

# On the Need to have an Additional Methodology for the Psychological Product Measurement and Evaluation

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**Abstract**—Cognitive Science appeared about 40 years ago, subsequent to the challenge of the Artificial Intelligence, as common territory for several scientific disciplines such as: IT, mathematics, psychology, neurology, philosophy, sociology, and linguistics. The new born science was justified by the complexity of the problems related to the human knowledge on one hand, and on the other by the fact that none of the above mentioned sciences could explain alone the mental phenomena. Based on the data supplied by the experimental sciences such as psychology or neurology, models of the human mind operation are built in the cognition science. These models are implemented in computer programs and/or electronic circuits (specific to the artificial intelligence) – cognitive systems – whose competences and performances are compared to the human ones, leading to the psychology and neurology data reinterpretation, respectively to the construction of new models. During these processes if psychology provides the experimental basis, philosophy and mathematics provides the abstraction level utterly necessary for the intermission of the mentioned sciences.

The ongoing general problematic of the cognitive approach provides two important types of approach: the computational one, starting from the idea that the mental phenomenon can be reduced to 1 and 0 type calculus operations, and the connection one that considers the thinking products as being a result of the interaction between all the composing (included) systems. In the field of psychology measurements in the computational register use classical inquiries and psychometrical tests, generally based on calculus methods. Deeming things from both sides that are representing the cognitive science, we can notice a gap in psychological product measurement possibilities, regarded from the connectionist perspective, that requires the unitary understanding of the quality – quantity whole. In such approach measurement by calculus proves to be inefficient. Our researches, deployed for longer than 20 years, lead to the conclusion that measuring by forms properly fits to the connectionism laws and principles.

**Keywords**—complementary methodology, connection approach, networks without scaling, quantum psychology.

## I. INTRODUCTION

**S**PECIALISTS in the human psychic research field talk about a crisis of psychology as science. They explicitly or implicitly place the cause of this crisis in the field of

measuring the psychic product system, particularly the psychological product. Generally, at high levels of promoting the psychological speech, the phrase of *inexact or non-canonic (atypical) science* is assigned to psychology. But the phrase triggers two questions: how much science should be included in the psychological product evaluation/interpretation so that the implementation/use of the results regarding this evaluation guarantees the social order? How much inaccuracy is allowed for the imperfection margin not to be the cause of a social disorder?

There are two questions to which the phrase *inexact science* has not found yet a satisfactory answer. Within the European Congress from Dublin (1997, which was held under the motto: *Dancing on the edge* – suggesting the idea of uncertainty proper to the contemporary social time), as well as in the volume *A century of psychology* (London, 1997), [11] Ype Poortinga, in the article *Brown, Lorenz, Heisenberg – forerunners of the 21<sup>st</sup> century psychology?* [pp.5-12], by invoking the three names, suggesting a complementary scientific method for measuring the psychological product, a method specific to a new measurement paradigm which is just to get shape, complementary to the classical statistics.

Statistics is probably one of the greatest achievements of mathematics, and its use as an instrument for measuring the psychological product, addressing this issue from the perspective of psychology history, is justified. This happens at a time when the mathematics of the quantitative aspect, positivism and Newtonian pattern of the universe recorded a significant success and recognition. It is true that at the time, the theory of dynamic systems and the understanding of the human psychic as dynamic system were at their early age. It was, therefore, much before Ilya Prigogine [23] (Nobel, 1972) formulated his theory of systems with dissipative structures (that type of systems having a permanent change of energy, substance and information with the environment) which were to make known in science the concept of open system far from equilibrium, assigned inclusively to the individual and to society. Behaviorism, the school refusing the approach to and the knowledge of the human consciousness, and which was very in fashion at the time, has been an appropriate support for the principles of positivism and classical statistics. Statistics enables, however, only the measurement of the 2<sup>nd</sup> degree movement, a surface and linear movement between a number of points making up a series. What is actually important for understanding the evolution of a psychological event is the non-linear movement, the 1<sup>st</sup> degree movement occurring within each individual point and which may offer the *surprise*,

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the occurrence of the singular event, that event which may break the series, anywhere, anytime, anyhow (according to Heisenberg non-determination principle).

