

REQUISITE VARIETY AND ETHICAL DECISION-MAKING

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Abstract

Ethical decision-making is examined utilizing a model of requisite variety that introduces the concept of the Paradox of Increasing Knowledge and the reciprocal. This paradox is contrasted to the general question of how to evaluate ethical decision-making criteria and the management of social issues such as environmental management. The concept of social progress is conceptualized according to the hierarchical and progressive model of requisite variety established. The question --- "What is ethical decision-making given the parameters of requisite variety?" --- is addressed.

Introduction

Man is simultaneously nature's greatest accomplishment and nature's most dangerous component. Nothing less than the future of the planet rests on humankind's ability to make correct and ethical decisions relative to issues such as environment management. The premise of this paper is that the Paradox of Increasing Knowledge and requisite variety perspectives make it possible to understand any behavior as deemed ethical from the perspective of the decision-maker.

This paper is based on two related perspectives that flow from an analysis of requisite variety perspectives on ethical decision-making. One is that if a reasonable level of management of the consequences of negative/destructive decision-making is to be attained, such decision-making processes must come from the best possible understanding of the perspectives and points of view that yield the negative/destructive behavior. The other perspective is that it is possible to analyze negative/destructive behavior utilizing established ethical models and the concept of the perspective of the Paradox of Increasing Knowledge. The combination of these perspectives will produce a model based on requisite variety concepts that illustrates that negative/destructive behavior from the decision-maker's perspective can be seen: 1) to come from identifiable and replicative sources, and, 2) to form a decision-making base viewed as ethical by the decision-maker.

Requisite Variety

The Law of Requisite Variety (Ashby, 1956) can be used to illustrate many of these processes. Ashby based his conceptualization of requisite variety upon Shannon's Tenth Theorem (Shannon, 1949). Shannon's Theorem states that if a correction channel has capacity H , then equivocation of amount H can be removed, but no more. Ashby (1960) extended this concept, which was initially used by Shannon as referring to telephone or linked communications, to brain activity. As Ashby states:

The theorem can then be applied to the brain, or any other regulatory and selective device, when it says that the amount of regulatory or selective action that the brain can achieve is absolutely bounded by its capacity as a channel. Another way of expressing the same idea is to say that any quantity K of appropriate selection demands the transmission or processing of quantity K of information. (Ashby, 1960)

The Law of Requisite Variety as put forth by Ashby thus states "Only variety can destroy variety". However, this statement only refers to Ashby's limited example of a two-actor game in which Actor D's range of choice behavior is driven down by the limiting precedent decisions of Actor R. Thus, "only variety in R can force down the variety due to D". In order to more fully embrace the concept of requisite variety, it is necessary to put requisite variety in less technical language:

As an actor's variety of choices (defined by range of breadth and depth of alternatives) is enhanced, the extent of possible behaviors is as large as the range of choices; conversely, as an actor's variety of choices decreases, a more limiting range of choices ensues proportionately.

Requisite variety can be used as an analytical tool to compare the decision matrices of different decision makers. The decision maker with a higher level of requisite variety has an expanded range of choices, while the decision maker with a lower level of requisite variety has a more limited range of choices. Ashby confirms this conclusion as follows: "It (requisite variety) says that certain types of

arrangements cannot be made. It is thus no more dependent on special properties of machines than is, say the 'theorem' that four objects can be arranged to form a square while three cannot." (Ashby, 1956)

An example of the limiting aspects of requisite variety can be illustrated. In this case, a simple example of the elemental characteristics of a line (defined as the connection of two points) is utilized. Since the example will use geometric figures, the reader may find this example easier to follow if each "line" is thought of as a toothpick, thus making all lines of equal length and breadth. The issue is capacity by line "accumulation":

1 line = has directionality capacity only

2 lines = all of 1-line capacity (two lines in parallel can illustrate one direction) + 2 lines have multi-directionality capacity;
Note: 2 lines lack the ability to enclose or define a space

3 lines = all of the capacities of 1 line and 2 lines + 3 lines can make a triangle

