



Excerpts from chapter 9 of

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From Apes to Intellect and Beyond***
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¹ Can be read on the web at faculty.washington.edu/wcalvin

...That said, let us consider the consequences of spreading humans around the globe at a time not long after we first became behaviorally modern 50,000 years ago.

While structured thinking may be one of the aspects of human uniqueness (and, when combined with ethical judgment ability, certainly a candidate for our crowning glory), I suspect that evolution hasn't yet tested it very well – that it is clunky and perhaps dangerous at times. Our emotional value judgments are far older and better tested than our intellects. Emotions are handy when decisions must be made quickly but they are also overly broad, lacking precision and nuance. Many problems arise when snap judgments substitute for deeper consideration.

Consider some of the consequences of acquiring higher intellectual functions:

- Our language instincts have become strong enough for orators to hold us spellbound, to urge us off to war.
- Our multistage planning is now good enough to prepare for a prolonged war, not just raids.
- Our compulsive search for coherence often results in finding hidden patterns where none exist. Astrology is one of the more innocuous examples (compared to religious cults, more later) of our tendency to find patterns in random noise.
- Our logic is so impressive (when it works) that we can convince ourselves that there are no other possibilities than what we have eliminated with our logic – even though the history of both science and politics is full of examples where we were blindsided, or where our logic instead led us down a garden path into a mire.

Cowboys have a way of tying up a steer or bronco that fixes the brute so that it can neither move nor think, like the proverbial deer frozen in the headlights. This is the hogtie, and it is what our rationality sometimes does to us, freezing us when we ought to keep searching.

There are ways around this, as when we teach about the common logical fallacies. Just as medications can fix some problems, it is hoped that education about pitfalls might alleviate others. Teaching “critical thinking” skills in school is one way to

combat the pervasive misleading information and logic that bombards us daily. We can learn to routinely ask: Why is this free? What are they really selling? What did they avoid mentioning? Do those statements really contradict one another? Important relative to what? Does that conclusion necessarily follow? Is the definition adequate? Is there ambiguity here? What's being assumed? Can you rely on the alleged authority? And when everything seems to hang together nicely, be wary of arguing in a circle – you may just be using different synonyms for the start and finish.

There is even an organized practice of trying to find people lacking critical thinking skills. The technical term is “trolling for suckers” – locating the fraction of the population that is truly impaired in their judgment and then attempting to part them from their money. “Sucker lists” collect the addresses of gullible people who have responded to something-for-nothing bait that is so improbable that most people would ignore it – but nibbling at it marks you for further attention. As in the New York joke about selling the Brooklyn Bridge, “If you can believe that, then I've got a bridge that I'd like to sell you.”

Schemes like this require communicating the bait to a large number of people in order to find the unfortunate few. Nearly free email has now enabled mass mailings on a scale never seen before. The everyday lament, “How could anyone believe such stuff?”, has a sad answer. Such ploys can pay off, sometimes not immediately but later on the followup (the free “bait” and then the “hook”). But we are all gullible on some occasions, often early or late in life, or on some subjects at all times.

This organized exploitation of intellectual shortcomings could be controlled by ethics and laws. But there are many everyday defects, shared by everyone to some extent, that make you wonder if *Homo sapiens sapiens* was really ready for prime time when everything expanded 50,000 years ago.

Complex thought presumably underlies the entire suite of higher intellectual functions. We can operate at levels that are not easily translated into words, as when we mull over a puzzle. I'll have much more to say on the subject of levels of organization in the next-to-last chapter, but first let me mention some flaws in the more

fundamental cognitive processes, where it looks as if we are still plagued by the crudeness that usually characterizes anything that is a “first of its kind”:

Categorical perception can put blinders on us, so that we cannot see the nuances. Japanese reared without hearing the English /L/ and /R/ sounds will lump them together and hear a Japanese phoneme that is in between in sound space; “rice” and “lice” sound the same to them. Newborn infants can hear the difference, but soon a category forms up around the sounds most often heard, and variants are conformed to the new standard. (It's known as the magnet effect or category capture.) Perception can also fill in missing information erroneously, as when blind spots in our visual world are filled in (look at wallpaper and, instead of seeing a featureless spot where your photoreceptors are missing, you see the area filled in by the surrounding patterns).

We also do this fill-in over time, as when a light flash in one location is followed by a second light flash nearby – and we report seeing a smooth movement of the light, filling in all the intermediate points. A striking example occurs in viewing cave art with the aid of a flickering oil lamp. Between flashes, one's eye position drifts a little in the profound darkness and, when the next flicker again illuminates the scene, it looks to us as if the depicted animal smoothly moved!

While we share such perceptual inaccuracies with most primates, we have higher-order cognitive versions of category-capture and fill-in as well.

Our *memory mechanisms* are not very good at avoiding substitutions or keeping things in order. A child taking part in a collaborative project, when later asked who did what, will often think that she performed an action that the videotape shows was performed by another child.