This movement, also understood by its spatial and temporal dimensions, namely by the *a priori* forms of the human sensitivity (Kant), as well as by the phenomenological nature of the event, cannot be seen, in our opinion, but by the help of methods for the measurement inspired from morphogenetic sciences (disaster theory, fractal theory, attractor theory, chaos theory), all based on the generalized quantum theory postulating the uncertainty as starting premises for the investigation regarding the evolution of an event. We will make a first remark here: if, in case of classical measurement, the knowledge of man is achieved starting from certainty towards uncertainty, the new paradigm, a complementary one, addresses the knowledge of the individual the other way round: from uncertainty to certainty.

Sciences have recorded a significant progress. Special mathematics, morphogenetic theories, quantum theory, modal logics, fuzzy logics, represent as many challenges for the classical statistics. Life itself has proven that this discovery for the human mind has, as it is natural, a limited applicability. Genetics and neurobiology, especially after the discovery of the double DNA structure (Watson and Crick, 1953), but also of the double structure of the cerebral sphere (R. Sperry, Nobel 1981) have increasingly shown, from the scientific point of view, the dual nature of the human being. A duality which, by understanding the relation between the two components (subsystems) as interaction and as interchangeability, has shown an essential truth regarding the psychological action (broadly speaking). Existence is actually co-existence. Good co-exists with evil, truth with lie, love with hatred.

This specific nature of the human psychic gives rise to other questions, referring to the issue of measuring the psychological product. For instance, which is the way of coexisting for the two subsystems during the processing of a reply, before the individual replies? It is the relation between them, one of succession or simultaneity? Is it, therefore, of the OR-OR type or of the AND-AND type? According to the Newtonian-Cartesian model, the measurement should start from the OR-OR premises, being supported by the formal logic of Stagiritus, particularly by the excluded third party principle. It is the model approaching the knowledge of the mind and cognitive psychology, on the basis of the computational model, model reaching its scientific peak in Kosllyn's wording, and then in Alain Turing's one (universal Turing-Church machine) and, with the subtle nuances brought from biology, of Daniel C. Dennet. [apud 10]

But the computational model is of the YES or NO, 1 or 0 type. It is a model which is very well suited for the classical statistics, however being far from solving in a satisfactory manner the big problem of the model in which it is the brain which processes the information. There are more and more proofs showing that, within the psychic context, the way of co-existing of the two subsystems is of the AND-AND type, being subject to the included third party logic (the dynamic logic of the contradictory, the Boolean logic, plurivalent logics, fuzzy logics, non-linear dynamics logic etc.). That

before a reply to a stimulus from the outside reality, good and evil, truth and lie, love and hatred are in an equiprobability relation, thus creating the state of option, the manifestation of one reply or another being a sort of necessary happening, controlled by an undetermined number of factors. Here frequentality, fundamental concept and instrument of the classical statistics, is irrelevant. Beyond the fact that this concept, judged in itself and as formulated by mathematicians, has no correspondent in the brain neurobiological reality (it is, however, about psychology and not about mathematics), the frequency for the occurrence of a reply in a series indicating a tendency at time  $t$ , is not a driving force for the manifestation in the  $t+1$  moment, as it is much more conditioned by the system of reasons, interests, states etc., rather than by the repetition for  $n$  times of the reply during a given period.

This is why Lewin's formula, according to which the human behavior depends on personality and environment:

$B = f(P, E)$  and which, indeed, can be included in the equation of a statistical approach, gets additional valences within the new context of understanding the forms of co-existence, namely: the human behavior depends on the  $q$  state of the system (individual), time parameters ( $T$ ) and environment disturbances ( $E$ ):

$$B = f(q, T, E),$$

Formula by which the equation of the human behavior is related to equations of synergetic systems, which do not overlap any longer with the classical statistics rules.

If this evolution of science emphasizes the strong need to find a way of measuring the psychological product complementary to the classical statistics, it is a reality imposed by the very dual character of nature and of Man. Orientals have recognized for so long that any purpose, any truth, can be achieved in two complementary ways. It is a principle which actually has been the basis for the creation of cybernetics (for feed-back and reaction loop concepts).

The measurement by statistics should have a feed-back. It is impossible, even unacceptable, for it to be the only way of measuring the psychological product. We should remind you, within this context, that cybernetics has been created, at its turn, by two ways: a mathematical (Norbert Wiener [25]) and a descriptive one (Stefan Odobleja [18]). And Frjtiof Capra [5] shows that all concepts discovered by the Western physics by a long series of equations and formulae are to be found in the writings (descriptions) from the texts of Oriental philosophers. Quantitative mathematics has Qualitative mathematics as feed-back. Arithmetic has geometry as feed-back. The measurement by calculation has the measurement by forms as feed-back. Besides, within the special mathematics there is a chapter having a very suggestive title: techniques of form recognition. Probability co-exists in a complementary manner with possibility. It is not by chance that within modal logics, a logic of the possible evolves.

