

The Construction of Conceptual Models and the Perils of Cartesian Rationality

Humans interact in one of two contexts, or domains. The first, and most common, is when they share the same – or at least relatively similar – conceptual models regarding the agenda at hand. The second is when they attempt to address a common issue with disparate conceptual models. Although some of the differing dynamics of interaction in these two domains are quite obvious, the simple existence of these two domains has not heretofore been the object of any rigorous focus. To provide a workable context for that focus, consider change.

Change is, of course, a constant in human history, tied perhaps most closely to technological innovation. Two of the first most significant changes in human cultural history were the ability to control fire and the “invention” of the wheel. Although we have no record of the actual impact of these new “technologies” on early human culture, we can surmise that some sort of disruption may have taken place within the ancient groups of people affected. For example, imagine that within a particular “tribe” there may have been a group of people who recognized the advantages of the new technology and advocated its broader adoption and application. At the same time, we can imagine another group within the tribe that was fearful of this hitherto unknown power, argued its dangers, and espoused disavowal. It’s even possible that the two groups split up and divided over this issue. It’s also possible that one or another of the differing groups overpowered and killed off the opposing group. That history tells us the eventual outcome of these early disputes is not presently relevant; what is relevant is the dynamics of human interaction in the face of change.

Many, many millennia later, Copernicus upset the conventionally accepted idea that the earth was the center of the universe. A few centuries later, Darwin suggested that species evolved and were not created. A few decades later, Freud suggested that humans were not even in control of their own behavior. Shortly thereafter, Heisenberg suggested that nothing could be predicted with certainty, and Einstein concluded not only that space cannot be considered separately from time but also that space-time must be curved. The first three of these men – Copernicus, Darwin, and Freud – hold a unique place in human history. Each of them essentially toppled humankind from its self-made pedestal of godliness. Each showed that humans were far less special than the prevailing conceit held. Ironically, their insights, along with many others, also demonstrate just how unique humans are.

The only epistemology that has ever been available to us, the rational man model, works quite well in steady-state situations, when change is so gradual that it is barely noticeable, which has been the case up to the last century. Gradual change allows time for adaptation and does not significantly challenge existing conceptual models. This gradual kind of change is “ordinary change.” Sudden, more radical changes that do require significant reformations of extant

conceptual models are not ordinary; they are “transitions.” Whereas, “ordinary change” present “problems” that can be resolved within existing conceptual models with gradual adaptations, “transitions” present “critical issues” that cannot be adequately addressed or resolved with the prevailing conceptual models. Up to the last century or so, change within human groups occurred gradually for the most part. For example, about fifty years elapsed from the invention of photography in the mid-nineteenth century to its widespread commercial application. On the other hand, it took only about three years from the invention of the transistor in the mid-twentieth century to its commercial application.

For the entire 200,000-year history of humankind, we have had only one basic epistemology. It was first explicated (made explicit) by Aristotle. For example, if he were to hold up a small rock and let it drop, the rational conclusion was that “it was in the nature of the rock to drop.” Or taking a knife and slicing a piece of fruit, one must conclude that it was “in the nature of the knife to cut.” These observations were obvious, and ones with which any reasonable person could agree. Centuries later, Descartes, despite his opinion that he was rejecting Aristotelian logic, “modernized” and “updated” it. His theory of innate ideas and his doctrine of clear and distinct perception are essentially reformulations of Aristotle’s conclusions. Cartesian or Aristotelian rationality simply maintains that if something is “self-evident” to any “reasonable” person, then it must be true.

Ironically perhaps, at about the same time, Galileo was developing and applying an antithetical approach to developing and acquiring knowledge, an alternative to the rational man model. What came to be known as the scientific method would represent the seeds of a new epistemology, but another four centuries would pass before the new epistemology would become explicit.

Not until the late nineteenth century did someone come along who first shined a brilliant light on the Cartesian way of thinking and behaving. One of the more potent precursors of the limitations of the rational man model was Sigmund Freud. His intense analysis of human behavior first made explicit the dynamics of rational epistemology. Ironically, he did so by examining behavior that was essentially non-rational. His recognition that much, if not most, of human behavior was based on nonconscious motives made no explicit mention of conceptual models, but that notion was implicit in his work. Not until a half-century later was the phenomenon of conceptual models explicated. And even then, Herbert Simon’s Principle of Bounded Rationality was embedded in the confines of economic theory. It took a few decades more for Harry Runyan to articulate fully the limitations of the rational man model that had up to then been implicit, and, in doing so, also offered the first alternative epistemology in human history.

Before exploring the limits of the rational man model, (and consequently its alternative, of course) we must first examine “reality.” A good assumption with which to begin is that the primary function of the brain – what Harry called “the

task of the ego” – is to organize information and experience into conceptually integrated wholes. That is what humans have been doing from the beginning: creating meanings for all the things and events that surround them. These meanings, however, are not at all “innate”; we construct them; we invent them. We do not do so arbitrarily or capriciously, however. The meanings we create must meet several criteria, because they become the components of the conceptual models that guide our behavior within our environment.

