time, heuristics circumscribe our thought with meaningful patterns. By compressing any vast, inhumanly complex phenomenon – the contingent patterns of weather, physics, or biology – into a comprehensible set of patterns, the human mind filters out the majority of the details, latches on to a few standout ‘curves’ and ‘angles’ and pronounces a judgment. Will this heuristically inspired piece of human comprehension be of any use? Sure, the lovely template will make some sense, it will predict a few things in an insufficiently crude manner and will even allow us to design other things in similar, viable patterns. Can any heuristically – that is, human – comprehension ever account for the ‘whole picture’ or even chart out a good many of the numberless details? Of course not. All human knowledge evolves from description and description arises from the barest essentials of a phenomenon. Had we enough brainpower, or an endless list of words, our descriptions of things, like the things themselves, would be infinite.

Contingency, the language of nature whose dialect we’ve just begun to decipher, speaks a tongue without the shortcuts of meaning and pattern by which we define ourselves and understand our surroundings. With its random permutations and its heartless computations, the cosmos creates worlds. We inhabit a very small world in this limitless universe; we live on a speck-sized island of meaning in an ocean of meaninglessness.