4 lines = all of the capacities of 1, 2, and 3 + 4 lines can make a square (Note: an ability to stack lines/toothpicks makes a "4 lines triangle" possible with two lines stacked)

5 lines to 42 lines to infinite lines (assuming stacking ability) = all have the square making capacity

This simple model illustrates that systems of higher capacity (4 lines to infinity in this example) encompass all of lesser capacity (3 lines or fewer). However, lower capacity systems do not have the variety requisite to encompass higher levels. This framework has implications for the measurement and assessment of social progress and ethical decision-making. As a first example, let us examine the issue of perceptual awareness, with five levels depicting differing degrees of perceptual mastery:

1. Lack of perceptual awareness (unaware of the problem or opportunity)
2. Perceptual awareness of the challenge, but with an inability to manifest significant levels of influence

3. Perceptual awareness and partial management, but with an inability to manifest effective management or meaningful control
4. Perceptual awareness and accomplished capacity for management, but still only partial encompassment of the total challenge
5. The ideal – capacity for total encompassment of the challenge, characterized by a synergistic tapestry of mutual benefit. In essence, a co-habitation with the challenge without consequences of mutually destructive processes of entropy.

Now let us examine this five-level requisite variety model as applied to the challenge of environmental management:

1. Environmental forces are seen as random
2. Environmental forces are seen as magic***; the concept of environmental damage cannot be grasped or appreciated as to impact
3. Environmental forces are seen as subject to a level of management, but not really subject to control; environmental damage is recognized as a factor but addressing it is beyond technological control or meaningful management
4. Environmental forces are seen as subject to management and control; environmental damage can be brought under control; however, the choice of actualizing environmental damage controls may or may not be implemented
5. The ideal – The environment is embraced as a co-inhabiting “partner” with humankind

***Any sufficiently advanced technology is indistinguishable from magic...Arthur C. Clarke

How does this model inform us if the challenge of pollution is the variable? Under requisite variety parameters, only Level Four can meaningfully address pollution. Upon attaining Level Four, humankind can be said to have progressed; however, only potentially. Just having the knowledge or know how to reduce pollution does not mean that pollution will be reduced.

The decision, for example, to function at Level Four = *pollution addressed*, or Level Two = *pollution is not viewed as a relevant concept*, is a decision that is determined by ethical considerations sourced in a Level Four capacity. In contrast, a Level Two system manager, lacking the requisite variety to address the pollution issue, does not

have the option of considering a Level Four solution. Pollution containment and management in this example is determined by the combination of: 1) the capacity to address the situation, plus, 2) the willingness to follow through and execute that capacity. If the Level Four capacity system manager chooses to ignore pollution concerns, society may label that manager as irresponsible, as unethical, etc. However, we do not label the polluting Level Two manager as unethical since the Level Two manager cannot exceed his/her requisite variety limitations.

The Role of Perception and the Knowledge Paradox

Before additional ethical decision-making points are discussed, it is important to look at the concept of perception relative to behavior. All behavior is a function of perception. Human beings can only act out in the world they know, and that world is defined by the extent of their complete and comprehensive ability to perceive, comprehend, and select what is to them goal directed behavior. This is experienced by decision-makers as the Paradox of Increasing Knowledge. The Paradox of Increasing Knowledge asserts that the more we know in either breadth of knowledge (more alternatives to consider) or depth of knowledge (more understanding of the intended and unintended consequences of behavior as well as possible chain(s) of events that may follow a specific behavior), the more ways we find to analyze the world in which we exercise our goal directed behaviors.

The Paradox of Increasing Knowledge of Increasing Breadth functions to open windows of new awareness of alternatives not known or considered before. However, the Paradox of Increasing Knowledge as a function of breadth operates more dynamically than simple arithmetic addition of alternatives. This is due to the fact that an "open window" allows us to see vistas of additional windows not known or considered before. Therefore, the Paradox of Increasing Knowledge as a function of breadth can function to expand perception of alternatives both arithmetically and geometrically.