Altogether, there are eight specific criteria that determine whether or not our conceptual models are appropriate:

1. They must facilitate the manipulation of the physical world to produce end results in the form of desired products or artifacts.
2. The conscious and nonconscious components of each model must be logically consistent.
3. The conscious portion of all problem-solving and decision-making efforts must remain within the limits of human computing capacity. (For all but the simplest of tasks, this constraint requires that by far the greatest amount of problem-solving and decision-making will be governed by the nonconscious component of the set of conceptual models).
4. They must include models that specify means for producing desired patterns of interpersonal interaction.
5. They must be consistent with and complementary to conceptual models held by others within and outside of the group with whom the individual must interact.
6. They must be adequate for the achievement of desired goals.

The totality of all models of an individual constitutes his/her model set. A model set, as a whole, is appropriate to the extent that:

7. The various models in the set are either legitimately independent or mutually consistent.
8. They can easily be revised, transformed, or abandoned to reflect changes in purpose and/or change in the physical and social environment.

Of course, not all conceptual models are appropriate, or more precisely, continue to be appropriate. But before examining the difference, we need to look at a dichotomy that is central to the issue. For people in most Western cultures, "reason" and "emotion" tend to be seen as two separate things: the former "good" and the latter "bad." In everyday language, this dichotomy is often summed up by phrases such as, "Don't get so emotional about it; use your head." The dichotomy is caused by the strong tendency in Western cultures to equate "reason" with the rigorous, conscious methods of logical analysis used in the mature physical sciences. Because of its success in this area, "reason" is highly valued and judged to be "good." Everything that does not fit this model is lumped into a residual category that is implicitly labeled "not-reasoned." Then through gradual semantic transformations, the label for the residual class becomes successively "unreasonable," "illogical," "irrational," and finally "emotional." As a result, "emotional" becomes the semantic opposite of

"reasonable," and, since "reason" is "good," then its opposite, "emotion," must be "bad."

This dichotomy is implicit in Cartesian epistemology; it is also perhaps its most fundamental subarticulate tenet. Consequently, within problem-solving contexts at least, only cognitive – and, yes, conative, for you strict academics – behavior is really acceptable. Affective, or “emotional,” behavior is acceptable in certain contexts, such as joy and cheer, bereavement, or anger and righteous indignation, but it certainly has no place in any human effort directed at concept attainment and problem-solving. Now, to appreciate how fundamentally flawed, how seriously limiting this mode of thinking is, we must begin a rigorous examination of how our brains actually work. To do so, we must return to Simon’s Principle of Bounded Rationality.

The complexity of “reality” processed by limited human computing capacity results in simplified conceptual models that, at best, remotely resemble the “reality.” This re-cognition is the starting point of transrationality. In the rational man model, we simply assume that whatever we believe reality to be, it is.

Perhaps the most important thing to understand about a conceptual model is that it consists of both conscious and nonconscious elements and that it also consists of both cognitive and affective components. Although one may be able to be aware of some of the cognitive and the conscious elements in most cases, the affective and the nonconscious elements are seldom, if ever, easily available. Therefore, one’s conceptual models operate for the most part on autopilot. Consequently, since conceptual models determine every single aspect of our thoughts and actions and since they operate automatically, most of our behavior is reflexive.

Moreover, a conceptual model is a variable. It is an individual’s worldview, or rather pieces of an individual’s worldview. It’s not merely an opinion, a perspective, or an attitude, although it’s what predetermines all of those things. To say it another way, whatever any of us thinks reality is is not reality; it is simply a conceptual model that we have constructed (or, more accurately in most cases, that has been constructed for us). In most cases, the conceptual model captures a minute picture of the whole reality.

Say you see a fat man walking by, and you think, “Wow, is he fat.” You’ve just constructed a conceptual model about that person. First, he may be fat, but he may have been trying to lose weight and have already lost a hundred pounds. You would have no way to know that, and thus your constructed conceptual model would be only partially correct, and the correct part would be of little relevance to the whole reality of who that person really is. A second possibility might be that he has just recently gained the weight that has made him fat, perhaps as a result of some illness of which you could again not be aware. And

again your constructed conceptual model about the man would be significantly off the mark.

Another example: a young mother takes her infant to visit some friends for the first time. During the brief visit, the baby cries and fusses almost constantly. After the visit – actually the process begins during the visit – the friends conclude that their unfortunate friend has a very fussy baby. Their newly constructed conceptual model will now predetermine every thought they think and every word they say about their friend's baby. They will probably feel sorry for the parents and, at the same time, critical of whatever they may or may not be doing to have created such a fussy baby. Obviously, they really don't know the whole story. It could be that the baby was just fussy at that time and at most other times was quite content. Perhaps, when the mother returned home and changed the baby's diaper, she discovered that one of the pins had come loose and was occasionally pinching the little girl. (Yes, young readers, diapers used to be cloth and held on by safety pins that sometimes came loose.)

A conceptual model is not only about things, like people and events. We also construct conceptual models about processes, such as how we communicate. For example, a person who has been the center of attention, perhaps because of her unusual beauty, for her whole life, might become so ego-centered that she will have difficulty in a conversation hearing anything being said that does not directly relate to her self.

