

THINK FUNDAMENTAL — ACT PROBLEM ORIENTED: A CHALLENGE FOR PHYSIOLOGY AND PUBLIC HEALTH IN THE 21ST CENTURY¹

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Мыслить фундаментально — действовать проблемно-ориентированно: задача для Физиологии и Общественного Здравоохранения в XXI веке

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Первый Московский государственный медицинский университет им. И. М. Сеченова, Москва,
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Who celebrates Newton as discoverer of gravity, Einstein as discoverer of the equivalence of energy and matter within space-time, Darwin as the discoverer of the evolution of species, Vernadsky as discoverer of biosphere and Noosphere and Sechenov and Pavlov as the discoverer of inhibition and conditioning, should connect to the «Extended View» the discovery that matter and information can be linked within the semantic space, but also the discovery that the entire process from the Big Bang up to society can be understood as one evolutionary process and attributed to one similar principle of development, namely as a result of alignments carried out by existing objects at a respective point of time within their consensus between the poles of self-reference, consent-reference and environmental reference. The «Extended View» uses, among others, all these perceptions for a comprehensive understanding of how health can be recovered, preserved and increased. Towards this common goal physiology and Public Health do orient ever again according to the ever-changing needs. With own studies on the example of the ability to link matter with information, the applicability in practice and the gain in explanatory power of the «Extended View» gets demonstrated. This provides a technique to tackle seemingly irreconcilable scientific areas such as the mind-body problem, the gap between individual and society, but also between reality, actuality and virtuality on a causal level. To elaborate this very comprehensive theory user-oriented is the aim of the 'Stockholm project' which shall be the main focus of this recently created cathedra. *Key Words:* Extended View on Evolution, ontology and epistemology as tools, application on physiological principles, information, body mind problem, Theory of Functional Systems, Enforcement, Inhibition, Conditioning, competitive effect, life events, Chernobyl.

Тот, кто прославляет Ньютона как человека, открывшего гравитацию, Эйнштейна за открытие эквивалентности энергии и пространственно-временной материи, Дарвина, открывшего эволюцию видов, Вернадского, открывшего биосферу и ноосферу и Сеченова и Павлова, как первооткрывателей комплексов и выработки условного рефлекса, должен связать с «Расширенным взглядом» открытие того, что материя и информация могут быть связаны в рамках семантического пространства, но также открытие того, что весь процесс, начиная с «большого взрыва» до образования общества, может быть понят как один процесс эволюции и объяснен одним подобным принципом развития, то есть результатом группирования, проведенного существующими объектами в соответствующий момент времени в рамках согласия между полюсами само-референции, референции согласия и референции окружающей среды. «Расширенный взгляд» использует среди других все эти виды восприятия для всестороннего понимания того, как здоровье может быть восстановлено, сохранено и улучшено. Физиология и общественное здравоохранение всегда ориентируются на эту общую цель в соответствии с постоянно меняющимися потребностями. При этом употребляется теоретико-познавательный подход, который использовался Эйнштейном, чтобы соединить те теории Ньютона и Максвелла, которые до этого считались несовместимыми, с помощью «создания» теории относительности: В соответствии с Эйнштейном все научные термины и правила являются изобретениями разума человека, чтобы мы могли лучше разбираться в нашем мире. При выборе этих терминов нам нужно проблемно-ориентированно пренебрегать разными вещами и одновременно усиливать другие. Это может быть понято как естественный закон, который доказывали Павлов и Сеченов своими принципами торможения и возбуждения для физиологии. В статье будет показано, как можно употребить эти принципы, чтобы понять ключевые функции физиологии из расширенного, единого взгляда (как регуляция и распределение, стресс, комбинированное влияние между физическими, химическими, но также и оценочными влияниями и, таким образом, например, для плацебо и т.д.). Конкретнее говоря, при этом соединяются две научные традиции, их подходы и теории, обе из них сами по себе не только убедительные и верные, но, кроме того, ни в коем случае не противоречат друг другу. Ключ для расширенного понимания — это соединение этих вовсе не противоположных

¹ This is the reading text adjusted version of the inauguration lecture 25th January 2013 (1st Moscow State Medical University) — This version and the PowerPoint version of the lecture are available on the website of the Herald of the Russian Section of the IAS-H&E <http://www.heraldrusias.org/>

взглядов на рассматриваемые процессы. Сеченов, Анохин и Судаков и с ними русская физиология фокусируются на процессах между разными структурами (разных органов, ретенционных зон и единиц и их носителей информации) и, таким образом, на динамике процессов здоровья и болезни. Динамика доминирует! В отличие от другой (тоже правильной) позиции: Начиная с фокуса на понимании структур (например единиц и их внутренних носителей) и на неподвижных/постоянных оставшихся аспектах факторов, включённых в здоровье и болезнь. В этом случае соединение неподвижных элементов доминирует. Отсюда вытекают взгляды на структуры как «посредники» или как «эгоцентричные» объекты исследования, которые соединяются к целостной картине. При этом нам необходимо создать термины, которые характеризуются поддающимися проверке аспектами. Без них невозможно обсуждать то, что наблюдается по-разному, или то, к каким выводам могут привести эти феномены. Эйнштейн ясно показывает, что термины не должны быть придуманы произвольно, но в соответствии с фактами наблюдения. Кроме того, он советует не исследовать какие-либо возможности мышления, только потому, что они логичны или математически верны: Он рекомендует ограничиваться теми изобретениями, которые находятся в соответствии с предположением, что существует только один эволюционный процесс. Этот процесс может быть понят, если различать энергетически материальное от нематериального по отношению к информации. Поэтому существует различие между естественнонаучными дисциплинами и точными науками. Условие для соединения обеих дисциплин может быть реализовано с помощью эволюционного субстанционного монизма, который предусматривает множественность деятельностей, даже без внедрения так называемой «Vis Vitalis». В рамках собственных исследований на примере возможности связать материю с информацией демонстрируется применимость на практике и усиление силы объяснения «расширенного взгляда». Это предоставляет технику для того, чтобы приступить к изучению кажущихся противоречивыми областей науки, таких как проблема тела и сознания, пропасть между личностью и обществом, а также между реальностью, действительностью и виртуальностью на повседневном уровне. Показанные в статье примеры доказывают принцип Густава Либиха, по которому «нет ничего практичнее хорошей теории». Это будет наглядно показано, например, с помощью открытия «принципа токсикопии». Описание процесса внедрения этого принципа в «Расширенный Взгляд» раскрывает силу этой теории. Это поясняет достижение этого процесса: Любой (безопасный и вредный) каскад стимулов для телесных функций, которые могут быть вызваны со стороны мозга в следствии, например, токсикологического стимула и/или прямого умственного, когнитивного или эмоционального предположения, может привести к идентичному физиологическому результату. Это было подтверждено экспериментами: Таким образом, Вы можете блокировать эффект плацебо с помощью химиката, который блокирует каскад, начатый со стороны мозга. Это каузальное объяснение раскрывает понимание не только плацебо, ноцебо и токсикопии, но и, например, массовой психологической болезни, или примеров эффекта «белого халата». Эти и другие примеры показывают, что «Расширенный Взгляд» является необходимым практическим инструментом, чтобы соединить упомянутые подходы, которые до сих пор считались взаимоисключающими. Разработка этой всеобъемлющей теории, ориентированной на пользователя, является целью «Стокгольмского Проекта», на котором главным образом будет фокусироваться наша работа на кафедре нормальной физиологии ПМГМУ им. И. М. Сеченова. *Ключевые слова:* торможение, побуждение, возбуждение, условнорефлекторное обучение, рефлекс, зависимость «доза — ответ», реакция прямого управления, петля обратной связи, теория функциональных систем, эффекты Чернобыля.

