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Reviewing the Feasibility of Formulating Mazlow requirments priorities

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Preface and Abstract

One of the ever increasing wishes of researches, is to delve quantitatively into ontology through social and natural relations. It is evident that the use of quantitative tools shall help us with correct and appropriate decision making. Thus the importance of mathematical formulating (whatever is observed or understood) is clear to everyone.

Perhaps, one of the original and fundamental theories diagnosing the motivation and behavior which brought marvels in different sciences, is the motivation theory of Abraham Mazlow. Although, this theory does not give a complete answer to the definition of individual's behavioral situation against his

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motivation, it helps a lot to recognize and understand the behavior and its relationship with motivators. Therefore, in this paper, attempts have been made to review this theory in a formulated framework, to allow achievement of the motivational situation of each individual and prediction of his behavior in future through analyzing some digits and numbers which have originated from some questions and answers.

It is noteworthy that this formula can respond only in respect of what are called requirements priorities. Though it has some difficulties, it can be used as a basis for further research. Thus any comments on suggestions by honorable professors and students will be highly appreciated, and I hope this paper will be helpful.

Abraham Mazlow innovated a kind of psychology which deals with the highest ideals and potential aptitudes of human beings. He was born in 1908 in Brooklyn, U.S.A. and in 1934 he got his Ph.D. from the Wisconsin University, and after some years of hard working in the social and university areas, he compiled his most famous book, entitted "Motivation and Personality" , in 1954. In this book he has suggested the most important theory of the classification of human needs. Unlike Freud and other theorists of human personality who had studied neurosis, Mazlow chose the healthiest samples of personality to do his research. From Mazlow's point of view, studying the distressed and the forlorn is only identification of man's morbid aspects, so it can not be used as a criterion to measure human mentality, and personality.

Although, Mazlow does not ignore the role of the society and the dominant relationships in forming the personality of human being, by studying the healthy personalities he came to this encouraging point that human being is not condemned to be affected by the abnormal situation of the society or by the regretful experiences of his past, and can activate his internal and potential aptitudes, and live in peace with his world freely and soundly. According to Mazlow, although we still have to be cautions of approving a benevolent attitude in human nature, we should also definitely reject this disappointing idea that says:"the nature of human is essentially satanic and corrupt".

He considers the atomized thought a kind of mild mental disorder and/or at least a sort of immature cognitive symptoms. Because to him, totalism is known as an obvious reality and he believes that the existing world enjoys unity and interrelationship which applies to every society and every individual as well. But the totalism in self - actualizing individuals and in those who are in a healthier mental condition, will be manifested automatically, but this is very difficult for the immature and undeveloped individuals.

In dealing with the man's needs, in fact we talk about the essence of the existence. So his essence cannot be examined in a limited dimension and requires examining of his general situation in his social environment. An individual is a conerent totality and this has a specific sense in motivation theory. Because the totality of an individual is motivated, not just a part of him.

The unique character of man's organism is that when a special need overpowers him, all the philosophy about his future will undergo some changes. For examlpe: a person who is suffering from hunger, the utopia is where he can find lots of food, and thus love and freedom, social feelings, respect, and philosophy may seem some sort of invalid expression, which has to be put aside.

Of course, the satisfaction is also, as much as deprivation, a factor of motivation because it releases the organism from a satisfied need and directs it toward a superior objective.

Therefore, this satisfied need denies its existence as a determining factor of behavior. Those individuals who have always been satisfied with certain kinds of needs, are more prepared to tolerate being prevented from satisfying those needs in future, compared with those who have always been deprived.

Thus, in case of satisfaction with any one of those needs such as, physiological, security, love, belonging, respect,[1] self - fulfillment, knowledge acceptability and aesthetic, the next need will become the factor of motivation respectively.

The physiological needs include food, water, sexual desire, sleep, appropriate air and temperature. The need for safety is the need for security, stability, dependence, protection, freedom from fear and worry, as well as need for order, rules and limitations.

1- Superficial exoteric knowledge, scientific knowledge, philosophical (esoteric) knowledge theorogical knowledge.

When the need for love and belonging is motivated, the individual will extremely feel the absence of his friends, the beloved, spouse and children. Satisfying the need for reverence refers to the feelings such as self- confidence, value, power, merit, competence, and effectiveness. Ignoring these needs will lead to some kinds of feelings like inferiority, weakness, and helplessness.

The need toward self-fulfillment can be interpreted as the tendency towards gradual formation of whatever is required for a person's idiosyncracy and becoming whatever an individual deserves to be. The need to know the life and the environment is in the direction of knowledge and acquisition and tenetizing the world of existence, which is motivated to achieve the basic security in life and eliminate any kind of fear and ambiguity.

The real need for aesthetics essentially exists in some people. These people will get sick by seeing ugliness. And they will feel fine if they observe beauty, and their active desire is only satisfied by beauty. This case can be seen, almost in all of the healty children, and it has continued in every culture and in every age from time immemorial.