## II. QUANTUM THEORY OF THE MENTAL AS SUPPORT FOR A COMPLEMENTARY METHODOLOGY OF MEASUREMENT IN PSYCHOLOGY

Against this background, the cognitive science becomes, has already become, a tensed and dynamic scene for a dispute of ideas regarding utility, even need to resort/not to resort also

to another model than the classical one for explaining and understanding consciousness related phenomena. A dispute in which scientists and fundamental research, actors and creators of scientific theories feel, collaterally but close, the breath of the 5th Generation Project which is aimed at the reduction of differences between the natural intelligence and artificial intelligence. But the elimination of this difference, and it would not be excluded that, this time as well, the practice exceeds the theory, it involves a complex understanding, much more than computational, of the mind, an understanding that might explain in a coherent and plausible manner the chain: data-information-knowledge-meanings. A chain which the science of cognition, for the time being, based only on the computational model, does not succeed to explain it in a satisfactorily manner. But the evolution of computer software, from the classical programming models to expert, neural expert, genetical expert and neural-genetical-expert models are the proof for the first steps made in order to eliminate the differences between the two forms of intelligence, within the context of building computer brains proper to the classical PC (inference engine), to the DNA computer, to the quantum computer, to Hugo de Garis computer. Obviously, there is a need for a strong experiment to check whether an electronic brain as close as possible in terms of complexity and structure of the natural brain shows or not mental phenomena. At Kyoto, in Japan, under the guidance of Hugo de Garis, there is in progress a Project called "Japan Brain Project", which is said to meet all the premises to be achieved. It will be a remarkable scientific experiment, both for the availability of the intelligence to be presented, as well as for the checking of the occurrence or non-occurrence of the mental phenomenon under the specified conditions.

There are more and more discussions on the role of quantum physics in this knowledge process. Naturally it raises the following question: is it necessary to resort to the quantum physics in order to explain mental phenomena, of the qualia phenomena in general? The main supporters and promoters of a pro-quantum thinking trend are: Roger Penrose, Henry P. Stapp, Stuart R. Hameroff, M. Jibu, K. Yasue, Edy Oshins. Still there are also reactions denying the quantum nature or the role of quantum physics in the manifestation and explanation of mental phenomena and of the consciousness.

However, here an observation will be made. All physicists are those who, by reference to the movement of particles into the quantum space, have ascertained that this movement follows the thinking laws, rather than the classical mechanics laws, the movement not being caused by the occurrence of any external force, but being the effect of an interaction. This is an argument in favor of the role that the quantum physics should play in order to provide an original core of laws and principles for a generalized quantum science, to represent an instrument for explaining mental phenomena.

But why, still quantum theories have been, and are still proposed in order to explain mental processes?

The answer is simple: the entire neurobiological science, despite all its huge progress, could not explain more delicate phenomena of mental processes, for example intentionality phenomena and, in general, phenomena called qualia. It is true that neurobiologists do not recognize it. They still believe that

all mental processes, if these are yet impossible to explain, will be explained in the future, only by means of neurobiological structures. But this is a point of view which extrapolates in terms of concept the current successes of the structural science without any certainty or serious justification according to which this science can explain anything, including fully mental processes. The belief that everything will be explained by the structural science, which is based on the reality of fundamental forces of nature, excluding anything else, is a philosophical point of view, not a scientific one. It would be quite a relief for science if the mind was explained by structural knowledge. The only certain landmark for treating the mind, within the conceptual framework of structural science, provides the brain neurobiological reality, because the mind cannot exist without this reality. But it is equally true that the neurobiological science alone cannot fully explain the mind.