1. INTRODUCTION: THE NEW FRAME

1.1. Physiology and 1st MSMU

It seems to be a benchmark for this about 250 year young university to anticipate the future — as the name giver Sechenov has done this with his logic conclusions about the interactions between nerves in the special and matter in the general and their interactions with immaterial aspects, e.g. valuation and perception — conclusions which caused a revolution in the state of knowledge but animosity in social and political systems too. These controversies have been one reason for him to come to Austria. So he realized remarkable research about a relevant aspect of my work — about inhibition — in my home country and I could read the original paper in my mother tongue [27].

With the implementation of a chair for the development and the implementation of theories for health and sustainability 1st Moscow State Medical University has implemented again not only a marker for uniqueness in the «revolutionary spirit» of Sechenov. My professorship is integrated into an unique institution which was and is trendsetting for theoretical Medicine: The Institute of Physiology based on the ideas of many world famous scientists like Pavlov, who stabilized the system oriented

focus of the Russian Medical understanding. It is the home of Pyotr Anokhin and the Function System Theory [1].

The modern version of this theory is realized by our famous Prof. Konstantin Sudakov [30, 31]. I am thankful for so many fruitful discussions. I could use many relevant ideas for my understanding. E.g. his definition of the quantum of action allows interpretations which are conclusive to my understanding of substance monism with a plurality of qualities — a fundamental ontological position of the Extended View.

So the orientation of this institute was historically and is actually focused on the anticipation of the dynamic changing of that was has increasing influence on the levels of health and their limits which are the borderlines on one hand to pathological effects, preventive and curative needs — on the other hand on wellbeing, quality of life and health promotion.

Sechenov, Anokhin and Sudakov and with them the Russian Physiology focus on the processes between structures (of different organs, tissues and cells and their information carriers) and therefore on the dynamics of the processes of health and illness. Dynamic dominates! This is in difference to another (also correct) position: To start with the focus on the understanding of structures (e.g. of

the cell and its information carriers within) and therefore on the static/permanent remaining aspects of the actors integrated into health and illness. In this case the linkage of static elements dominates.

Therefore structures — which can be offered by biochemistry, genetics etc. are seen in Russia more as intermediaries for the process of the whole person and not primarily as a distinct research object. And «action» covers energetically and information-related aspects — thus the complex nature of the «quantum of action».

1.2. «Physiology» — «Medicine» — «A. Nobel»

This is the understanding of physiology of Alfred Nobel: His award distinct between two aspects: medicine and/or physiology: «Medicine» summarizes the different applications of the health oriented knowledge, techniques and skills — and «Physiology» covers all the different health oriented sub-disciplines focusing on the health relevance of the physical, mental, social and cultural complexity of a human person in our environments.

The requirements, burdens, types of stress and challenges have changed fundamentally especially within the last 20 years. I remind that actually the virtual economy endangered the real economy and with that the fundamentals for physical, mental and social health: We must not believe that we can overcome the problems of the future with the methods of the past only.

Physiology has to extend permanently its self-understanding:

And the Anokhin Institute has extended his brightness in future oriented way by the foundation of its International Institute for Social Physiology — not liked by all, but nevertheless a cornerstone in the progressive evolution of the 1st Moscow State Medical University.

This analysis makes evident:

There are two fundamental positions to observe and take care on Health: one is the perspective from the individual person with his bodily, mental and sociocultural characteristics and his expectations on and interactions with his environment. The other perspective is that of community and society influencing these environmental conditions and adapting the offers of health care worker in the interest of persons as social beings. Nobel would summarize the scientific activities of one perspective with «Physiology» the other one with «Public-Health-Science».

My professorship can be understood as bridge between both, including the fundamentals of natural environment. And humans are part of this natural environment.

1.3. Biosphere — Health — Noosphere

V.I. Vernadski «Thinking is not a form of energy.

Why can it modify material processes?

This question is not answered scientifically up to now.

And there is another giant in Russian science — compared with Darwin — who linked these aspects so

prominent: It is Vernadski with the introduction of biosphere and noo-sphere [33] If we are really willing to integrate the scientific fundament of «theoretical medicine» and therefore of «physiology» in the meaning of Sechenov and Nobel, then we have to do our best to integrate these aspects too — just with respect to increase the power of the instruments to understand health, to improve, restore and protect it.

2. IN THE CENTER OF MY WORK: THEORY BUILDING AND ITS TRANSFER INTO APPLICATION: THE EXTENDED VIEW

The «Extended View» is a model to deal with the health of a human person as a social being and its interactions with and expectations on its environments. It is based on the assumption that all material and immaterial aspects of our world can be understood from the view of just one evolutionary process.ⁱⁱ

The related different scientific disciplines focus on special aspects and skip others out. The incompatibilities between them, e.g. the body-mind problem or the individual-society problem are understood as consequence of this ongoing. Therefore we should expect that the given incompatibilities could disappear if we would have one comprehensive model of the evolutionary process of all health-related aspects. The Extended view is such a model.

The Extended View (EV) is therefore primarily an interface between existing theories but should offer additional options for applications

2.1. Substance Monistic View — modifiable properties

The EV is based on a substance-monism in opposite to dualistic models like the Cartesian model with *Vis Vitalis*. The plurality of phenomena can be explained with the potential of the substance to modify its expressions in two types: in materialistic and idealistic properties. Therefore both types of properties are understood as the expression of the same substance. We can compare their interrelationship with a coin e.g. of gold: Each coin has two sides: They look totally different. Without the assumption of the substance the observable properties seem to have no similarities and no common ground

The sides are in complementarity, too (N. Bohr): The observation of the upper side excludes the observation of the bottom side. But the actually unobservable properties determine the level of the observable. Both are depending on the level which they have reached within the evolutionary process: Therefore the level of the material evolution defines the possible immaterial level. Therefore humans are not monkeys, monkeys not alga and alga no quanta but all consists just from «quanta».