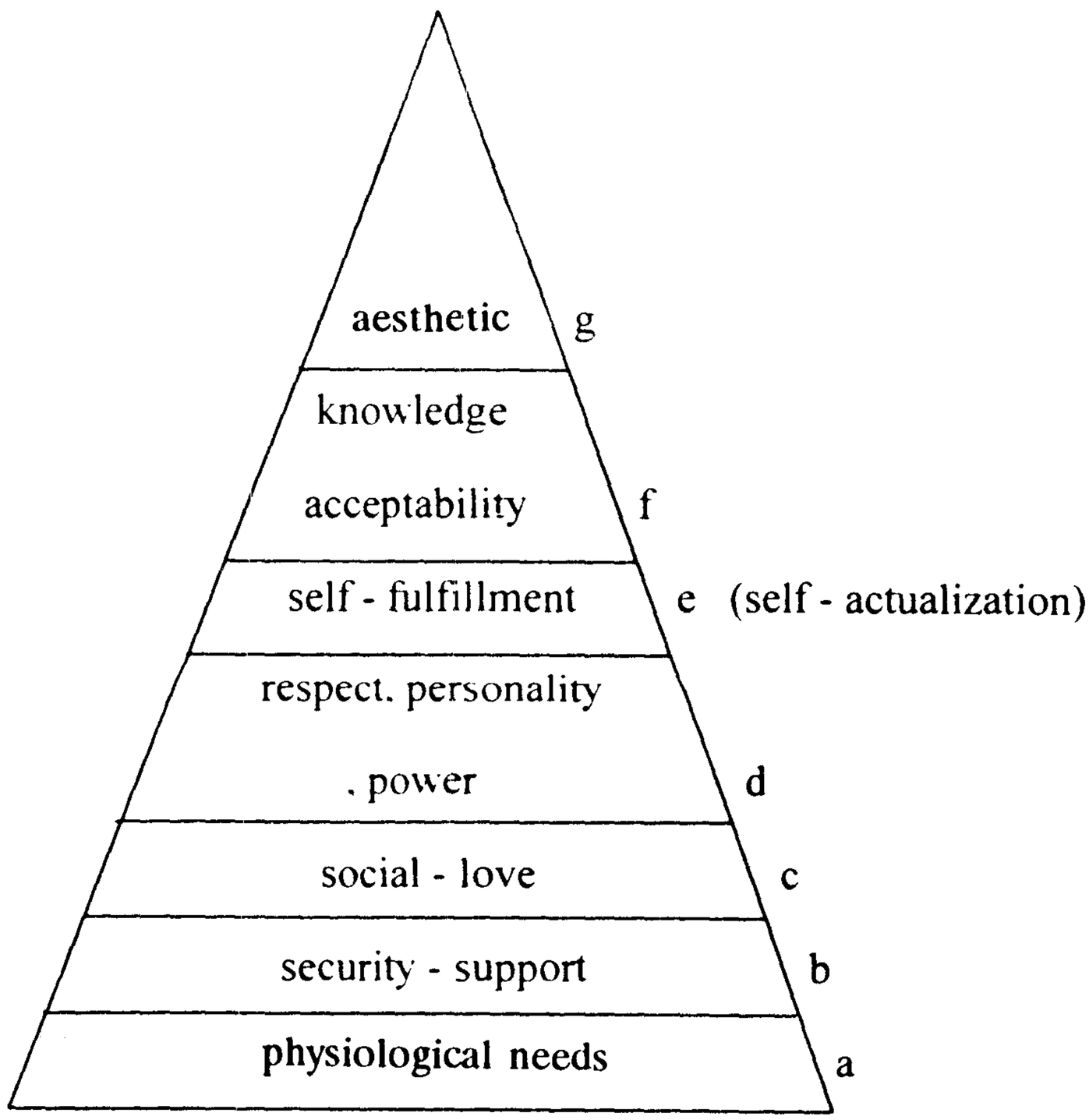
According to Mazlow, there are some essential and direct requirements necessary to satisfy the main need. Such as freedom of speech, freedom to do whatever a person desires but is not harmful to other people, freedom of investigation and research to obtain information, freedom of self defense, and expectation of justice, equity truthfulness, and order.

In the absence of such requirements, satisfying the primitive needs will be impossible. Or at least, it will face a very serious danger. By expressing the requirements priorites one should not infer that by satisfying each requirement (need), the next need will determine the human behavior.

However, there are many determining factors, other than personal requirements and desires. And perhaps the most exceptional ones are martyrdom, self-sacrifice and achievement of sublime human values. There are also individuals who sacrifice everything for a certain goal and value.

In such cases, one can suggest this assumption that, the individuals, whose requirements (needs) have been satisfied throughout their lives, specially during the first years, have gained an exceptional power to tolerate the present or future deprivation of these requirements. And this is just because they have gained a healthy and strong personality structure due to the satisfaction of those basic requirements (needs). Another doubt that may arise is to assume that all the requirements be in a situation that the next requirement (need) emerges only when the previous one is completely (100%) satisfied. However, as we approach the higher levels in the requirement priority, the percentage of satisfaction will reduce. It can be said that for a normal citizen there might be 85% for physiological needs, 70% for security needs, 50% for emotional needs, 40% for reverence and respect needs, and 10% for self-fulfillment. About the meaning of an emerging

requirement (need), after a dominant one is satisfied, it should be mentioned that this phenomenon is not an instantaneous and sudden one, however; it is a phenomenon that has gradually emerged, and this fact will manifest itself for all the individuals in all aspects of life in one way or another.