As opposed to the aforementioned scientific opinions, H. Stapp (apud [9], pp. 80-100) tries to regard the brain as a quantum system in which the processes the most specific to the mind as a quantum system occur upon reduction of the brain wave function. But this would mean that at that time there comes something additional, beyond the known quantum mechanics. H. Stapp, however, does not suggest this, as he thinks that the achievement of the mind specific nature is guaranteed by the reduction process. A question arises: how come that the mind specific nature is involved in a structural process, without anything in the equations describing the quantum state before reduction, containing something which then results in the extraction of the mental phenomenon? Still it is important that Stapp focuses on a limit phenomenon of the quantum mechanics, the quantum reduction. It acts, according to Stapp, on a quantum field of the brain. By comparison with Stapp, Penrose makes a step forward. He shows that the current quantum mechanics cannot explain non-computational information mental process or the other specific mental phenomena by the reduction of the wave function as it is known by the quantum physics. He assumes that in the brain, because of its structure, there occurs a reduction of the wave function in a new way, unknown until today, and which might bring the necessary element for the occurrence of the mental phenomenon. Consequently, he proposes an extension of the quantum physics, as the current one is considered as not being enough for explaining mental processes. At the same time, Penrose suggests that the structures where this mental quantum reduction is likely to occur would be the fibers of the neuron cytoskeleton. As he cannot put aside the physics and structural science framework, Penrose does not resort to a new phenomenon which should bring resources for the mind, but he resorts to the involvement of the gravitational field effect at this level, considering that it should generate the mental processes. But the gravitational field is structural, and the gravitational force is currently subject to the advanced theoretical process of union with the other three main forces of nature. A question arises: Why would, under these circumstances, the gravitational force be "more mental" than electromagnetic forces, weak and strong?

It obviously results that structural quantum physics cannot bring something in addition in order to fully explain mental

processes. If the structural science insufficiency principle were considered from the very beginning in order to explain the nature of the living, mind, consciousness and the nature of the entire reality, then is obviously, ab initio, that a quantum theory of the mental processes is impossible to formulate within the structural science. Recent research of the mental specific nature, at the quantum physics level, led to a ceiling requiring its extension beyond the current knowledge. But as an extension within the structural field cannot be a solution, then the extension should exceed this field. But as compared to the quantum physics, the laws governing this extension are laws of a generalized quantum theory, and not of a strict quantum physics, especially given the fact that meanwhile, there has occurred also the possibility for a structural-phenomenological science, which, except for main physics forces, proper to the structural field, to consider physical and informational processes neglected by science so far, which should be the basis of mental phenomena. According to the Romanian academician Mihai Draganescu [9] pp. 151-200: *Mental features involve the participation of an essential ingredient of nature, the phenomenological meaning, which is not a mentality atom, but a co-participant together with certain structures, in order to generate mental processes.* According to the Psychology of Order. Quantum Psychology (POQP) built by the authors on an experimental basis, these ingredients are not just mere co-participants, but they are intrinsic constituents of objects belonging to a certain type of reality, conferring them mental features. This reality is a structural-phenomenological one, and involves all living forms having a nervous system.

### III. GENERALIZED QUANTUM PSYCHOLOGY AND THEORY

Structural – phenomenological realities are all those forms of existence belonging to the living nature having a nervous system. The phenomenological meaning is not just a mere participant, but an intrinsic participant of the structure within which it evolves, conferring it phenomenology. Seen from this point of view, the phenomenological meaning has, on the one hand, a double structure (of the plus and minus type, dr. Jekyll and Mr. Hyde, Virgin Mary and Mary Magdalene, Morning Star and Lucifer etc.), and on the other hand, it has various evolution stages from inferior to superior. There is therefore a primary phenomenological meaning, with a minor functional role and which generates a limited number of significations.

At a higher structural organization level, structural-phenomenological, there are realities with an unlimited and complex system of significations, and one of these realities is Man, the individual. His phenomenological side is the consciousness, his mind, without putting the sign of identity between consciousness and mind, even if this article will not especially refer to this aspect. The structural nature is ensured by the neurobiological support, through the brain; but the brain is a semantic device, and the semantic aspect has a phenomenological nature.

But it is not the brain which generates the very mental processes, and this is the reason why conclusions and interpretations made only on neurobiological experiments basis are sometimes false. The mental processes are the result of a complex of interactions, and this occurrence has a

quantum nature, the interaction related process generates a field with quantum features, therefore with quantum effects on the mind.

The brain potential, the availability of the neuron structure upon interaction is highly increased. Scientists noticed with surprise the capacity of association of neurons! 25-30 years ago, one estimated the number of these associations to a figure 1 followed by 800 zeros.