ⁱⁱ Different contributions to this topic are available on the website of the Herald of the Russian Section of the International Academy of Sciences. A basic contribution is the Sechenov Honor Lecture 2004 of Kofler W., 2005

2.2. Nothing is as practical as a good theory: some fundamentals

I am called to focus on theory building and its applicability. But I will not spend too much time on that in this lectureⁱⁱⁱ. I will demonstrate its relevance to extend the power of applied science: Nothing is as practical as a good theory (G. Liebig)

So I have to present some philosophical aspects to make clear:

The fundamentals define what you can catch with your scientific net.

1. I will give a spotlight on my understanding of ontologies
2. Then I inform about the position of Einstein on the relationship between reality and the terms we communicate about reality.
3. Then I deduce from them conclusions with relevance for physiology and health:
 - a) cover natural rules natural laws AND natural principles, e.g. enforcement/inhibition?
 - b) the need to introduce an additional «potential» to «deal with information» and
 - c) the need to postulate — additional to the geometric grid — a grid to characterize the attributing of information to and the changing of the meaning of matter — a process
 - d) therefore we have to understand information as a result of a process
 - e) characteristics for empirical proving of the new «potential»
 - f) Conclusions about Information and the ability to deal with it
4. Then I will transfer these «relevant philosophical aspects» to applied tools to deal more appropriate with health related aspects. I will handle these aspects with respect to «inhibition» and «enforcement». I understand them not only as physiological principles but as general natural principles — comparable with natural laws — as I will deduce within this lecture.

2.2.1: Ontology — «world views»

Th. Kuhn teaches us (Kuhn T. 1962): A paradigm (world view) is not the knowledge «what fits the world objectively together». Paradigms have changed and will change. Therefore we can use ontology for tools: problem oriented generalized in relation to the focus we have to deal with — as simple as possible but not too simple.

Let me compare the relationship of fundamentals of applied sciences (e.g. the used paradigms, techniques of epistemology or different logics) and the problem oriented use of scientific techniques (e.g. the principles of good laboratory practice, correct selection of a random sample etc.) with a historic alpine tradition: The «Fensterl»:

«Fensterln» — and fundamental and applied aspects of science

«Fensterln»: To visit your girl top secret by climbing up to the window. The easiest way is to use for this an adequate long ladder. But you do not need this ladder anymore when you have arrived in the room. Then you have to show other skills attitudes and knowledge.

But maybe the leader is helpful for the way back or for your next visit — maybe by another girl — or for totally other demands.

The ladder can be compared with the fundamentals: epistemology and ontology as the two ladder beams, different logics, ethics, etc. as the rungs. The techniques within the room with applied scientific tools. If you are lucky and your girl lives in the ground floor you do not need any ladder. But in other situations a ladder is very helpful but should be long enough. But there are problems which needs exclusive solutions, too. We have more and more complex problems which need «exclusive» solutions!

2.2.2. Einstein and the relationship between terms and that for what they stand for

Einstein had a similar problem like medicine: Incompatibilities between indispensable disciplines: The definitions of «movement» by Newton and Maxwell seemed to exclude each another by Aristotelian logic — like psychosomatic -social — and natural scientific based medicine.

Einstein — the only natural scientist honored with the highest awarding of philosophy for his natural philosophy (Schilpp P.A., 1949) — solved this problem: He pointed out that not the nature is in contradiction — just the contents of the terms are in contradiction.

The map has another nature than the landscape

Science has another -idealistic -nature than its materialistic research objects. Scientific terms and natural laws are free inventions of the human mind (A. Einstein)! Terms «enforce» problem-oriented aspects and skip/»inhibit» other really given aspects.

2.2.3. Conclusions with relevance for physiology and health:

2.2.3.1. cover natural rules natural laws AND natural principles, e.g. enforcement/inhibition?:

«Enforcement» and «inhibition» in physics and chemistry, too

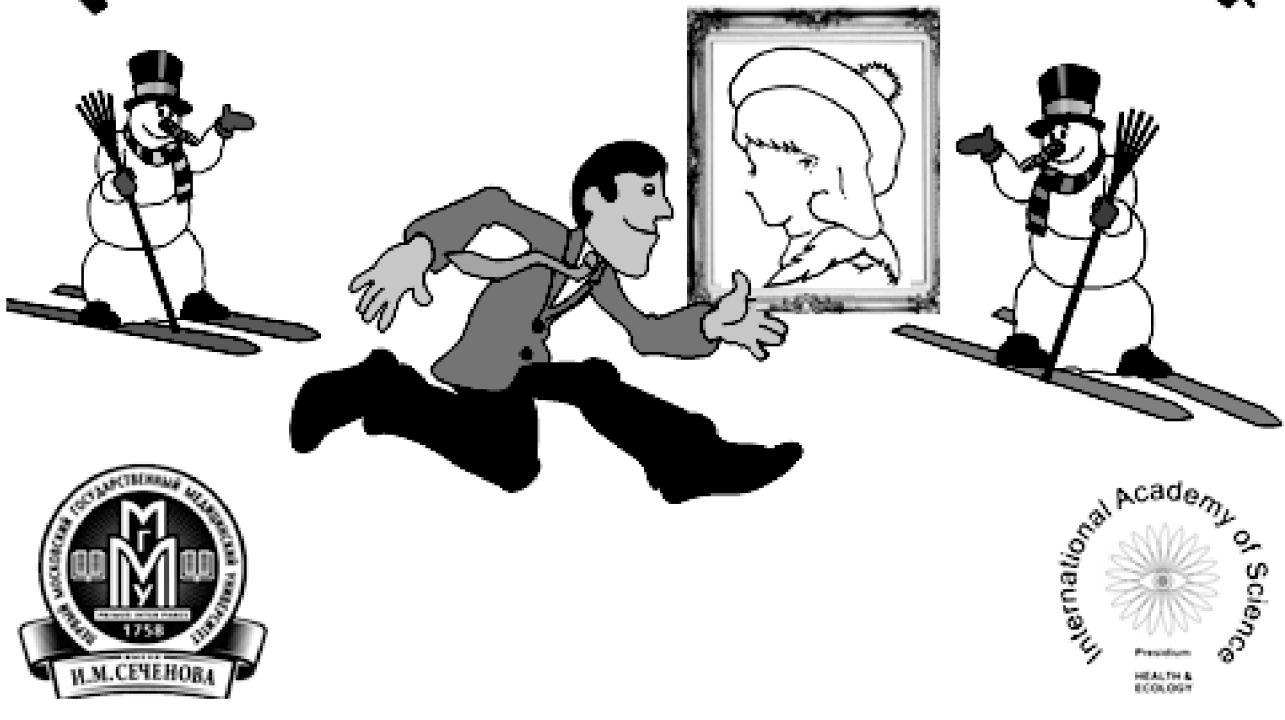
The statement of Einstein about the nature of scientific terms demonstrates:

The principles of «inhibition and enforcement» are in power even on the highest level of evolution — critical thinking. You can observe related phenomena in psychosocial situations, but also in cultural settings, e.g. norms, but for terms even in science, too (see the next example).