Mazlow's Hierarchy of Needs

According to Mazlow, the lower levels, in case of lack of satisfaction will affect much more than the upper levels (on the individual behavior). In case of lack of satisfaction of the requirement, the individual's behavior changes and the next levels

will work. The effect of the requirement on the individual can be changed through education.

The general formula of Mazlow's behavior function will be discussed here:

Behavior function

$$z=\left(\frac{1}{y(a+\varepsilon_a)}-0.1\right)^7+\left(\frac{1}{y(b+\varepsilon_b)}-0.3\right)^6+\left(\frac{1}{y(c+\varepsilon_c)}-0.5\right)^5+\left(\frac{1}{y(d+\varepsilon_d)}-0/8\right)^4+$$

$$\left(\frac{1}{y(e+\varepsilon_e)}-1\right)^3+\left(\frac{1}{y(f+\varepsilon_f)}-1\right)^2+\left(\frac{1}{y(g+\varepsilon_g)}-1\right)^1$$

$$\forall \quad x \in R^+, \; y(x) = \begin{cases} 1 & x>1 \\ x & x\leq 1 \end{cases}$$

Where:

a, b, c, d, e, f, and g are the variables that refer to each class of Mazlow's requirment priorities, such as: physiological, security, social, self-fulfillment, acceptability of knowlege, and finally aesthetic. The range of their variations is between O to one.

Zero is for complete lack of satisfaction, and one is for complete satisfaction of each series of level (variable). Ei, for I= a,b, ... G, are fixed values that get a fixed amount, according to the nature of the individual, and can be determined through cognitive psychology or analysis of special questionnaires predicting the type of motivating factor of the person. This function is a general function of the behavior that defines the entire behavior of an individual, according to the degree of satisfaction of his physiological , ... and aesthetic requirements (needs). The power on each parenthesis shows the intensity of the

requirement and for each of the seven classes of Mazlow requirements the intensity is shown with this power. For example, the first class (level) of the physiological requirements has got the highest power (7), and the rest of the requirements have got a certain power accordingly .....

In this formula, the first four parentheses will never equal zero. Because there is a fixed number in each parenthesis (0.1, 0.3, 0.5, 0.8) and in case of satisfaction of each level of requirement, the amount of the function $(\frac{1}{Y(i+\varepsilon_i)})$ for I= a, b, c, d will get their least amount, that is 1, (because if a=1, then we will have y(a+Ea)=1, ...). And thus, for the first and fourth levels of Mazlow priority, we will have:(0.9)7(0.7)6,(0.5)5 , and (0.8)4. It can be justified that, these are instinctive requirements, and will never equal zero. They always exist, though with some rarity in many people. By contrast, the requirements of levels 5, 6, and 7 may be equal to zero because these requirements may not exist in some individuals. At this juncture we want to have some discussions about the dynamic and static systems in the footnote.[1]

1-In discussing the systems, we also talk about them as being either static or dynamic. Static refers to constant systems, while dynamic discusses changing system. But any complicated system tries to live and coordinate itself with the changes that occur in its environment and thus gradually develop itself. Otherwise, the outside world's pressures and encroachments will force it to run the risk of complete destruction and disorder. A system must have the two characteristics of "dynamism" and "constancy" in order to

When the index Ei in the said formula is equal 1, then the function y(I+Ei) gets 1, and in this case some of the behavioral variables in the function will be zero, and less important. By contrast, when this index (Ei) is assumed to be zero, then we have attached great importance, or much higher importance to the behavioral variables in the function. Of course this case dependds on the value we have chosen for I, (I= a, b, c, ... g).

The above function can be approximated as the following function, about which we continue our discussion and analysis:

(1) $$z=(\frac{1}{x}-1)^7+(\frac{1}{y}-1)^6+(\frac{1}{w}-1)^5+(\frac{1}{v}-1)^4+(\frac{1}{s}-1)^3+(\frac{1}{t}-1)^2+(\frac{1}{u}-1)^1$$

For : $<x<1$, $0<x<1$, $0<y<1$,... , $0<u<1$

Although these two characteristics are contradictory, their concurrent existence, shows that the structures and behaviors of an open system, while renewing its components continuously, remain constant and unchanged. The subject of static and dynamic mathematics on the state-determined systems shown by the differential equations is as follows:

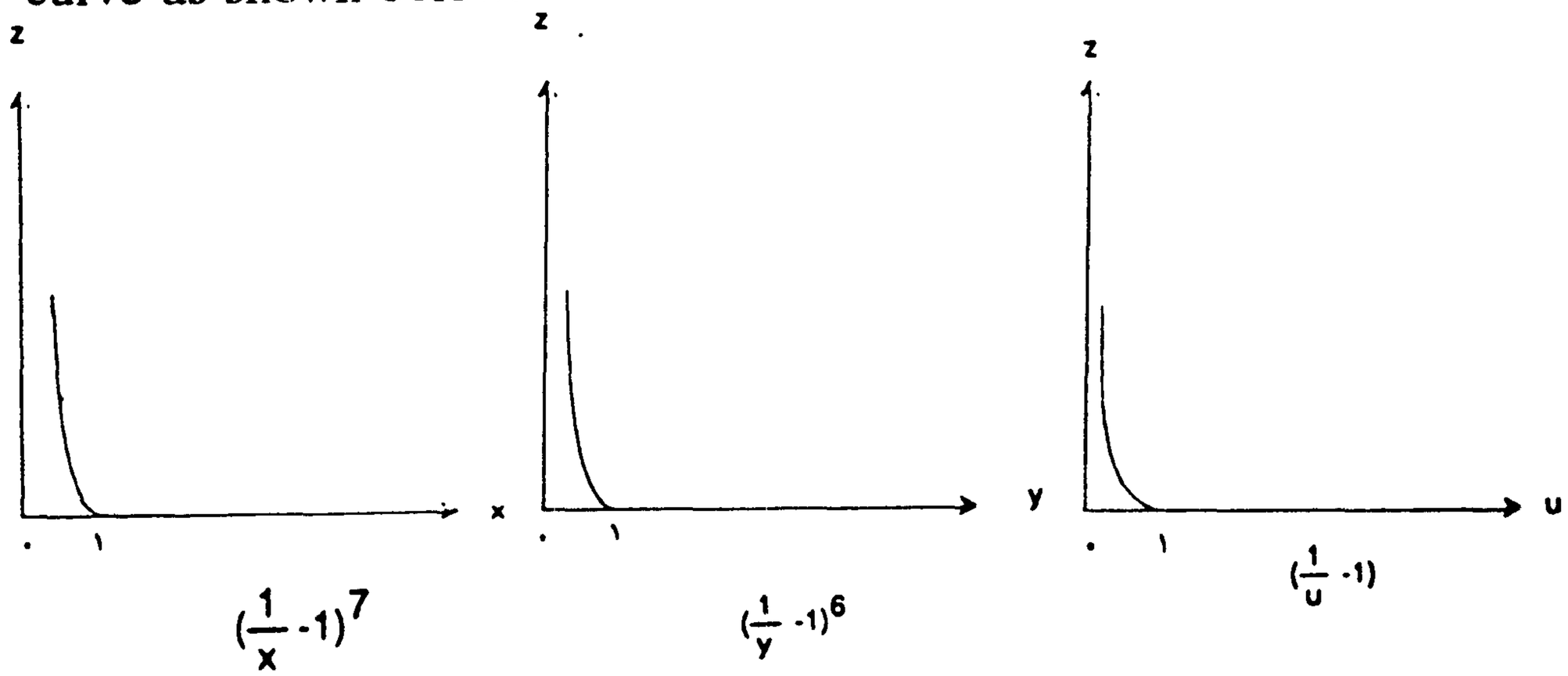
$$\frac{dx_1}{dt}=f_1(x_1,\ldots,x_n)$$
$$\vdots \quad \vdots$$
$$\frac{dx_n}{dt}=f_n(x_1,\ldots x_n)$$

The above functions are value functions, when F1..... Fn functions are all zero. If the variables do not change with time, the system is constant (fixed), but when at least one of the variables changes with time , then it is called a dynamic system.

In behavioral science and in our subject, the instinct can be attributed to static systems and the ingenuity to dynamic systems. The **ingenuity** in behavior leads to selection. For example, consider the honey bees, from the beginning of their creation.

Z is a descending function, so, by adding any amount to x, y, or .... , u, the amount of Z will be reduced. In this formula $(\frac{1}{x} -1)^7$ with the highest power belongs to physiological requirements, $(\frac{1}{y} -1)^6$ to security , ... and $(\frac{1}{u} -1)$ with the lowest power is for aesthetic requirements.

Each of these requirements and their related formula, have a curve. For example the physiological requirements (needs) have a curve as shown below:



Physiological needs security needs aesthetic needs

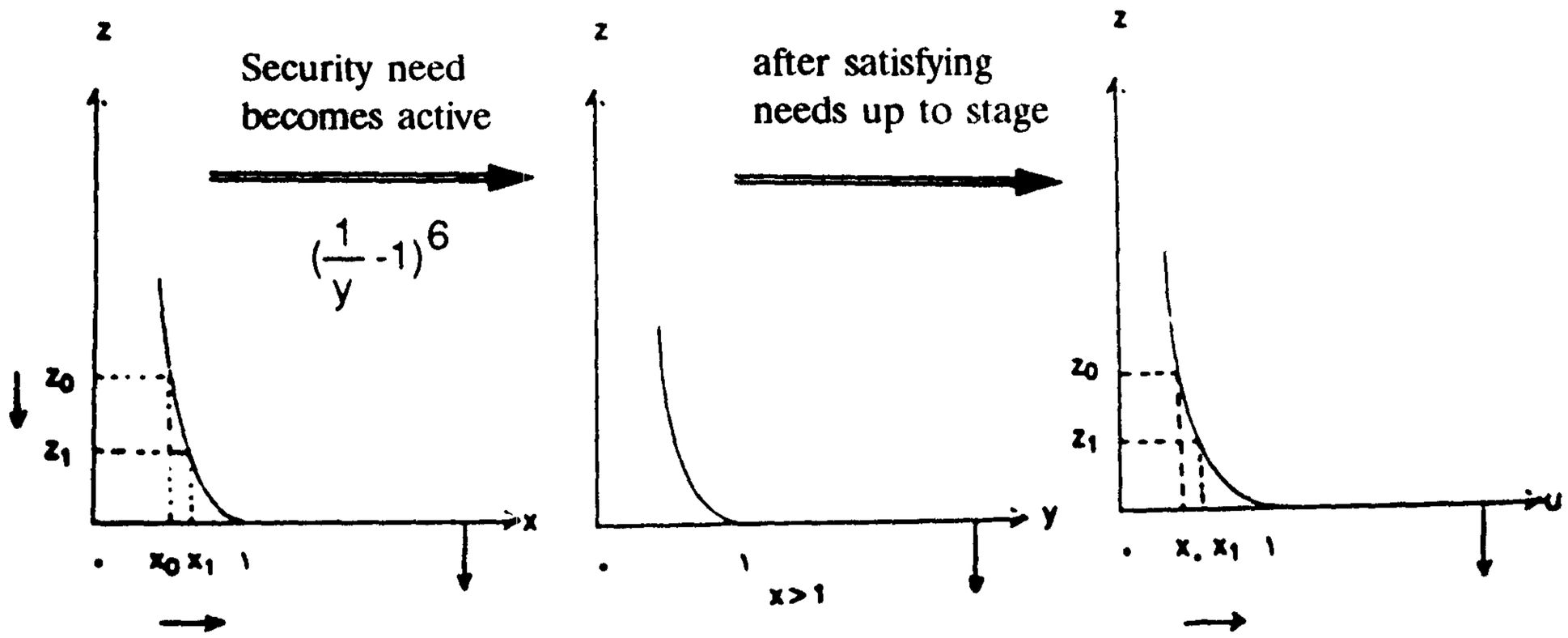
They build their hive in a hexagonal shape, and this cycle will continue up to the end of the world. This is an instinctive act, which is in the nature of honeybees, and will never change (a constant system).

But the same honeybees make choices among two flowers, and prefer one of them to the other one, to make honey. Then it can be said that the ingenuity has led to selection (a dynamic system). In this respect the holy Qoran says.

... And Lord inspired the bees to make their hives on high mountains, trees and ceilings and then feed on sweet fruits feed and sweet smelling nectar of the flowers, and follow the path of the God, and then they will produce a sweet sherbet that is sanative to the people.

Two important points should be noted here: first the behavioral function Z (formula 1) is arranged using 7 variables (x, y, ... u) . Each class (level) of Mazlow priorities acts independently , and it is assumed that the requirements do not affect each other. Second if we have a close look at the slope of each of these diagrams we will find out that for the amounts of $1>x>0$, ... $1>u>0$, the slope of the curve in function $(\frac{1}{x} -1)^7$ compared with the same points on the curve of $(\frac{1}{y} -1)^6$ is steeper, and the slope of $(\frac{1}{y} -1)^6 -1$ is steeper than $(\frac{1}{w} -1)^5$, and so on , ...

We continue our discussion in two ways: if we assume that every individual's requirements are satisfied and go to higher levels according to Mazlow's theory, the behavior of the individual at first follows the $(\frac{1}{x} -1)^7$ function. When the limit of this function tends to zero (when $x \rightarrow 1$, then $\frac{1}{x} -1 \rightarrow 0$), the $(\frac{1}{y} -1)^6$ function becomes active, and when it is adequately satisfied, the limit of the function tends to zero, and the function $(\frac{1}{w} -1)^5$ will become active. And similarly, when every requirement is satisfied, we will have the behavioral function $(\frac{1}{u} -1)$ on the highest level of Mazlow's pyramid. The final limit of behavioral function (Z) , is a numeric amount that is close to zero. And it is the time when all the requirements have been satisfied, and if we draw the above observations as diagrams, they will be as follows:



Final satisfaction of physiological need

for x>1

final satisfaction of of security need

for y>1

Final satisfaction of all needs as well as aesthetic

for u>1

Notice that in every one of the above curves, the slope of the curve for the amounts less than one in each step will reduce. And this is the same meaning of the reduction of intensity of requirements relative to the lower levels.

Another way is to assume that after a certain percent of each level has been satisfied, we go to the next level. In such a case, theoretically , we can attribute the percentage of increase or decrease of Z (behavioral function), with different proportions, to each one of the priorities. For example, a change in behavior that amounts to z, can be considered a μ percent change only in physiological needs or β percent change in security needs, and so on.