So, in every situation, we construct a simplified conceptual model about whatever's happening, but it's always only a small piece of the whole reality, a reality that's quite beyond our perception. The construction of our respective conceptual models begins at birth. The accident of our birth immediately puts us into a particular language context, into a particular set of fundamental basic assumptions, into a particular worldview. Our parents, representing a particular sociocultural milieu, transmit all of this information to us in innumerable overt and covert ways. Thus what most of us think are our own perspectives are actually the legacy that we have been simply programmed or conditioned to believe.

A conceptual model is a lot like an iceberg. Only about one-tenth of it is visible. The rest is submerged. The visible tenth is the cognitive, conscious part. So, ninety percent of a conceptual model is affective and nonconscious. Both the conscious and the nonconscious components each have a cognitive and affective component. However, the component that always has the most impact on one's actual thinking and behavior is the nonconscious part and, in particular, the affective component of the nonconscious.

"Limited human computing capacity" has a very specific meaning. In the first place, we know that short-term memory is limited to seven plus or minus two (*i.e.*, $7 \pm 2 = 5$ to 9) chunks of information. That is, the amount of information a typical human can hold in memory at any one given point in time will be within

the range of about seven chunks of information. Of course, that statement requires clarification of what a “chunk of information” is. A chunk of information is, in fact, a variable. What is one chunk for one person may be several chunks for another. For example, a series of equations or a single complex equation may be one chunk for an accomplished mathematician, whereas for a novice, *each* factor in the equation may be one chunk. Similarly, for a linguist familiar with several languages, observation of a phenomenon such as rain or snow might simultaneously translate into several different words as one chunk of information, whereas for a person who knows only one native language, the same observation would translate into just one word, still just one chunk, but of a different size.

Long-term memory also appears to have severe limitations. In this case, however, the limitation is not on how much information, again expressed in terms of chunks, can be ultimately held in long-term memory. So far, at least, we have not been able to find a limit to that capacity. Rather, the limitation is on how long it takes for one chunk of information to be transferred from short-term to long-term memory. Research suggests that about five seconds is required to transfer one chunk of information from short-term to long-term memory. Again, a little reflection should indicate how seldom that much time is available to accomplish this transfer.

Now, given these two neurophysiological limits, and considering how much information is presented to us in most situations, it should be obvious that our neurological apparatus is simply not equipped to process all that information very effectively. In other words, one of the primary functions of the brain is to *limit* the amount of information it has to process. Or, to say it another way, the function of the human brain is to construct simplified conceptual models of the real world. And the most important thing to understand is that these “simplified conceptual models” are just approximations of what the “real world” really is.

Moreover, neural pathways that have been consistently reinforced over time come to seem “natural.” They become the boundaries that prescribe and determine acceptable thinking and behavior; any tendency to think or behave outside these boundaries is forestalled, proscribed, and severely inhibited. These boundaries represent the restrictive nonconscious.

Now, to return to the two domains of human interaction – the first in which shared conceptual models prevail and the second in which disparate conceptual models prevail – we can now examine more precisely the different dynamics at play in each situation. In the first domain, as long as some significant level of logic is maintained (which frequently is not the case), communication and problem-solving will be relatively straightforward. Words and references will tend to mean essentially the same thing to all participants. Areas of disagreement can easily be recognized and either resolved or compartmentalized as, “We’ll agree to disagree.”

However, in the second domain, many words, phrases, and references will not mean the same thing to all involved at all. Since a great deal of the ongoing discourse will be confusing and incomprehensible, misunderstandings will lead to annoyance, anger and increasing frustration. Each will think the other foolish, stubborn, intransigent or simply stupid. Even the most rigorous application of logic will not help the situation, since disparate subarticulate basic assumptions will impede any mutual understanding. Unlike transactions in the first domain, where emotions will remain under control, in these situations, emotions will literally explode. In fact, before long, out-of-control tempers will essentially sabotage any hope of productive discourse. Eventually, the only options will be to discontinue or escape from the discourse or try to find a way to ostracize (or “kill off”) the opposition.

Not only does the possibility of productive discourse and problem-solving disappear when people find themselves in this second domain, but, probably more important, they will not even be aware that they are now in this arena. Whereas rationality is fully appropriate in the first domain of shared conceptual models, in the second domain of disparate conceptual models, it is totally useless. In this arena, people will have become quite non-rational. Any attempt to apply rational thinking will only exacerbate an already dangerous situation. Since rationality is no longer applicable, an alternative mode of interaction will have become necessary. That alternative mode is a wholly new epistemology called transrationality.

Rational behavior takes place *within* an existing conceptual model. Therefore, as long as people share common conceptual models and as long as they exercise logic, their transactions will be productive. Non-rational behavior occurs when people try to interact with each other *within* disparate conceptual models. Even with perfect logic at play, their transactions cannot be productive, because they will simply be “talking past” one another. Transrationality acts *on* existing conceptual models by transcending them, examining and evaluating them for their current appropriateness. The methodology of transrationality is radically different from that of rationality, first because of the simple recognition of the phenomenon of conceptual models and second because it focuses primarily on process.