If we accept a substance monism and the position of modern physics that physical entities (like scales, dust

ⁱⁱⁱ More information about the applicability of philosophy for problem oriented tools is given in: Kofler W: Epistemological and ontological tools for an extended view of a human person as a social being and its environments, Part 1: considerations about ontological and epistemological options and restrictions, Biocosm. Neo-Aristotl., Vol 2,4, 273–292, 2012.

We hope you have pleasure with this interesting picture but primarily...
We wish you health for 2013-2557



chambers, or photons) can be understood as observer (but on a more basic level than living beings up to the level of scientists) then we have to expect generalizations of observations thanks to inhibition and enforcement in physics and chemistry:

This can be confirmed: We all observe surface, form and shape of entities, e.g. of a pipe. But any entity consists just of atoms. The atom consists of electrons and nucleus — and the related space around. The diameter of this space is about 100.000 times of the diameter of the nucleus. But this space in-between is empty. But we generalize the whole of the atoms and observe a surface, form, shape etc. Therefore the matter of the atom is generalized for the whole and the emptiness is neglected.

Not only humans generalize if they observe. Any animal and plant, but also inanimate entities like a camera, a scale, or any microscope is generalizing the same! Therefore any observation is a result of construction. The conclusion is: Matter, form, shape etc. can be understood from the position of inhibition and enforcement — like cultural habits, terms...

«Natural rules» — «natural laws» — «natural principles» ?

Maybe we should discuss to distinct natural rules into — primarily energy/matter related -natural laws and

— primarily information related natural principles. But more in other lectures

2.2.3.2. *The need to introduce an additional «potential» to «deal with information»*

Please accept my cordial greetings for the New Year! You see, that I have changed the number of the year from 2013 to 2557. I don't like to be late or too early. So I am good in time. Why: According to the Buddhistic calendar we have the year 2557 and in China New Year is in a few days.

An observer who has no knowledge about the Chinese and Buddhistic Culture and nothing about the birth of Jesus Christ would assume: Minimum one of the dates must be wrong. But with the background information will agree: 2013 and 2557 have the same meaning.

Both numbers make a long story short — as any term, any symbol...

But now look at the remarkable picture. A young man is carrying it from one snowman to the other. We are able to explain why he is able to do this: Because of his energy, his ability to move matter within a geometrical grid.

The same structure but three different figures/meanings: A young girl — as a high percentage of men recognize, an old lady — as nearly all women see, and an old man

And you are able to see one, two or three: Therefore you are able to shift matter within an additional grid: A grid of meaning.

If you have difficulties to distinct the different figures, I help you: Focus your interest on one and try to neglect other aspects! I can help you with a temporary increase of the intensity of the phenomenon. Do you see the old lady if I increase the intensity of the chin? Now change to the girl! And now to the old man! I can help you if I color — just temporarily — his nose!

Now we have learned about our abilities and made discoveries:

« If you accept that Newton has discovered gravitational force then we have discovered now an ability to link matter with information!

2.2.3.3. *The need for an additional grid*

But there is another consequence and therefore a second discovery we made: Obviously the position of identical matter can be shifted not only in an geometrical grid, e.g. der classic Euclidic grid. We need an additional grid for positions of matter according to their meanings.

2.2.3.4. *Information — a result of a process*

«Information» can be understood as the result of a process which causes a non-materialistic relationship between the observer — e.g. you or another member of the audience — and the observed, in our case the presented picture. We explain the result — the information that you attribute to the picture e.g. the pretty girl or the modification in the information that allows you to shift to the mother — with the use of an ability of you. This ability we have to introduce: You can not find it in the textbooks e.g. of physiology.

The use of the term «information» is quite common and it is common sense that «information is the difference which makes a difference» [3]..» but it needs matter for its embodiment and energy for its communication» [34]. But it is not common to ask thanks to what ability this difference can be made. We do this and from an Extended View on evolution — even of this ability. And it is common to accept that information is non-materialistic — from the philosophical point «idealistic». («Information is information and not energy or matter» formulates N. Wiener 1948).

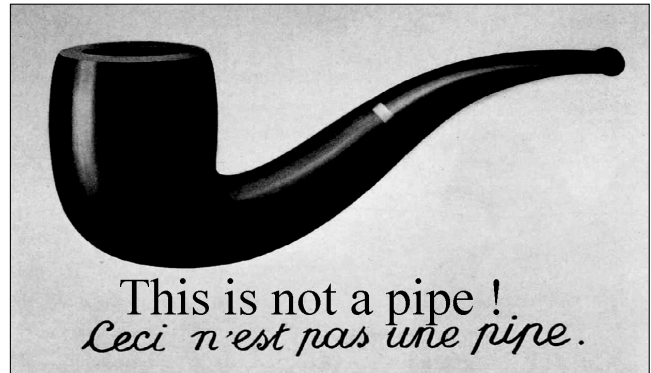
It makes only sense in science to introduce e.g. a quality or an ability with characteristics. This way you can make predictions which should be observable — if your assumptions are helpful: Then you can hope to be in agreement with the real world — related to your problems.

2.2.3.5. *Characteristics for empirical proving of the potential to link matter with meaning:*

We can deduce same from our actual experience!

The kind of meaning we attribute depends on (minimum) three aspects

- self-oriented: it is influenced by experience, expectations
- consent-oriented: I could motivate you to act
- environment-oriented: colors help!



• This ability is restricted but modifiable: (analogue to the conservational law): We were able to learn

This ability enables us to enforce on a figure but thanks to the inhibition of given aspects (not ideal, restricting and limited): We can see just one figure at the same moment!

2.2.3.6. *Conclusions about Information and the ability to deal with it*

If you accept a substance monistic position and the law of conservation of energy, then you have to accept that even the capacity of the ability to link and modify information — including its relevance — to matter must be restricted too. Therefore the sum of the ability should be the same with and without inhibition or enforcement. Therefore the conclusion should be correct that any increase of the use of the ability for one aspect must have the consequence that on another aspect a reduction of the availability of this ability should take place.

• natural law — analogue natural principles must be in power on all levels.