The ingredient referred to by academician Mihai Draganescu, and which he calls, being very inspired, phenomenological meaning has a complex role, it is, therefore, according to the authors vision, intrinsic to a structure, it is the property of the living nature having a nervous system, conferring it mental processes and being able to explain in this way the phenomenon by which the information processing leaves tracks in the subjective experience. A structural-phenomenological understanding, in particular neurobiological and phenomenological understanding, explains the way of generating, at a high structural organization level, the subjective experience starting from a series of physical and chemical interactions between Man and environment, explains the relation between the inner experience (qualia) and the formal description of the experience, language, communication, spiritual development. The structural-phenomenological matching may be achieved in the neutral genome (the DNA), existing in each cell. And geneticists research comes to support these ideas. Any individual has a personal genetic code (PGC). But, according to the cybernetic principle of reaction loop, the personal genetic code, understood as a system, is made up of two subsystems: the personal biogenetic code (PBC) and the persona; sociogenetic code (PSC), the latter being also especially subject to our concerns. The biogenetic code has a mainly structural nature, it is the physical pattern, substantiality. The sociogenetic code is, first of all, phenomenological, is, basically, information. The bridge between the two codes is achieved by energy animating both of them.

But the quantum effect on the phenomenological meaning, understood as having a dual nature, leads to the creation of an overlapping state. The human nature, its dual structure proven by the structure of its genetic code, as well as by the dual structure of the brain, confers to the phenomenological meaning a dual nature, a coexistence state, and this coexistence is of the overlapping type. In the strictly neurobiological plan, one has succeeded in proving, still not to a large extent, the overlapping state of neurons, demonstration having represented the premises for starting to build the quantum computer.

A more subtle argument, already making reference to the phenomenological meaning, is represented by the demonstration regarding the relation between truth and lie. Experiments have proven that the same frontal lobes are activated both in case of truth and lie. David Jones, known as Daedalus (in *Scientific American* in Romania, 2004, nr. 6, pp.14-15), formulates the conclusion according to which during the utterance of a lie two sites are activated: one containing lie and the other one containing truth which is hidden! Trying to make a parallel between nature-society

given a quantum model and understanding nature and society as two subsystems of a unitary system: the cosmos (generically), - in nature, physicists have discovered the atom that they have considered for a long time as being indivisible. By comparison, and out of the need to find a bridge between nature and society, specialists in socio-human sciences have assigned to the individual the role of atom, by calling him social atom. Apparently an indivisible atom, as well. But just as the atom from nature opens in a mysterious quantum and sub-quantum world, the individual opens within his own inner universe, equally mysterious and which we dare call quantum and sub-quantum.

The human psychic universe has a quantum nature because it is dual, and this duality is of the overlapping type. It has a quantum nature because the existence forms are actually coexistence forms. And this coexistence means an overlapped reality, generating uncertainty. It has a quantum nature because it has a structure made up of parallel worlds, having the relation real-imaginary quite relevant, especially now when the individual is more and more involved in the cyberspace, in the virtual world, the real world becoming for him just an alternative. But in the cyberspace, the individual develops several personalities, lives in several dimensions, the dimension supposed by the external reality being added to this. It is a quantum universe because it is subject to the holon principle, as an ultimate reality cannot be discovered, but everything is a permanent movement resulting in a permanent reorganization of perception and memory.

The phenomenological nature, at a high structural organization level, confers equiprobability to the co-existence and by it uncertainty. Honesty and dishonesty are in an equiprobability relation. And even if, in particular, the individual replies by honesty at time  $t$ , to the reply from time  $t+1$ , the equiprobability state is reestablished. In  $t+1$ , by reference to the time  $t$ , the individual may reply by dishonesty. The equiprobability state (uncertainty) is not exhausted. It is the condition for the existence of Man, it is his resource (one of his resources) of adaptation, and sometimes a defense mechanism.

The reply is a necessary happening determined by the phenomenological nature (motivations, interests, will, aspirations etc.). The phenomenological nature creates, at a given time, the asymmetry situation, which enables the expression by a single form. Given an equiprobability ground, the individual opts for one of the two forms which co-exist, but equiprobability and, in particular, uncertainty, are reestablished, regenerated. The recurrent expression by the same phenomenological meaning creates a constant nature of the reply, in fact, a habit of replying in the same way, enables the achievement of a series of relatively identical replies, situation which inspired for the classical statistics the concept of frequentality. But if we define the constant nature of the phenomenological meaning as constant, we will notice that the size, as well as the duration of this constant element cannot be determined by the help of classical statistics. It is subject to the aleatory nature, to the phenomenological nature, being able to give the phenomenological structure uncertainty. The size and duration of the constant is determined by the phenomenological nature, at any time another type of

motivation may break the series, may lead to the change in the phenomenological meaning. And this dynamics of hazard has also a neurobiological support resulting from the fact that memory and perception are permanently reorganized. We may even say that the phenomenological meaning is, actually, a phenomenological program, and the essence of this program for the human being is its uncertainty, resulting from the overlapping state of the co-existence phenomenological forms. Life and Death themselves, understood as fundamental phenomenological expressions are in such a state. Thus it is possible for an individual to die at his/her very birth, for another to live in agreement with the absolute age of the species (120 years), or to actually die at any age. This is why classical statistics, the frequentality concept cannot be used for the forecast needs, but, at the most, for diagnosis situations.