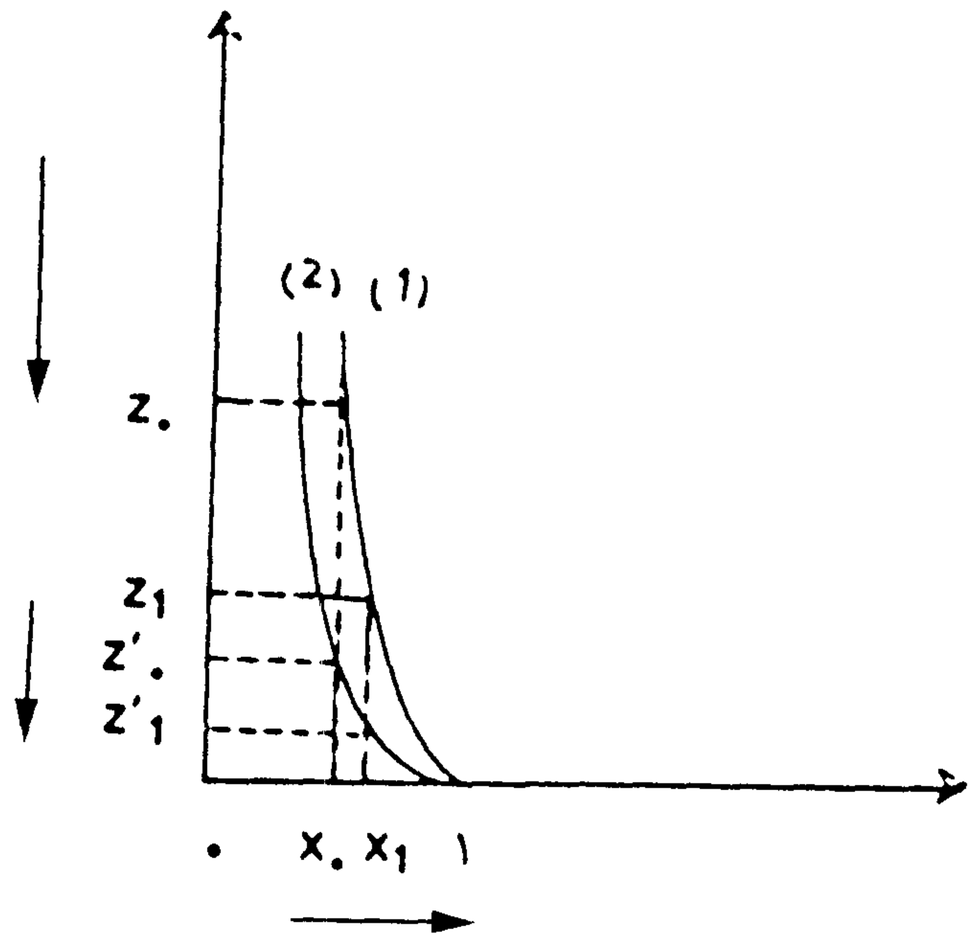
Thus, in order to produce a Z amount of change in an individual's behavior, we may be able to invest as much as μ

percent in his physiological need, or invest as much as β percent in his security need, and so on.

It is obvious that the percentage of μ is less than β and β is less than φ and φ is less than ....

In other words, a change in the amount of Z (Δ Z), can be attributed to one percent of physiological needs, one percent of security needs, and ..... and this proportion can be guessed. Please pay attention to the two following examples.

Example: Assume that the general behavioral function of an individual is like curve No. 1 and we are only considering the physiological and security requirements now. And also imagine that the physiological need function of the individual is in the form of curve No. 2.



If we have once obtained Z0 for the individual behavior from the behavioral function, in another time, due to satisfaction of one of the requirements (for example, security need), as much as (Dx

= xl - xo) percent, the new amount of $Z'_0 - Z'_1$ will be obtained. If we draw this amount of percentage on the curve No. 2 the amount of $(Z'_1 - Z'_0)$ is obtained. That is, we consider the change in behavior due to the change in requirement, (physiological need, for example) and as much as $Z_0 - Z_1$.

Example, (about an infant): for an infant, only physiological needs affect the individual's behavior, that is, crying when being hungry or feeling a pain, or smiling when being full and comfortable. Thus the fixed amounts are as follows:

$$\begin{cases} E_b = E_c = E_d = E_e = E_f = E_g = 1 \\ E_a = O \end{cases} \longrightarrow z = \left(\frac{1}{a} - 0.1\right)^7 + (0.7)^6 + (0.5)^5 + (0.2)^4$$

$$z = \left(\frac{1}{a} - 0.1\right)^7 + \underbrace{0.11 + 0.03 + 1.6 \times 10^{-3}}_{\text{can be omitted}}$$

a = 1 complete satisfaction of requirement

$z = (0.9)^7 + (0.11) = 0.48 + 0.11 >> 0.6$

$Z \leq 0.6$ no special action takes place. The infant is either asleep or is soundly looking around.

a = 0 Non-satisfaction of requirement $Z = \infty$ death and the end of life, since there is no uncontrollable and life behavior.

a = 0.9 90% of requirements are satisfied

Z= 1.19 the baby is grumbling softly

a = 0.8 80% of requirements are satisfied

Z = 2.77 the baby is restless and expresses his hunger by crying,

Z>2.5 restlessness and behavior due to unsatisfied requirement.

a = 0.5 50% of the requirements are satisfied

Z = 89.49 the baby is stifled and completely restless.