There is no time in this inauguration lecture to go more into the details of the consequences. However empirical based arguments confirm that:

• any «dealing with information» («observation» on any level) is at the same time a statement about the constructive aspects of the observer.

I. Kant pointed this out for the human person on idealistic basis [9]. This is named «Second Copernican Revolution». But we humans are restricted in our observation on the «light matter» — just about two percent of the total energy of the universe, too. But other «observers» can deal with e.g. the «dark energy» and «dark matter». But they are restricted too. So we should think over about the special situation of any person in the general and the scientist in the special:

• Einstein teaches as that any term — even any scientific — term is an invention with a focus on selected aspects and suppression of others.

The photo of the surface e.g. of a pipe, which consists just of atoms, electrons and a lot of special space in-between, demonstrates the applicability of this principle on non-animate observers. The famous painting of Ren? Magritte «This is not a pipe» can stimulate us to think over about the «Second Copernicanian Revolution» and the evolutionary

consequences of this principle on the human person: This painting demonstrates — with respect to the argumentations above — impressively different levels: «This is not a pipe» — it is just a painting of a pipe — as «the map is not the territory», as A. Korzybski has formulated. And the word «pipe» is from another nature than the pipe itself — as we learned from Einstein. And the information which can be collected with any type of analysis of a «real pipe» is selected by the nature of the used technique («observation»).

«And any observation of a person is a statement about the (immaterial aspects including experiences etc.) person, too — as we learn from Kant.

2.2.4. Transfer of «relevant philosophical conclusions» to «tools» to deal more appropriate with health aspects — The example of inhibition and enforcement.

We have seen: Inhibition (Sechenov) and Enforcement (Pavlov) are connected with mass, surface, shape but terms, theories norms too: Therefore this principle of biology and physiology is also to observe in physics, chemistry, topics of the humanities and Public Health, too.

Therefore inhibition and enforcement can be understood as the expression of the same principle and should be linked: No enforcement/inhibition without an inhibition/enforcement a natural law — analogue natural principle.

Maybe we should discuss the option that natural rules deals with natural laws (focusing primarily on energetical aspects) AND with natural principles (focusing on information). The natural laws are in power «from Big Bang to modern societies» — the «natural principles» should do the same — as we will confirm for «inhibition/enforcement» and its modifications. But we have to expect their modification within the evolutionary process and its relevance for the progress within evolution. These conclusions should be in agreement to the empirical experiences.

2.2.4.1. Modifications oriented on an efficient use: Enforcement/inhibition

The model of the Extended View accepts an ability which allows to link matter with information and to modify this linkage with respect to an efficient use. This allows to make plausible a dynamic process which integrates relevant discoveries of Sechenov and Pavlov with different basics of normal and social physiology and Public Health: Pavlov could confirm the principle of enforcement. Sechenov could confirm with his experiments the principle of inhibition of physiological processes even with mental intentions. I remember the classic experiment to inhibit the velocity of a reflex to a chemical agent, which is to observe in frogs or humans, e.g. by the intention of the person to suppress the reflex. This experiment demonstrates the interaction between (philosophically) idealistic and materialistic aspects of a human person.

2.2.4.2. No pain

Experiences with the interdependence of inhibition and enforcement are part of the daily life of nearly everybody: Who was not wondering about «blue spots» after an

intensive sporting activity, e.g. a football game, without any memory of the situation when the damage was caused. Extremely is the loss of the feeling of additional pain during the birth act: The surgeon can make an episiotomy without narcosis without causing additional pain to the mother.

2.2.4.3. Reflexes: The natural principle for «enforcement/inhibition»: modified for increasing efficiency: «automatization of the response»

We have to expect an economization of the use of resources according to the assumptions of the Extended View: Therefore we should expect principles for the dynamic of the need to use bodily functions for different purposes.

We can understand reflexes in this way.

2.2.4.4. From steering-reaction to feed back: The generalization of enforcement and inhibition to economize efficiency

After birth a human person is exposed to new stimuli, but has just the ancient «hardware» of the brain and the body. Therefore there must be a dynamic from the first contact with such a new stimulus to the situation in which this stimulus is common. The dynamic can be expressed — in the terminology of the «Extended View» — with the process from «steering reaction» to «feedback».

Maybe you made the typical experiences of this process personally — if you have learned to drive a car. When you started the first time a car you were highly concentrated. You focused on the adequate amount of «gas» — but it was too much or too less: So the car «jumped» like a billy goat to the street-cross.

You sweat, embraced with all your power the steering wheel etc. You did not know what you should do first: All typical reactions of active enforcement in steering reactions: To overestimate aspects and «waste» resources, but you are able to select between options. After a few weeks you have learned to drive a car automatically: Now you use the gear, the steering wheel etc. unconsciously and can even communicate during driving the car: The used function units are preselected. You save (energy and information related) resources. They are well adjusted to the actual need.

This is typical for feedback reactions.

2.2.4.5. Dose — response

But on the evolutionary «lower» level we know similarities if we analyze the answers of the body to chemicals and other demands: For «common» stimuli we can observe (economic) dose-response-rates. Extreme loads are often answered with extreme up and down reactions, to describe with a (expensive and dangerous) «spline interpolation» e.g. of the messengers.

2.2.4.6. Conditioning: The natural principle for «enforcement/inhibition» modified for increasing efficiency — adjusted to intentions — oriented on self, consent and environment

Our experience with mother-father-daughter caused our prediction that higher animals should balance their activities within the guidance of self-, consent and environment: Even this can be confirmed with classic experiments: e.g. Pavlov's experiment with the dog and conditioning. You see: Conditioning can be understood as

a special application of the natural law-analogue principle of generalization of enforcement and inhibition with respect to increase the efficiency economically.

2.2.4.7. *Shift of dose -response rates: The natural principle for enforcement/inhibition» modified for efficiency -adjusted for complex demands*

Any individual has to balance at the same time different demands and its body. Therefore we have to expect that the relevance of an objectively identical burden can change, depending on the relevance of other stimuli and intentions, which should be handled/cope at the same time. This can only be done with the — maybe adjusted — ancient instruments, but with respect to the conclusions we made up to now — if the model of the EV is really helpful.

Therefore e.g. dose-response rates should persist but should be modified under different conditions/demands. This is generally accepted if we speak about well-known combined effects in toxicology or the — not so well understood — differences in sensitivity. The EV allows predictions which can be proved. (later more)

2.2.4.8. *Causally unspecific health effects: The natural principle of «enforcement/inhibition» explaining a new type of deficit based health effects^{iv}*

Another prediction on the basis of the EV is that we should expect phenomena, e.g. the surprising increase of symptoms or earlier death as a consequence of an additional need on capacity to deal with information, e.g. to adapt to additional physical, chemical but also emotional, cognitive or intellectual stimuli. I call these effects «causally unspecific health effects» and will report later about them.