Then, the individual psychic universe meets another condition proper to the quantum world: the existence of parallel realities. In his inner universe, the individual lives parallel existences of the real-imaginary type (virtual), conscious-unconscious.

Thirdly, the psychic universe is a permanently moving holon, there is no last «brick», there is no ultimate meaning, everything is a *bootstrap* (G. Chew), creating the image of a network without scaling.

#### IV. METHODOLOGY AND PROPER QUANTUM TYPE METHODS

Just like in the IT there are deep concerns for the development of programs including the models as close as possible to the natural way in which the human brain works – expert, neuroexpert, genoexpert and neurogenoexpert programs; in the same way, psychology should be focused on creating tests reflecting in the most accurate manner the actual way in which the brain processes the information, the actual testology, mechanisms used by it for testing a subject, being far from desideratum. Besides, the mere transposition on computer of the form and contents of tests in use doesn't represent an actual progress for psychology.

The methods and methodologies proposed by the authors are built in the spirit of modern scientific thinking and are complementary to the measuring methods built on the classical paradigm principles.

##### *A. Method and methodology of measurement by coherence-decoherence - Method of Configurations (MC)*

The measurement based on the quantum and morphogenetic science rules and laws necessarily involves the creation of techniques and methods referring to coherence and decoherence concepts.

The coherence state, namely that state in which possibilities of reply are in an equiprobability relation can be generated by testing. The test explores the experience of the subject in relation to a given stimulus, taking as reference a definite period of time. As an example: a driver and his experience for the last year up to the moment of his testing. He is asked to describe his behavior for the last year in most situations, sometimes and very rarely. Most is the equivalent of 75% of situations, sometimes is the equivalent of 20%, and very rare of 5%. The way in which the subject describes his behavior by the help of the method of configurations (to be presented

within the context of this article) in the three hypostases indicates that in 75% of the situations, the subject adopted a masculine rational behavior, with initiative spirit, with respect for passersby, by taking the relevant responsibility. In 20% of situations, the subject had an irrational behavior, with aggressive attitudes towards the passers-by, with a risk behavior by recurrent attempts to unauthorized passing, by ignoring the traffic rules. In 5% of situations, the subject has also behaved irrationally, with non compliant tendencies, with impatience manifestations, with nervous reactions. The first type of irrationality is masculine. The second type is feminine. It is certain that during time  $t$  the subject provides with 3 possibilities of reply, judging these replies from the perspective of  $t+1$ . The reply of the subject is a coherence quantum state. The relation 75%-20%-5% is not relevant. The majority behavior is not a condition for drawing the conclusion that, starting from time  $t$ , during time  $t+1$  the subject will have such a behavior. As to  $t+1$ , the subject shows the first three possibilities of reply: rationally masculine, irrationally masculine, irrationally feminine, being in an equiprobability relation. The phenomenological nature (motivations, interests, the state of the subject, etc.) will lead to the option of reply. The relation 75-20-5 just enables to prepare a diagnosis. Let's say, therefore, something about the subject's behavior up to the testing moment. And, a very important aspect, let's establish a feature of quantum systems might have occurred or have not occurred. Anamnesis may lead to errors of appreciation because it is likely that the subject has not caused, during the latest year, any accident. But irrational behavioral forms (present in 25% of the situations) indicate that the subject could have been involved in an accident which, even if not occurred, might have occurred.

The determination of the coherence state involves the existence of measurement instruments enabling the application of such methodology. Such an instrument is the Method of Configurations (MC), created by the authors. It is the actual product of an experiment finally resulting in the discovery of original archetypes, of the form of cognitive schemes reflecting the essence of the way in which the individual processes the information. Thus one has identified eight basic forms, which can be associated by their contents to the theory of the 8 idols prepared by Emily Pronin, associate professor at Princeton University. This test is the actual expression of the psychic system function, coming from its very contents, of objective assimilation of reality, based on which it prepared the inner model of the outside world. MC is an actual inner model of the outside reality concentrated in a given stimulus. It shows that the information processing involves the processing of form, contents (according to the type of hemisphere providing the information), direction (extravert/introvert) and attitude (rational/irrational). It measures therefore the form (masculine, feminine, androgen) of a reply, expression of the active/passive manner of reply, its quality to be a rational or irrational reply, as reference for understanding the adaptation function of the individual psychic system, respectively the organizational level of information indicating the effectiveness of the respective reply, the behavior, finally, of neurophysiologic mechanisms