Example: (Youngster), for a youngster the physiological requirements are not important anymore, the social and security requirements become much more important than the other classes (levels) of priorities. Ei (for I = a, ..., g) should be determined for each individual and each level. A youngster does not show noticeable changes due to shortage of food, but if he is not respected, he will revolt strongly. And in the case of security he considers himself as a brave and strong person, which is due to the demands of his age.

$$\Rightarrow \left| \begin{array}{l} E_d = E_e = E_f = E_g = 1 \\ E_a = 0.3 \ * E_b = 0.2 * E_c = 0.7 \end{array} \right.$$

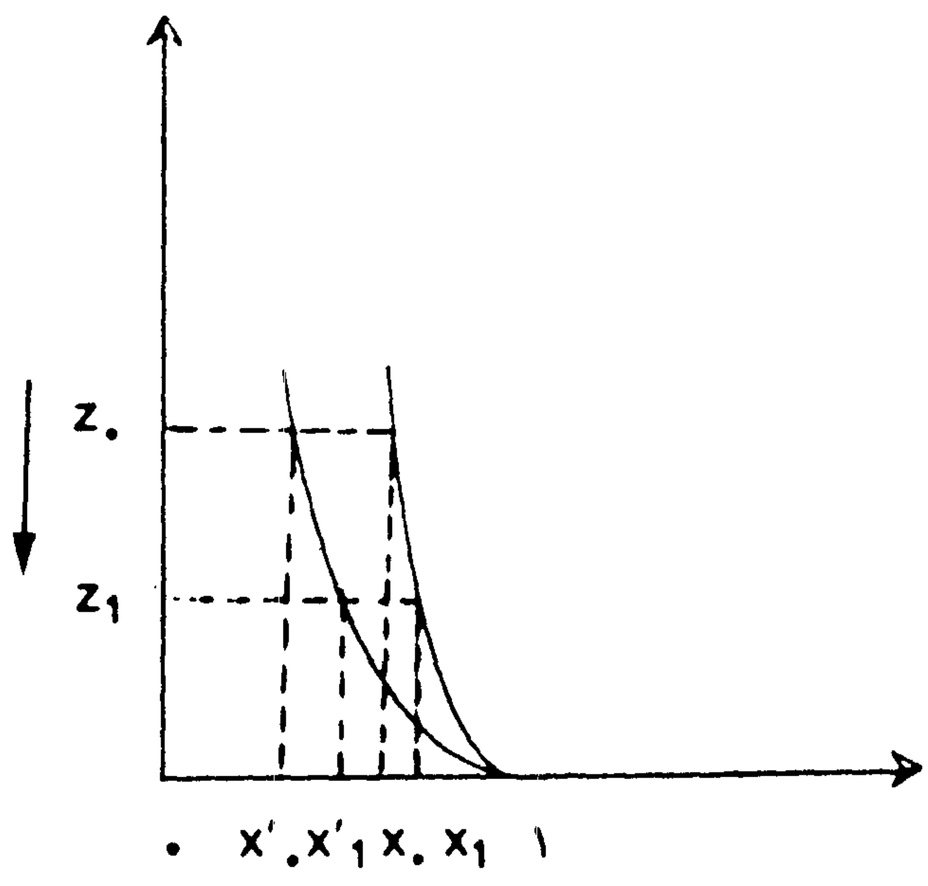
$$z=\left(\frac{1}{y(a+0.3)}-0.1\right)^7+\left(\frac{1}{y(b+0.2)}-0.3\right)^6+\left(\frac{1}{y(c+0.7)}-0.5\right)^5$$

This formula shows that when a = 0, that is complete non-satisfaction of physical requirement, then we will have Z = 3694, which in fact means that behavior will be affected only by physiological requirements.

The other requirements can also be analyzed in this way. (in this example X_0 changed to X_1 and the changes of Z were also shown).

Example 2, (opposite the above example), if we assume that there is a DZ amount of change in the behavior then we will see what the reflection of X will be. Z0 that changes to Z_1 , any X'_0 will change to X'_1 . And this is the same β percentage that we

referred to earlier (for security requirements, for example). Now if we assume that this change in Z (Z0 .... Z1) belongs to one of the lower levels (classes) of requirements, then its X0 will change to X1, and this is the same above mentioned μ percentage ($\beta > \alpha$).



Obviously, in near future, some new patterns, having been continuously investigated for more than four years, will be suggested about the motivation and motivational theories that have been worked out in the third world. Also a pattern about Erosmatic[1], particular power (leadership) on the basis of love and kindness will be offered.

1- In fact Erosatic is corret; and M is added because this stage occurs after charisma: Erosmatic which has four stages: 1- crying, 2 - sharing, 3 - respect, 4- responsibility, creats a dynamic system interactively between main power (leadership) and the individual (individuals) who obeys the power.

System analysis

In this method, measuring and identifying of the changes are considered, when we may be able to measure the changes by an index. For example, the knowledge of an individual can be measured through some tests, We can display the changes by using the variables.

Thus it can be said that it is a method of making undesirable changes into desirable ones:

1- Why does a change occur?

2- How do we omit or correct the changes?

3- The sets of changes are not always desirable,

For example: in economics, increase of unemployment and inflation are not desirable and must be decreased.

4- Being desirable or undesirable (value system) is different in the view of some certain groups and individuals.

5- To analyze the systems, we have to use models.