2.2.4.9. *Placebo and toxicity: focus on expectation can cause identical bodily functions without physical/chemical/biological stimuli*

The Extended View is based on the assumption that the bodily functions of a (weakened) person is guided by the brain and the person is able to stimulate the brain to start a cascade of follow-ups of stimulus — valuation — responding stimulus — valuation ... up to the function unit in the periphery. (The details are part of the Special Extended View).

Toxicologists are used to describe the follow-up of stimuli, if the starting point is a chemical. But there are chains which can be started just by emotional, intellectual or cognitive information. In connection with chains linked with drugs we call this placebo or nocebo, in connection with assumed environmental burdens I could enforce the theory of toxicity — as I will present later-on.

FROM BIOLOGY TO PSYCHOLOGY AND SOCIAL SCIENCES: LINKS TO PUBLIC HEALTH ASPECTS

Many significant connections between psychosocial situations and risk for health or illnesses can be handled

plausibly with the use of the chain of argumentation which I have started with inhibition and enforcement. I can only present here two examples:

1) The significant increase of the risk for pathophysiological different diseases (like risk for CHD, different cancers or accidents) depending on just one parameter: The score of points on the Life Event scale.

2) The increase of risk for health in connection with life habits, which are typically for a well-organized daily life («Golden Rules») and the active integration into social networks (according to the Alameda County Study of Belloc N.B., Breslow L., 1972) [4].

We accept the holistic nature of a human person and the relevance of feedback not only to economize bodily processes but of daily life functions in psycho-socio-cultural interactions and their interrelationships with the body and the available capacity of idealistic and materialistic resources too. Therefore we have to expect that live events should be linked with an increase of risk for many diseases:

2.2.4.10. *Life events: The natural principle for «enforcement/inhibition» links different evolutionary levels: simple + intellectual life etc.*

Negative and positive life events, e.g. the death of the beloved wife and a progress on the career ladder, are linked with a breakdown of former available feedback systems. Therefore — uneconomic — steering- reactions «misuse» capacities to deal with information, which then is missing to cope with common contemporary pathophysiological burdens, like e.g. atherosclerosis [7].

2.2.4.11. *«Golden rules» — social networks: The natural principle for «enforcement/inhibition» links complex behavior and social relationships, etc.*

The adequate use of these physiological instruments can support the prevention of diseases, health promotion and the level of wellbeing and quality of life: The «Golden rules» and the active integration in social networks are linked with additional feedback systems. Therefore we should expect such positive effects even in physiological functions.

2.2.5. The link to new evolutionary levels

Up to now I have presented examples for the influence of inhibition and enforcement (and their applications within the evolutionary process) on the efficiency to deal with different types of demands. But the presented chain of increasing complex processes allows us one view on a relevant aspect to make the evolutionary process itself plausible:

Placebo demonstrates that the attribution to a situation must not be objectively correct. We can attribute to a placebo the assumption to be a verum — with the consequence that reactions can be observed which are stimulated by the brain only. The principles of enforcement and inhibition allow this and much more: «We can increase

^{iv} See the papers Kofler et al. for more details

the relevance of an irrelevant detail to dramatic size» We call this «making a mountain out of a molehill». And much more: To be the first to see a connection

2.2.5. 1. *The natural principle for «enforcement/inhibition» a cornerstone for new evolutionary levels?*

Enforcement/inhibition allow to make plausible quantitative effects, like to be able to attribute to the same more or less relevance: «from molehill to mountain». But this principle allows explaining why a common situation can be seen in a principle new way if we focus on a given but up to now underestimated, overseen aspect and neglect the common view: «to see what everybody can see but recognize what nobody has recognized». This can be the starting point for an emergent win and therefore for evolution.

2.2.5.2. *Extended View of Evolution*

This option is understood just as an additional way and apart to the «classic way» of evolution thanks supporting genes: But there seems to be an interesting additional point for this view on evolution: The discovery of the emergent is a necessary explanation for a possible evolutionary win, but not a sufficient explanation that the so created emergent is «surviving» the life time of the creator. If the creator does not communicate about the personal win which is linked with the emergent new, then the win will disappear with the death of the creator: Therefore there is a need to share the win to a win-win. Thanks such win-win constellations a new subset-constituting consents must be created. But the time does not allow pointing out this in detail. More in a special lecture.

3. SOME RESULTS OF MY STUDIES

3.1. The discovery of the Toxicopy principle.

«Toxicopy» stands for «a copy of the reaction to a toxic burden but without a toxin». You can name it «environmental nocebo» if you like. Now shortly the story (Kofler W., 1988a)

In the late 80ties of the last century I was called to clarify the involvement of a small industry plant for the epidemic outbreak of toxic symptoms in its neighborhood. This plant was the only industrial emitter in the region and produced sand of feldspar and quartz by physical methods in this rural area. It emitted an irrelevant amount of harmless fluorides and a typical smell accepted without any complaints over decades. Maybe you know this smell: It is a smell as if cutting a Christmas tree.

The epidemic started after the public got the information that cows — which were the record holders in milk-production in Austria at this time, died in the vicinity of the industrial plant by fluoride poisoning. Now the information associated with the smell changed dramatically from a harmless odor to a smell of death: Even the medical doctor informed me in private that he has been vomiting when smelling the plant. The symptoms of the epidemic were similar to the ones of other etiologically

unexplained syndromes appearing on workplaces (e.g. Mass Psychogenic Illness).

At this time nobody could explain «what is a thought» and in which way a thought can cause physiological, toxicological/pharmacological bodily effects. Our state of knowledge was restricted to describing the follow-up of phenomena in the brain and the nervous system up to the peripheral functions. The fact was state of knowledge that a pharmacologically ineffective pill prescribed by a doctor can cause identical effects as the verum. It is named «placebo or nocebo». But these terms covered the unexplained/as unexplainable accepted «body-mind» problem. Therefore many scientists would accept the causal explanation for placebo as criterion for a solution of the body-mind dilemma.

We made it conclusive that the death of the cows by fluorosis was caused by overdoses of food additives. Our field-studies and further investigations could not explain the epidemic with a toxic component, but they showed clearly the very high level of anxiety against the emissions.

It was not correct to explain the epidemic with «placebo or nocebo» because of epistemological reasons. Therefore I had to formulate an additional hypothesis for the theory of toxicology (which was extended by two former steps with placebo and white-coat phenomenon) by the toxicopy principle. This alternative hypothesis was confirmed with my study.