I'm not referring here to what Henny Youngman said, “After you've heard two eyewitness accounts of an auto accident, you begin to worry about history.” I'm talking about what happens much later, even if you get it right initially. Even when you

initially succeed in recalling a sequence of events, you may make a mistake in recalling the event weeks later. If you scramble things once, it may have consequences a month after that, as if you had overwritten the correct memory sequence with your erroneous recall.

The memory expert Elizabeth Loftus likes to say that “Memory, like silly putty, is malleable.... The inaccurate memories can sometimes be as compelling and ‘real’ to the individual as an accurate memory.” Keeping things in the right order is often important for structured thinking, and it looks as if evolution didn’t get around to fixing the flaws in memory mechanisms.

Changing the name of something is, of course, a standard attempt to manipulate your memories, perhaps to run away from a problematic reputation. (Cynics would note that both my local telephone company and my bank have changed their names twice in recent memory.)

Our *structured judgment* may not be up to the task even when we structure our thoughts successfully, as in those fallacies of logic. And as merchants know all too well, our decision-making is easily swayed by the last thing we happen to hear. Psychology texts are full of examples about the unwarranted emphasis that is often given to some minor aspect.

Vivid examples can capture our minds and override other considerations. Although we might spend all day carefully considering the documented facts about frequency-of-repair records when shopping for a new car, our judgment is still notoriously easy to sway with just one nonrepresentative example. Someone at a dinner party complaining about repairs to their top-rated car is often sufficient to override our logical consideration of the average repair experience. We ought to treat the new example as just part of the range of variation that led to the average we researched. Instead, captured by the vivid example, we go out the next day and buy the second-choice car.

Any narrative provides an attractive framework, when competing with dry facts detached from stories. Ronald Reagan

often took advantage of this when he was president of the United States, telling an easily appreciated story of some one person – and letting this carefully selected example serve as a rationale for a favored government policy. Vivid stories can be used to smother inconvenient facts.

Searching for coherence, we sometimes “find” patterns where none exist – as when imagining voices when it is only the sounds of the wind, or trying to force fit a simple explanation on a complicated set of relationships. “It all hangs together” is what makes for strong belief systems and allows all sorts of actions to be rationalized.

We offer *reasons*, often several deep, for an action or a belief. Some considerations, perhaps ethical ones, can override others. *Rationalizations* are untruthful inventions that are more acceptable to one's ego than the truth. We fall prey to logical fallacies; even snails assume “after this, therefore because of this” and you’d think that evolution could have kept us from falling for it so often. *Reasoning* often involves a chain of reasons, a considerable limitation because the reality is usually a more complex web of interacting causes.

There are *disconnects between thought and talk*, as in that blues lament of Mose Allison, about when “Your mind is on vacation but your mouth is working overtime.”

Conditionals and pretense work surprisingly well, considering how little evidence there is for such abilities in the great apes. We have an ability to entertain propositions without necessarily believing them, distinguishing “John believes there is a Santa Claus” from “There is a Santa Claus.”

But we aren’t born that way. The ability to play a role in “doctor” or “tea party” arise later in the preschool years. Do we later remember what was pretense and what was real? Not always. Source monitoring (tagging facts with where you learned them) often fades with time so that “facts” become detached from their supports. The day afterward, you may

know it only happened in a dream – or that you only planned to say it but didn't actually utter the words – but will you lose that pretense tag in another month?

Concreteness is seen in a few modern people who answer very literally to any example of figurative speech, who are unable to rise beyond the most basic interpretation. But most of us are very good at backing off and treating a question more abstractly, looking for the metaphor. When someone starts to lose this ability, physicians suspect damage to the frontal lobe and go looking via diagnostic brain imaging.

Rational argument alone often cannot overcome those who simply and passionately believe. Yet logic is often bent and distorted in the service of those belief systems; it can even override everyday experience. As Fyodor Dostoevsky noted, "But man has such a predilection for systems and abstract deductions that he is ready to distort the truth intentionally, he is ready to deny the evidence of his senses in order to justify his logic."

I doubt that this was a problem before the behaviorally modern transition. There is nothing like logic in the aid of strong beliefs to provide the motivation to override ethics and find hypocritical excuses for committing acts of violence. It is most familiar from extreme political beliefs but consider two examples of how professedly peaceful religious cults have, once they became wealthy via give-us-everything contributions from their members, turned to using biological and chemical terrorism.

In 1984, members of the religious cult of Bhagwan Shree Rajneesh sprayed the salad bars of four restaurants in The Dalles, Oregon, with a solution containing salmonella. The idea was to keep townspeople from voting in a critically contested local election; 751 people became ill. This cult merely obtained mail-order biological salmonella samples and cultured them. (This is low-tech kitchen stuff.)