The Paradox of Increasing Knowledge of Increasing Depth has this same arithmetic/geometric dynamism. The Paradox of Increasing Knowledge as depth has five simultaneously operating mechanisms: 1) awareness of the manifestation of intended consequences, 2) awareness of the lack of manifestation of intended consequences, 3) awareness of the manifestation of unintended consequences, 4) awareness of the chain of events yielded by the outcome(s), and 5) awareness that a chain of events may precipitate subsequent additional chain(s) of events.

In summary, the Paradox of Increasing Knowledge illustrates that knowledge and awareness manifest in something more akin to an expanding sphere than a linear progression. The consequence of this phenomenon is that the more we come to know, the more we come to realize how much additional we do not know. Humankind has been unrelenting in exercising a spirit of inquiry and unfailing in the drive to progress in knowledge and accomplishment. Progress has been made with the Paradox of Increasing Knowledge affording us perspective on not only what we know, but also what we do not know. This progress, in an elemental and instructive form, has been described as “being confused at a higher level and about more important things”.

The Reciprocal of the Paradox of Increasing Knowledge

However, consider the ramifications of the reciprocal of the Paradox of Increasing Knowledge. The narrower one’s perception, the fewer alternatives there are to consider, the fewer windows of awareness that are open, and the more limited are the vistas of possibility. Similarly, shallow levels of understanding produce less of an awareness of the consequences of behavior (including both intended and unintended outcomes). Moreover, chain(s) of subsequent events are not readily identifiable or subject to consideration. Understanding this phenomenon gives rise to the old saw “ignorance is bliss”, and the understanding that it is impossible to be concerned about something of which you have no knowledge.

World Perception and the Consequences of Limited Requisite Variety

When the Paradox of Increasing Knowledge and requisite variety are applied to the case of an individual making a decision that can be assessed as to its ethical implications, it is desirable to highlight a number of requisite variety theorems:

- 1) **Theorem One:** Requisite variety has dimensions of both **scope** (breadth) and **penetration** (depth). The range of scope finds its limit at the number of alternative decisions an individual is able to identify and process to a meaningful level of understanding for that individual. The range of penetration finds its limit at the degree to which the individual is able to identify and track consequences. Identification of consequences relative to penetration is defined for this purpose as:

1. Intended consequences – the purpose of goal directed behavior
2. Unintended consequences – the possible byproduct(s) of goal directed behavior
3. Chain of event(s) consequences – the subsequent impact(s) of goal directed behavior and its byproducts

2) **Theorem Two:** An individual's world perception (capacity to perceive and engage in goal directed behavior as a function of his/her requisite perceptions) is as large, and no larger, than the range of his/her requisite variety **scope** and **penetration**.

3) **Theorem Three:** An individual, at a given point in time, has a world perception that is derived from the sum of their life experience to that point in time.

4) **Theorem Four:** Individual world perceptions are unique.

5) **Theorem Five:** An individual's world perception is subject to requisite variety constraints, and thus an individual's world perception can only contain that which is within its scope of variety (or lesser variety). This process establishes the extent of that individual's decipherable mapping of reality.

A higher requisite variety world perception can include a lower variety world perception. However, a person with a lower variety world perception can only partially encompass higher world perception frameworks. In straightforward language, this means that a person does not know what they do not know and, furthermore, cannot consider, for ethical decision-making purposes, that which they are not equipped to consider.

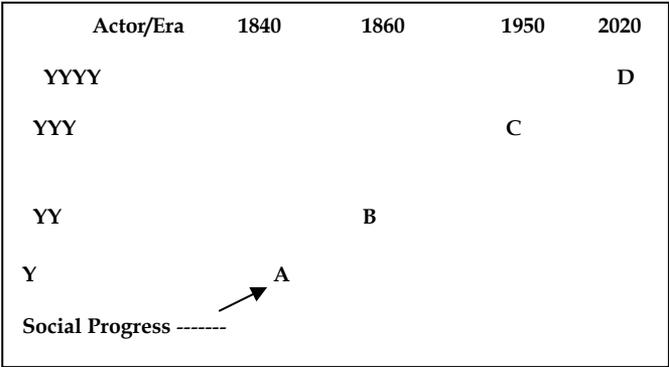
A "Social Progress" Illustration

Figure A below is a graphical portrayal of requisite variety capacity and social progress relative to an issue of race. The Y-axis of the graph is an assessment of "requisite variety capacity" running from lower to higher. The Y-axis construct assumes that enhanced levels of requisite variety include the requisite variety capacity of lower levels in dimensions of breadth and depth. In those cases where the lower level perspective Y has been supplanted by the higher-level perspective YY, it is hypothesized that the YY perspective encompasses the Y perspective.

