

## ***Previously on Complexity***

To date, we considered Complexity in the first two of four parts:

- 1. Illustrative Example**
- 2. Determining the complexity of a problem/situation**
- 3. Assessing the capacity of a person to cope with complexity**
- 4. Developing your potential**

Complexity was first defined as “compound intricacy” and illustrated through the process of solving Sudoku puzzles. Part 2 considered (a) some formal aspects of measuring complexity in well-defined problems, and, then (b) the increasing Complexity inherent in the growing uncertainties of today’s business and personal worlds, the two being inextricably linked for most of us.

In this installment, we look at some more general aspects of Complexity and how to approach an understanding of its nature. The main difficulty in this installment is that you cannot skim the words and keep your place. I am forcing you to read and reread this. This is the essence of learning how to cope with complexity. If I could explain to you in 5 minutes, where you get it immediately, you wouldn’t need me to tell you this! If you have to understand one thing I’ve ever written or presented, this essay is IT. It has become a source of continuous revision for me.

This essay is central to the “secret” of long-term financial success: have a great knowledge base with all your information current. But wait! THAT’S not all. Your actions should always be carried out with a positive expectancy. That is, based on your information, the expected outcome of a potential legal action yields positive cash flow if the certain events transpire. AND the expectancy is zero when one or more of the posited events fails to occur. Not guaranteed success with every action, but with no cost other than the maintenance of the knowledge and the execution of the action—all infinitely easier in the saying than in the doing. But as an aspiration, it is a Single Principle. Can’t get any simpler than one Principle.

## ***Assessing the capacity of a person to cope with Complexity***

### **Eight straight game**

How big in bits is a person’s head is my question. Is it quantifiable? Think so. This is Mind as information entropy engine, net emitter of bits. If the Internet is the World Brain, then the World Wide Web IS the World Mind. The advantage of Mind over Brain is that Mind scales where Brain doesn’t except as an object being distributed or supported. Mind scales: one mind to many ideas, while Brain stays constant at one person, one brain—one hopes.

With a high school diploma alone, my birth father, Paul, learned to play eight games of chess concurrently, face to face, in round-robin fashion, and win the majority of them. So, I asked myself, just how did he do it? It must have been only for fun because he

never made a dime off of it. Good hurdle for improvement. I do make a dime off of eight games played as one. If only Paul had been a floor trader on a commodity exchange instead of a small-time roofing contractor, The Paul Roofing and Siding Company.

Thank you, Paul, for those genes. Thank you Lord for the Intelligent Design bound up in the gene's ability express this "eight straight" capability in many different forms. Father: Chess. David: Finance." Hallelujah, Brother. My point here is that if there is a God, and many believe this to be so, then in fact the Intelligent Design has to be in the brain structure of people to see the Creation. The Creation, and therefore, in the Cartesian sense of proving the existence of God, the Creator, is never knowable completely. Especially if you believe (better to know, however) that the infinity of possible truths exceeds the infinity of provable truths by yet an infinitely infinite, *ad nauseum*, times. The absurdity of this degenerate, but amusing, Self reference is seen in the movie, BEING JOHN MALKOVICH. Strict Fundamentalists (read "literalists") of any stripe infinitely short change the infinity of their idea of God in the same way. More like Ironic Design in this case. {8>P

Back to the main story line. Following the 50's Quiz Show, *20 Questions* ("animal, vegetable or mineral?" **importance: three exclusive categories**), one needs 3 yes-no questions to discriminate among eight different items. Repeated with a change in phrase placement but with the same correspondent meaning: And so, 3 bits are what he needs to keep the eight components of a game space straight.

The Topic here is "the need for 3 bits to uniquely name eight components." This begins to sound like a Monty Python routine from THE HOLY GRAIL (And "three" shall be the sacred number. Neither "two" nor "four", but "three." One shall never say "four" and only say "two" when preceding "three": instruction for counting after the fuse is set on the sacred grenade. Making fun of both Religion and Military in one fell swoop. This is worth a {8>)). Or is it a {8>P?

Now the real mind bender follows. The actual number of subsets of these eight components distinguished by 3-bits is the power set of 8 which has 256 ( $2^8$ ) different subsets. 256 is the number of the states about which to infer truths on an 8-component object knowledge base

First are those things that are true about behavior independently of any component. These are tautologies. True within themselves, like  $(a = a)$  regardless of  $a$ . Then there are the things true about each component's behavior itself alone. This would correspond to eight distinct scenarios as independent sets of state to maintain. Then, there is consideration of scenarios in combinations of 2, 3, 4, ..., 8. All the combinations of 0-8 components—number 256. In terms of a power set measure, Complexity of "3 bits" is 256. Of course, just one interesting measure. Effective, but just one measure.

Back to the example of Paul Sherr's minimum entropy—how many things could he distinguish?. This puts a lower bound on the capacity of his head to handle all this

Complexity<sub>3-bit</sub>. After I studied Information Theory in graduate school, my hypothesis was that the ninth game would degrade his performance to less than 50%. He died in 1973, before I could test this hypothesis. However, as a teacher of programming for 16 years, 1968-84, I discovered this to be probably true with the help of my great friend, Giorgio.

In closing, the situation can be simpler than it appears. {8>}) The rules of the games are all the same, so the situation has large amounts of symmetry. This symmetry reduces the two-way operational interactions up to a limit of 50%. It is  $(n^2-n)/2$  as the diagonal is always in. In the case of n=8, the reduction is 28 of 64, a reduction of 43.75%. So each game operates independently but in concert with the other games. This means that each game supplies experience to all the others. And so, there is leverage to learning. A very obvious conclusion to draw after a contorted reasoning process. Best to stop right here. If you've read this far, you probably feel I will go on forever. It is true, there really is no stopping point. To the point in the previous installment: the Knowledge Game is Infinite. Selah. This is God-like by anybody's definition.

In the next and last Installment, we will treat the personal side of coping with Complexity—honing your capabilities and therefore increasing your capacity. Most probably, you have already profited through the complexity of the first three installments. The last one is the finishing process. Let's wish me well to achieve the goal.