and of the self-regulating function. The reply is concentrated in a cognitive scheme, as defined by Jean Piaget [20], a cognitive scheme which is the result of the mnemonic trace of stimulus taken as reference system in the psychic universe of the subject, and it has the features listed above: form (manner of reply), central position indicating rationality or marginal position sign of irrationality (adaptation function), organization level (the self-regulating function). The test enables to assess the coherence state as described in these lines.

The decoherence state means the establishment of intentions of subject's reply to the respective stimulus, being known that intention is an essential feature of consciousness, it is the expression of its predictive function, of the reality anticipated rendering function. From the number of possibilities which have an equiprobability relation, the subject intends to express himself by one (some) of them. The determination of the reply intention has nothing to do with the frequentality or tendency concept. It replies to the intentionality concept, as formulated by Karl Raymund Popper ([22] pp. 36-74), based on which one has created, as a testing instrument, the simulator.

In my model, K. R. Popper used to say, *ideas become dead before people die*. Intention is directly related to the phenomenological nature. The phenomenological nature (motivations, interests, moods etc.) will decide on the reply in  $t+1$ . But the determination of the reply intention involves the creation of a scenario of intentions. It supposes building a virtual space-time that has the features of the real space-time in compliance with the René Thom's theory of disasters.

Thus, the subject is tested for the way in which he intends to act in the future as compared to the actual situations from its relation to the stimulus. For the organizational field, the experience acquired up to now led to the next scenario: the behavior under ordinary work circumstances; the behavior in critical /unique situations; the behavior during one week, the behavior under special circumstances requiring first of all capacity of quick decision-making / self-control / forecast spirit / keen attention etc. Finally, a prognostic can be set regarding the subject's behavior intentions in terms of form, rational/irrational attitude and information organization level (behavioral effectiveness) under the circumstances listed above. The analysis of the scenario regarding the reply intentions shows the existence/absence of catastrophic points, of fractal images (of non-determination), of irrational tendencies; there are determinations which enable the application of feed-before psychological interventions.

The Method of Configurations (the Test of Configurations) is an instrument guaranteeing the application of quantum laws in testing. It enables to determine the coherence state and the achievement of the decoherence state. It is a support for the identification of the type of irrational circumstances and behaviors which, though not leading to the occurrence of events and incidents, could have been the cause for such events and incidents. It facilitates the understanding of the reply not only in terms of its actual features, but in terms of their potentialities.

*B. Measurement methodology built on the cybernetic principle of networks without scaling - the Numbers-Words Associationist Test*

It is another measurement method complementary to the current psychometric methods. This measurement method comes from modern cybernetics, given the background of concerns for building expert, neuroexpert and neurogenoexpert models. The aim of such a test is to obtain the image of the internal network of the individual psychic universe. The network image of the psychic system originates in the model of the psychic apparatus described by Sigmund Freud as a network of lines and knots.

From the cybernetic point of view, in order to prove resistance to the pressures coming from the outside reality, such a network should contain hubs, namely knots which can concentrate around them as knots of the network taken as a whole as possible, thus increasing the inner resistance of the system. It is a model which successfully works in the artificial intelligence field. A network of computers including hubs has a very low vulnerability to external attacks. The nature gives us, at its turn, more spectacular examples. The water network has hubs, the oceans. The strong knots are the seas. The ordinary knots – rivers. Streams are weak knots, and creeks–anemic knots. Even if creeks, streams ran dry, the network resists because of the oceans. The same is valid for the inner universe of the individual, a network of knots and lines, much more resistant to the outer environment as its configuration contains hubs.

Based on this principle, the Numbers-Words Associationist Test (NWAT) is built. The test construction (the method) is based on the synchronicity principle (Jung, Pauli), on Montecarlo probabilist method, and on the principle of networks without scaling. Lines are generated by inductive words (in total 30 inductive words). They are key-words defining, according to C. G. Jung's model, the Self, the Ego and the Person, as reference for understanding the individual evolution. Knots are the system of needs. A system made up of ten major needs: independence need (the primary Self), inner harmony need, the harmony between Animus and Anima (the matching Self), the dynamic equilibrium need (the dynamic Self), the stable equilibrium need (the Ideal Self), the identity need (the original Ego), the affirmation need (the useful Ego), the self-achievement need (the progressive Ego) the proximity need (the close Person), morality need (the moral Person), the social integration need (the social Person).