The second cult, in contrast, recruited technically trained people in considerable numbers and engaged in indiscriminate slaughter. Aum Shinrikyo ("Aum" is a sacred syllable that is chanted in Hindu and Buddhist prayers; "Shinrikyo" means supreme truth) is a

wealthy religious cult in Japan (recently renamed Aleph), with many members in Russia. Their recruiters aggressively targeted university communities, attracting disaffected students and experts in science and engineering with promises of spiritual enlightenment. Intimidation and murder of political opponents and their families occurred in 1989 by conventional means, but the group's knowledge and financial base allowed them to subsequently launch substantial coordinated chemical warfare attacks.

In 1994, they used sarin nerve gas to attack the judges of a court in central Japan who were about to hand down an unfavorable real-estate ruling concerning sect property; the attack killed seven people in a residential neighborhood. In 1995, packages containing this nerve gas were placed on five different trains in the Tokyo subway system that converged on an area housing many government ministries, killing 12 and injuring over 5,500 people.

During the investigations that followed, it turned out that members of Aum Shinrikyo had planned and executed ten attacks using chemical weapons and made seven attempts using such biological weapons as anthrax. They had produced enough sarin to kill an estimated 4.2 million people. Other chemical agents found in their arsenal had been used against both political enemies and dissident members. While they were also virulently anti-Jewish, apocalyptic scenarios dominated the sect's doctrine and the Tokyo attack was said to be an attempt to hasten the Shiva version of Armageddon. Only cult members would survive it, they claimed, thereby purifying the world by ridding it of nonbelievers. (No mention seems to have been made of the enormous cleanup job the true believers would then face.)

The general problem here is the motivation provided by strong belief of all kinds and its narrow logic. As Dostoevsky observed, belief systems serve to distort new information, making it conform to preconceptions. It provides a narrowed focus, within which everything seems to hang together, and consequences follow from its logic. It reminds me of that aphorism: the person with one watch always knows what time it is. The person with two watches is always uncertain.

If you approach a problem from multiple directions at once, you

learn to live with such uncertainty. Strong belief systems, however, often try to narrow you down to one source so that you cannot escape its logic. Educated people are not immune to getting trapped in such blinkered logic. Most technically trained people, including many physicians, do not have broad educations and they are often activists, trained to make decisions quickly and move on. The masterminds of modern terrorist movements are frequently personable, technically competent people from privileged or middle-class backgrounds, not at all fitting the usual depiction of their foot soldiers as the ignorant downtrodden. And such leaders, in the manner of modern executives everywhere, usually weed out the truly mentally ill as too unreliable. To get people to follow your orders, it helps if they can follow your logic.

Martyrdom is often the result of excessive gullibility, of ensnarement by narrowly focused logic. Some suicide bombers turn out to be educated people, trapped in the logic of some scheme where “everything hangs together.” While the false-coherence problem is old, its consequences have escalated. “For the foreseeable future, smaller and smaller groups of intensely motivated people will have the ability to kill larger and larger numbers of people,” Robert Wright writes. “They’ll just have to be reasonably intelligent, modestly well-funded, and really pissed off.” Or really trapped by a compelling logic that reframes their existence.

Recall the Fermi paradox about extraterrestrial intelligence: “If intelligence is common in the universe, why haven’t we seen them already?” (since some surely evolved technological civilizations before we did). This suggests that prior technological enlightenments elsewhere might have flickered only briefly before self-destructing.

Sometimes the strong belief and its logic is of religious origin (“God gave us this land”), sometimes secular (“All power to the people”). But all this has little to do with mental illness (that I will discuss in the last chapter), however great our reflex tendency to label some of the acts as “crazy.” It has everything to do with our half-baked rationality.

Despite its virtues, anything that is “the first of its kind” tends to be awkward at first, rough around the edges. There is a growing

suspicion that maybe modern humans are like that. Our intellects are a big step up but they appeared very recently in the ice ages, long after the human brain stopped enlarging. They’re not well tested yet and are still prone to malfunctions.

However impressive our average intellect may be when compared with the other apes, remember that biological evolution often produces overblown features with major drawbacks. Peacocks have tails that hamper escape from predators. Elk grow antlers so wide they can no longer run through forests to escape wolves. Overgrown intellects have similar problems. An intellect with great persuasion and planning abilities sometimes produces dramatic results as the leader of a suicide cult.

As Desmond Morris once said, we prefer to think of ourselves as fallen angels, not risen apes. At least, we hope, evolution is still improving us. Alas, biological evolution doesn’t perfect things – it just moves on to new “products” with a different set of bugs. (Sound familiar? And how often does your computer still hang or crash? We might be like that, not ready for prime time.) Even when we avoid hanging up from obsessions or crashing from epileptic seizures, we stumble over numerous cognitive pitfalls (usually without noticing).

Once you also recognize that we’re *recently* risen apes, you realize that there simply hasn’t been much time in which to evolve a less buggy version 2.0. Clearly, human cultural innovation is now in charge of getting the bugs out, not biological evolution. And we haven’t made much progress yet.

The entire book can currently be read on the web at faculty.washington.edu/wcalvin. It will be in bookstores this Spring.