I reported about toxicopy on the World Congress of Clean Air and Environmental Protection (IUAPPA) in Sydney [11, 12]. I proposed the legal condition of adequate information. The chairman of my session — the president of the Australian Steel industry — refused this with correct epistemological arguments: One confirmation of an alternative hypothesis does not change the state of knowledge. (Do you see the dilemma for health care — caused by this philosophy?!? He claimed: «Go and confirm this in men and women, old and young, rich and poor, different ethnic groups and actually and in the past. Then you have changed the state of knowledge: Industry cannot be ordered to do more than the state of knowledge demands.» I stopped my journey back in Bangkok, founded with members of Chulalongkorn and Mahidol University the Austrian-Thai Toxicopy Research Group, organized with their help (partners within ASEA Uninet) eight international conferences and could confirm all the claimed criteria. (e.g. Kofler W. et al. 1988) The results I have presented six years later at the World Congress of IUAPPA in Montreal [13]. I was invited by the Society of the Medical Experts for Law Medicine. So I was able to change the state of knowledge.

I had to integrate the toxicopy principle into the other models for links of intensive stimulations in physiology, psychology and social sciences — into the «Model of Complex Coping» — just for the requests of the legal procedure [14]. This model was — and is — the standard in Austria in such legal procedures up to the highest courts [19].

In the meantime the toxicopy principle is integrated also into the Extended View: Any (harmless and harm-

ful) cascade of stimuli for functions of the body which can be started by the brain in consequence of a e.g. toxicological stimulus and/or directly by an intellectual, cognitive or emotional assumption can cause identical physiological output. (You see: There are different epistemologically based tools which can be used depending on the problem which is to solve: Sometimes I used «Popper 1994», in other cases I modified «Einstein» [8].

The assumptions about the follow up of stimulus — valuation on the stimulus (e.g. with enforcement, inhibition) — response — valuation of the response as stimulus ...etc. for placebo is experimentally confirmed: This way you can block the effect of placebo and verum with a chemical which blocks the cascade started by the brain.

This causal explanation allows understanding not only placebo, nocebo and toxicopy but also e.g. mass psychogenic illness, repetition strain injury and white-coat phenomenon.

3.2. LINK TO CAUSALLY UNSPECIFIC HEALTH EFFECTS

3.2.1. Unclear correlations between «Chernobyl» and CHD

1992 I presented the toxicopy principle in the Academy in Kyoto [15] after a report of Tsyb about the health effects after Chernobyl in a 6 year follow-up study. He had the dilemma that not only the expected effects on cancer occurred but also etiologically not to understand significant increases e.g. in CHD and mental disorders in relationship with the dose of radioactivity [32]. Tsyb asked me: Are these phenomena toxicopy reactions? I neglected. The relevance of threat should not persist in all the victims over such a long time. I assumed that the symptoms occurred because of a lack of capacity to adapt in consequence of the additional needs caused by radiation parallel to the given pathophysiological abnormalities (e.g. by atherosclerosis).

I formulated different phenomena which should be to observe if my assumption would be valid [18]. The predictions were confirmed later with the data of the survivors Hiroshima and Nagasaki.

I was so lucky that Stewart and Kneale published in 2000 a study about the long-term survivors of Hiroshima and Nagasaki [29]. The authors came to the conclusion that the data of the survivors cannot be valid for statements concerning the risk of a normal population, even after 5 years of survival. The analysis of their mortality rates seems to exclude this.

Their argumentation was: If they are part of the normal population then any randomized sample should show the same mortality distribution if the effect of radiation is standardized. Therefore survivors with no bodily injuries should show per Grey the same risk as survivors with two or more bodily injuries.

But there are significant and relevant differences. As you see e.g. on the differences in Mortality risk for Neoplasm, CHD and all causes for death.

3.2.2. Confirmation: Mortality of Survivors of A-bombs

My argumentation was [20]:

The selection is not standardized. Persons with two or more injuries have an additional demand on capacity for adaptation in comparison with persons without any injuries. Therefore the selection is not randomized. We have to expect an additional negative effect if there is a lack on this ability (at locus minoris resistentiae). Therefore we should expect as a consequence of any environmental disaster two types of effects:

- 1) The specific effect of the related toxic component and
- 2) the causally unspecific effect of the additional need of capacity to adapt parallel to the former given pathophysiological abnormalities.

This conclusion is confirmed by many environmental studies e.g. the London Smog disaster, Seveso, extreme heat periods and also Chernobyl. Because of these papers I was awarded by Nobel Laureate Y.T. Lee as «Th. Kuhn — Hope for the Future for a Sustainable Word.»

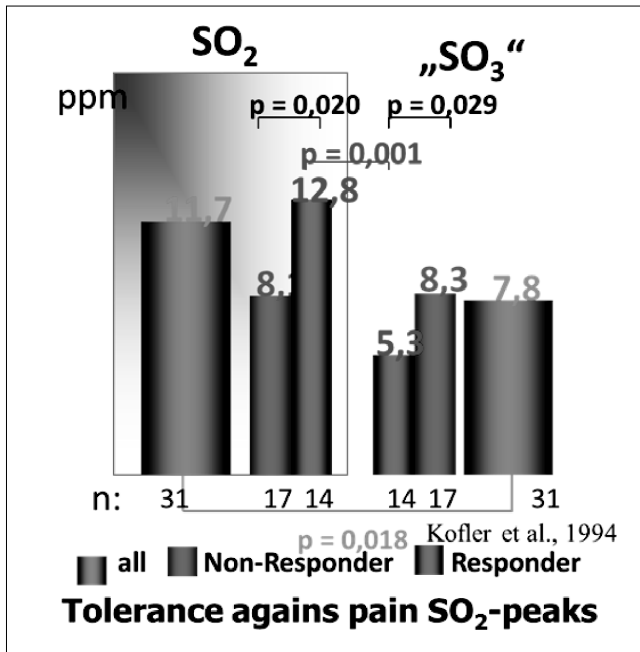
3.3.3. Link to non-competitive effects

The EV predicts that the different cascades causing (patho-)physiological reactions should be connected. It is a prerequisite that a human person can act in a comprehensive way in an environment with permanently many different physical, chemical, biological, emotional etc. stimuli and with a lot of intentions on different levels which are accepted by the same person. We should assume that these connections should be based (often) on feedback systems. The noncompetitive effect can be understood as an expression of such linkages. If the assumption is correct that not only biological factors should be able to influence these effects, then e.g. emotional and cognitive effects too. This should be to prove in experiments.

I have done this experiment with health volunteers. We integrated the students into this experiment. We informed them that we will demonstrate the technique to measure (toxic) odor levels with an olfactometer. This allows to expose the test person one breath long (2,2 sec with irrelevant dose) to a test gas, the next breath with synthetic, odorless air and again one breath long with a higher concentration of the test gas and so on. We invited the students to tell as the concentration when they had the sensation to be able to feel the gas within their lungs and then again when they felt pain.