The network results from the association of lines to knots. An ideal configuration should include: 2 hubs, 2 strong knots, 4 ordinary knots, 2 weak knots. The deviation from this configuration indicated the weakening of the inner resistance structure, evolution tendencies towards dysfunctional states: depressive, maniac, paranoid etc.

The analysis of the configuration in its whole enables a vertical and a horizontal approach to the network. The vertical approach refers, according to Lewin, Zender, Cartriwght, to the productive energy, to the individual effectiveness. It is the symbol of the rational behavior, of the informational energy. There are three possible states: active (living in a present time anchored in the future), passive (living in a present with the face back in the past) and defensive (living in the past), the

last state showing the vertical vulnerability of the individual in the relation with the outside world.

The horizontal analysis refers to the maintenance energy, namely to the emotional energy. And from this point of view there are three possibilities: the normal emotional state and hyper or hypo emotional states, both representing sources of vulnerability.

*C. Curve of knowledge – another scaling method*

A complementary methodology necessarily involves another scaling method for human performance. The curve of knowledge is built on the ground of modern logics, an important role being played by the contradictory dynamic logic (Stefan Lupascu [16]) and the Boolean logic, but also by the entropy principle in an open system far from equilibrium (point 0.5), as formulated by Gh. Zapan [26].

The curve has values ranging between 0.5 (T state – Lupascu) and 0.94. According to the quantum principle, as well as to Goedel's incompleteness theory, an open system far from equilibrium includes a minimum chaos space, enabling the movement and, in particular, the creation. The difference up to 1 symbolizes the imperfection of the human being, justifying the approach to the human act in terms of probability.

The curve has three segments. The first refers to the type of homogenous, coherent and constant behavior and includes performance certainty values (the equivalent of grade 10), guaranteed certainty (9) and limited certainty (8).

The second segment includes complex, incoherent, unstable behaviors. Its values are hidden uncertainty (7), risk (6). The last segment refers to the maximum entropy behavior (chaos): (5).

On this range, from 0.5 to 0.94, only the plus or minus sign of the behavior is important. Here are also Dr. Jekyll and Mr. Hyde. Or, as the well-known Polish writer Stanislaw J. Lec said: *My two little dogs, Sense and Anti-Sense, are identical. I recognize them by the clothes I dress them.*

The assessment is made based on the probability-possibility dyad.

- Thus, at the highest level of performance we talk about a probability of performance certainty – between the subject and the stimulus there is a total identity, namely a maximum commitment (grade 10) to which, with reference to the possibility of occurrence for the negative event, one associates the relatively impossible possibility. Within the terms of emotional intelligence, the generation of a negative event by a social individual appreciated at such a level is assessed by phrases of the type: *This can't be! This is not true, he cannot do such a thing!*

- Probability of guaranteed certainty– between the subject and the stimulus there is slight tension state, which most often is beneficial, but it may also be the cause of the negative event (9) it is associated to the unpredictable possibility: *I cannot believe he could do such a thing.*

- Probability of limit certainty– between the subject and the stimulus there is a slight discomfort,

pretty hard to notice (8) it has as correspondent the surprising possibility (*I am surprised that he could have done such a thing!*)

- Probability of hidden uncertainty – between the subject and the stimulus there are forms of disagreement (7) is associated to the non surprising possibility (*I am not surprised that he had done such a thing.*)

- Probability of risk– between the subject and the stimulus there is likely to occur incidents (6) is in the dyad with the expected possibility (*I was expecting him to do such a thing.*)

- Probability of chaos – between the subject and the stimulus there is a crisis situation (5) is identical to the chaos possibility (*He can/could do such thing at anytime, anywhere, anyhow*)

The world, the human society in particular, obviously evolves. The Man, the social individual, is subject to unique challenges, the social environment shaping him is in a way and in a pace not known till now. It is obvious that the individual lives in a dramatic pace, with an overwhelming dynamics. One cannot take picture of him any longer, because he is always in movement. In order to see it as a WHOLE, he should be followed in movement, with a camera. And this camera, as instrument for measuring him, cannot be built but by the help of modern sciences and theories: the quantum theory, the disaster theory, fractal theory, strange attractor theory etc. A new methodology that is strictly necessary, complementary to the classical one.

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