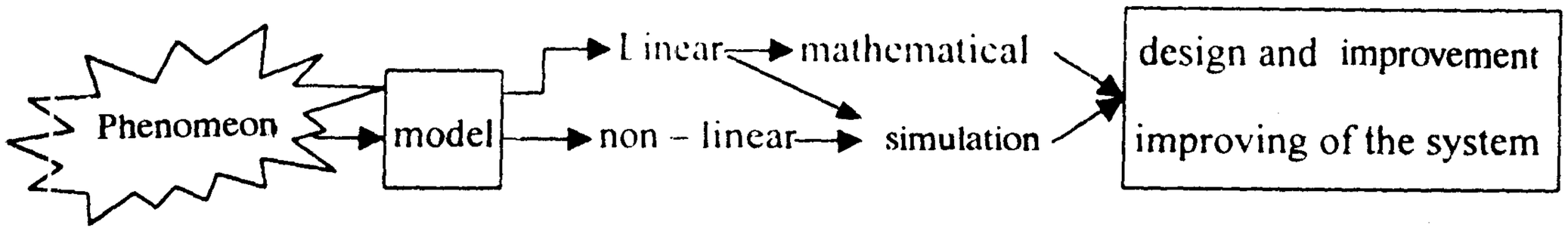
Making models in systems

A model is a picture or imitaion of the facts of the outside world in human mind, or it can be said that the model of a phenomenon is an imitation of the real phenomenon. And decision on the basis of the model is made abstractly.

Mathematical Model

In this model the factors and the relationships between the

model are shown by mathematical signs and symbols.



1- systematic view

2- Theory of the system structure

3- Modeling

According to the algorithmic shape seen in the figure, we can design a mathematical model.

Making a system by mathematical equation

1- State changes $x_1^{(t)}, x_2^{(t)}, x_3^{(t)}, ..., x_n^{(t)}$

2- Changes in increase rate $RI_1, RI_2, RI_3, ... , RI_n$

If they cause a decrease in Xj, then they are considered as decrease rate.

$RI_n, RI_{n-1}, RI_{n-2}, RI_{n-3}, ... , RI_{n-k}$

As a result, the following system of equation is achieved.

$$) x_j(t) = x_j(t_0) , x_j(t) = x_j(t_0) + \int_{to}^{t} [RI_j(t) - RD_j(t)]\, dt$$

Where: Xj (to) is the initial state of the state variable.

$$\int_{to}^{t} [RI_j(t) - RD_j(t)]dt$$

input and output from the change of state are from the (to) moment to (t) moment.

The rate variables are functions of state changes, thus:

$$R_{ij}(t) = f_j(x_1^{(t)}, x_2^{(t)}, ..., x_n^{(t)})$$

$$R_{Dj}(t) = (x_1^{(t)}, x_2^{(t)}, ..., x_n^{(t)})$$

$$x_j(t) = x_j(t_0) + \int_{to}^{t} [f_j(x_1,x_2,\ldots,x_n) - g_j(x_1,\ldots x_j,\ldots x_n)]\, dt$$

upon derivation from both sides, we will obtain:

$$\frac{dx_j}{dt} = f_j\,(x_1, x_2,\ldots, x_j,\ldots, x_n\,) - g_j\,(x_1,\ldots,x_j,\ldots,x_n) - g_j\,(x_1,\ldots,x_j,\ldots,x_n)\ j= 1, 2, \ldots ,n$$

Considering the systems as dynamic and static:

$$y = f(x)$$

$$y=f(x_1\,, x_2\,,\ldots x_n)$$

$$\frac{dx_1}{dt} = f_1\,(x_1, x_2, \ldots, x_n)$$

$$\frac{dx_n}{dt} = f_n(x_1\,,\ldots, x_n) \qquad 0 < x < 1\,,\ 0 < y < 1\,,\ \ldots\,,\ 0 < u < 1$$

1) $$z = (\frac{1}{x} - 1)^7 + (\frac{1}{y} - 1)^6 + (\frac{1}{w} - 1)^5 + (\frac{1}{v} - 1)^4 + (\frac{1}{s} - 1)^3 + (\frac{1}{t} - 1)^2 + (\frac{1}{u} - 1)^1$$

Z in a descending set, that is, by increasing in each amount of (x or y ... or v) the amount of Z decreases, and $(\frac{1}{x} -1)^7$ with the highest power belongs to physiological requirements and $(\frac{1}{x} -1)^6$ is for security requirements, and .....

$(\frac{1}{u} -1)$ is for aesthetic requirements has the lowest power.

According to Mazlow behavior function, the formula is as follows:

$$z = (\frac{1}{y\,(\alpha + E\alpha)} - 0/1)^7 + (\frac{1}{y\,(b + Eb)} - 0/3)^6 + (\frac{1}{y\,(c + Ec)} - 0/5)^5$$

$$+ (\frac{1}{y\,(d + Ed)} - 0/4)^4 + (\frac{1}{y\,(e + Ee)} - 1)^3 + (\frac{1}{y\,(f + Eg)} - 1)^2 + (\frac{1}{y\,(g + Eg)} - 1)^1$$

$$\forall\ XER\ y(x) = \begin{cases} 1 & x>1 \\ x & x\le 1 \end{cases}$$

In this formula the first four formulas never equal zero, because there is a fixed number in each parenthesis.

$$\left\{\begin{array}{l} y(\alpha + E\alpha) = 1 \\ \\ \dfrac{1}{y\,(i + E_i)} = 1 \end{array}\right\}$$

Because (0.1, 0.8, 0.5, 0.3)

In Fact 0.9

That is:

- Instinct requirements never cqual zero.
- On the other hand, the last three parentheses become zero.

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