The official goal of the experiment was to test: Do persons with a low threshold for smelling show also a low level for feeling pain or not? Does a person, who shows a low threshold level for smelling e.g. SO₂, show a low threshold for other odors too?

In a next step we gave them additional information: One for the relatively harmless SO₂ und one for the much more toxic SO₃. We tested the learn effect of the students and asked them to mark within a thermometer-scale the time they thought to be able to be exposed to SO₂ and SO₃ on the level of pain. They marked quite correctly a few



minutes for SO₂ und about 25–30 minutes for SO₃. Therefore is an exposure of 2,2 s no reason for anxiety.

We invited the students to tell as the concentration when they had the sensation to be able to feel the gas within their lungs and then again when they felt pain. Then we told them they will be exposed to the «SO₂» and «SO₃» — but offered them both times the harmless SO₂. This way the only difference between the two tests was only the intellectual information they have been given. Nevertheless nearly 50% of them showed significant differences: Responder accepted significant more SO₂ than non-responder, but significant less SO₂ when they believed to be breathing the toxic SO₃. So we could modify

the identical person just by intellectual information to shift from an insensitive to a very sensitive person [18].

I have no time to present more details from this experiment and other confirmations that we made about a natural principle, valid in any person.

3.3.4. We combine toxicological and socio-psychological effects

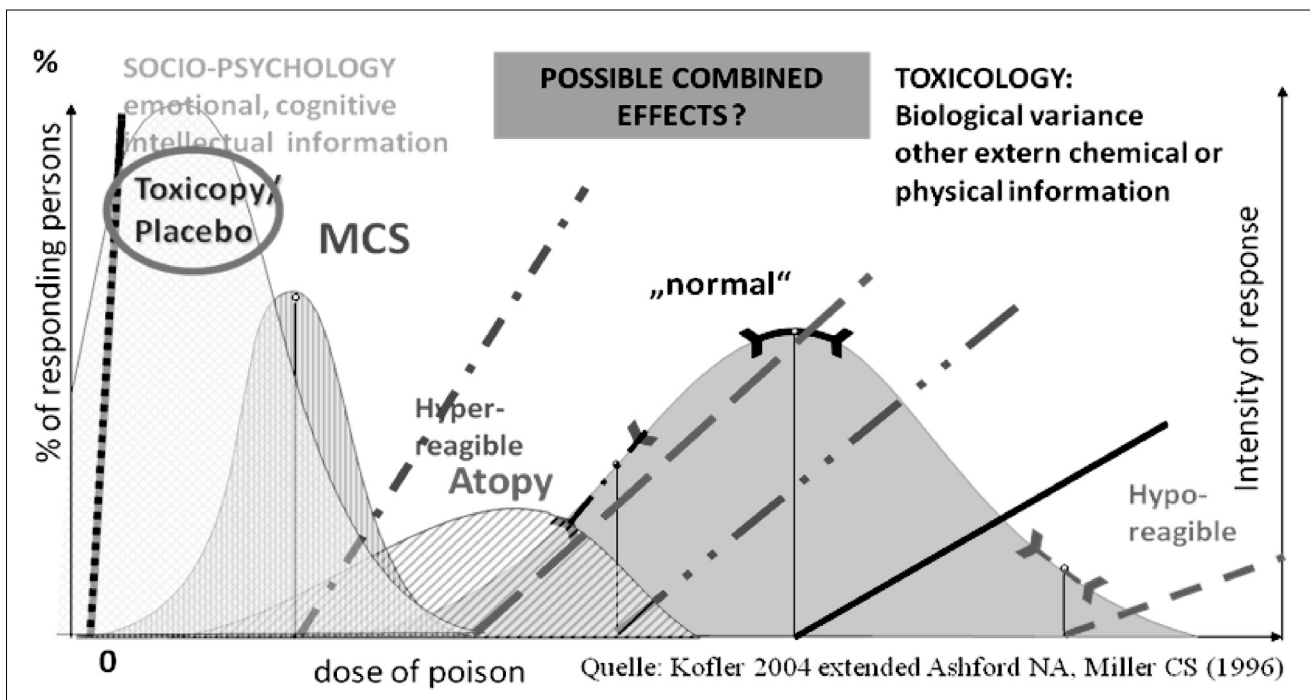
There are typical connections described with the instruments of toxicology and of socio-psychology. We can integrate the psychosocial effects (nearly no relevance of the presence of toxic component) within the famous graph published by Ashford N.A. & Miller C.S. [2]. This demonstrates the empirical fact that the shift of the threshold is linked with a change in the angle of the dose-response rate

Using the «extended view» any cause which is able to influence the threshold should have the same effect on the dose — response relationship because of/if the use of the same physiological functional system within the organism. Enforcement on one aspect causes an inhibition on the other — as Sechenov and Pavlov demonstrated. Maybe a door for an «extended view» on sensibility [22]?

I would like to close my presentation reminding the position of Sechenov, that all external manifestation of the brain can be finally regarded as one phenomenon — that of movement [28]. But I am sure he would agree if we extend the sentence that a starting point of information is to attribute meaning to such movements.

4. AFTERWORD: LINK TO STOCKHOLM-PROJECT

The main intention of this contribution is to motivate experts and students which are working on academic level with scientific aspects of health. It should stimulate them to be



interested in more information and active participation. Therefore the information must be general and in a language which should be understandable even for persons which are not experiences in the different fields which are integrated.

This offers a general principle: We have to focus on the option to give an overview. This is only possible if we skip out detailed information. But detailed information is needed, e.g. to control the correctness of the argumentation. Detailed information is usually presented in highly specialist publications. Often only a small group of experts can read such papers because e.g. of the special terminology. But the «Extended View» should allow to act like an interface between many disciplines. Therefore the intended auditorium covers experts of many different specializations and therefore of many scientific frames and terminologies. It is like the «tower of Babel». We need an instrument to offer data, written text etc. on different levels with different abstractions not only because of different specializations of the users. We made the experience that the same user is interested often on information about the same but — depending of changing in the interest — in varying abstractions. I made good experience with the problem oriented use computer technology: I created different «Glass Plants» to bridge the interests of the neighbors of the environment polluting industry, the owners of these plants and the local and the country government [17]. Now we modified this idea with respect to the options which are given for the International Academy of Science — Health and Ecology [5]. Our Russian Section is publishing the «Herald» in an electronic version. Therefore we will integrate into the website of the Herald a platform where everybody can use for his private interest different available information. So we will handle this problem in a pragmatic way:

We offer information on different levels about the Extended View.

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