The X-axis of Figure A is a representation of social progress relative to the concept of utilizing African-Americans as organizational laborers. "Social progress" as used here is a proxy for higher levels of requisite variety encompassment. In this example, the assertion is that as social progress is made, levels of increasing social progress include not only the capacity for the current/enhanced perspective, but also those precedent and "lower". Thus, while it is possible for an individual to be a racist in the year 2020, the "enlightened" perspective of the year 2020 baseball team owner would not reasonably be able to be manifested by an 1840's slave owner. Please accept that these value-laden concepts are grossly simplified here for the purpose of illustration.

The actors are: 1) **A**- a "deep south" 1840's slave owner utilizing captives from Africa as plantation labor, 2) **B**- a 1860's Mason-Dixon line plantation owner, 3) **C**- a 1950 major league baseball club owner (five years before Jackie Robinson) , and 4) **D**- a 2020 major league baseball club owner. The relative requisite variety of each actor is displayed in a stair step fashion in the center of the chart from Y to YYYY. The direction of "social progress" is indicated by the arrow at the lower left portion of the figure.

FIGURE A



A's Summary Sample Statement (Y): Africans are an important asset to my business. They are not people per se, but are property. They have no rights other than what I grant them.

B's Summary Sample Statement (YY): Africans have been an important asset to my business. Some governments view them as people, and some governments view them as property. Their usefulness to me and my ability to control their behavior is enhanced if they are property.

C's Summary Sample Statement (YYY): African-Americans are citizens of the United States, but they have to know their place, and one of their places is not in professional baseball except in segregated Negro baseball leagues. They are an important asset only to segregated Negro league teams.

D's Summary Sample Statement (YYYY): African-Americans are an important asset to my business, not only as players, but also as managers, coaches, trainers, and fellow owners. They have the same rights as any citizen. These rights are guaranteed by the government and are part of not only part of my personal ethical standards, but also part of my company charter.

A's sentiments and B's statements seem harsh and inhumane by our modern standards of civil conduct and business ethical codes. However, from the world perceptions generated by the era in which A and B functioned (and especially the agricultural/cotton crop driven deep South of A), these points of view were not only widely accepted in society, but also an integral part of the economic system in which actors A and B functioned.

If A were thrust into baseball club management in the year 2020, he would face some significant world perception challenges. Unable to control his African-American players (by his experiential standards), let us assume that he trades away all of them. A would be perceived as racist by 2020 critics. However, from A's world perception his management approach to African Americans would be to him not only ethical, but also sound from a total stakeholder perspective. In other words, A would be perceived by A as acting ethically ridding the system of troublemaking blacks.

Now, what would happen if D, also an ethical choice decision-maker, chose to do exactly the same thing in 2020? D would be viewed as racist (and unethical) by others in 2020. By choosing A's Y strategy, he would be accepting a lower requisite variety 1840 solution (Y) than his 2020 option of YYYY. Choosing a YYYY solution (no racism), D would be perceived by D as acting ethically.

The question thus arises – do we judge actor A as behaving unethically if A has only an 1840 Y requisite variety capacity? Is actor D more ethical than actor A, operating comfortably within the scope of his 2020 YYYY requisite variety capacity?

The bottom line, and the point of this example, is that social progress can only occur from a 2020 set of world perceptions when individuals operating in 2020 have: 1) enhanced levels of ethical choice variety, 2) the capacity to exercise such choices at higher levels of ethical

consequence, 3) the freedom to exercise such choices, and 4) the will to do so.

Perspective and Grace

Attaining a level of effective management and a capacity for meaningful control of a phenomenon, including ethical decision-making, are limited to the parameters of *perspectives* attainable at a given point in time. There is also a need to accept with *grace* the necessity to cope with variances endemic in the modern social system. When we “evolved ones” (with enhanced requisite variety capacity) manifest our attitudes and opinions on ethical decision-making, we may see others (with lower requisite variety capacity) as perhaps lacking a perspective on *perspective*, exhibiting behaviors we judge as unethical from our point of view.

This brings us to the point of taking a point of view on *grace*. To make this point, consider this quote from the modern techno writer William Gibson, from his book *All Tomorrow's Parties*. While Gibson's story character is speaking of a weapon (a knife actually), the words ring true when considering the requisite variety parameters of ethical decision-making. Here is what Gibson's character has to say about his knife when confronted as to the purpose(s) intended relative to the tool he has at hand: “That which is over designed, too highly specific, anticipates outcome; the anticipation of outcome guarantees if not failure, the absence of grace.” (Gibson, p. 242)

In other words, the relationship with the instrument becomes part and parcel of the instrument itself. This also rings true when ethical decision-making is used as a “knife edged” tool. Humankind's relationship with ethical decision-making should not be one of being subjugated to the judgment of others, nor should it be a challenge of how to dominate others. Rather, it should be one of grace and co-habitation with, understanding of, and toleration of others encompassing differing levels of requisite variety capacities from us.

Summary

The reciprocal of the Paradox of Increasing Knowledge illustrates that decision-makers are limited in their capacities to evaluate decision-making frameworks outside of their world perception frameworks. However, within those frameworks they can be acting within their requisite variety constrained capacities, and behaving (from their perspective) ethically. The management of social issues and the measure of social progress are thus consummated by individuals with world perceptions of a higher/broader variety being willing to understand and encompass this dynamic.

Judging those with ethical perspectives and decision-making alternatives that are lower in variety as evil, subhuman or even inadequate does not serve a constructive purpose. Such judgmental behavior puts the world perceptions of others under attack and functions to solidify and reinforce their extant behaviors. When attacked, people become more defensive and then they are less inclined to being open to alternative perspectives that could enhance their functioning level of requisite variety capacity. The world abounds with current examples of systems in crisis unable to break out of this vicious cycle.

One significant implication of requisite variety for ethical decision-making remains to be examined. This is the point of view that adoption of the requisite variety framework of analysis facilitates the management of social progress through examination and understanding the processes of ethical decision-making. The focus changes from simply judging behavior as unethical to understanding the world perceptions and points of view that yield the decision-making behavior being observed. This level of analysis facilitates: 1) recognizing that behaviors are often judged ethical by the behaving party as they operate at their particular requisite variety capacity, and 2) having higher requisite variety people accept the mantle of responsibility of managing social progress by first understanding and then expanding the world perceptions of others.

Humankind must develop and nurture *perspective* relative to ethical decision-making. An absence of “an absence of grace” is also needed. Our behaviors must exclude “over design” that is disrespectful or neglectful of others.

Epilogue

The paper closes by using the five-level requisite variety model to address humankind’s increasing levels of understanding and control of the component of nature we call “DNA”:

1. I am. We are.
2. Life (and all of its unsolved mysteries) is wondrous
3. Life comes from cells made up of genes transporting DNA. DNA can be identified and decoded.
4. Life can be enhanced with DNA and genetic manipulations. Crops can be enhanced. Cloning is possible. Disease detection is enhanced. Cells can be harvested for research and for medical applications such as gene therapy. Limb regeneration becomes an identifiable dream.
5. The ideal result occurs? What is the eventual set of outcomes?

Level Five is a work in progress. As humankind continues to function at level Four, the distinction between humankind and nature itself is becoming blurred. As mastery of Level Five approaches, we do not know where this story will go. Nonetheless, we do know that humankind, in order to harvest the benefits of DNA manipulation, will need to make a series of significant unprecedented decisions. Let us hope that those decisions are steered by ethical guidelines, and that the decision makers have the requisite variety needed to encompass the challenge.

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