

# Toward a Science of Consciousness

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## Conference abstracts

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## **THE CONSCIOUS AND THE SUBCONSCIOUS EXCHANGE 'FRIENDLY' VISITS**

*Poster*

The main aim of this paper is to prove the existence of a new state of mind that I would call the New World (NW). If only I could successfully convey its notion to the world then this would mean a smooth move from the subjective phenomenal experience to a sort of really high ranked or super empirical one. My thesis recalls Plato's "World of Ideas" (WI), Freud's World of Dreams (WD) or the subconscious, and our World of Matter (WM) and physical objects, for comparison purposes. The NW's hypothetical content, location, nature and definition constitute the major task that I have to show all through my presentation. To define it in one sentence: It is a lucid dream in reverse. Therefore it is easier for those who are familiar with Platonic, Freudian, or more importantly LaBergean notions to understand this NW concept. Let us now bear in mind how a lucid dream occurs. If it happens that the conscious visitor could show its presence "there" in the WD then the dream is lucid regardless of its occurrence in a world where the subconscious is the absolute sovereign and host. The reverse of this state hypothesizes that the subconscious visitor accompanies the conscious mind to this very world WM under the control of the

latter now the only and sole sovereign and host. If it happens that the subconscious in the WM is free or not under full control of the host conscious then we may have a case of insanity. The (NW) embraces both the subconscious as a visitor, and the conscious as a host, where dominance and control is for the latter. Anyone who could perceive such a show in this NW may at ease drinks his tea while watching the effect of the subconscious power on the physical objects, and he can as well discuss "matters" of philosophy and study the differences between the NW and other worlds.

**Keywords:** The New World (NW); The Conscious ; The Subconscious; a reversal of a lucid dream.

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## **EVOLUTION OF GLOBAL HUMAN CONSCIOUSNESS**

*Poster*

Evolutionary efficaciousness is measured in how well a given species adapts itself to its environment. In applying this premise to humanity, a model of global human cultural evolution is hypothesized. This exploration of Human Creativity focuses on: - emergence of humanity's direct conscious sense (personal ego), - the field of reasoning from which this conscious sense arises (imagination), - the field of reasoning that follows (knowledge), - and the system in which all is bound together (evolution). All else is derivative - a litany of subsequent emergent events (worship, war, work) endlessly folding back upon themselves, revealed as "civilization." This study begins with the organism that originally births humanity, Earth. Earth's geologic record shows at least five episodes of mass extinction followed by recovery. From these episodic cycles of Earthly death and rebirth, five evolutionary dynamics are named. The millennia-long interplay of these five dynamics brings greater diversity and complexity of life, until we arrive at the species of our epoch; including humankind with its challenges of consciousness. Earth's overarching evolutionary dynamics set the stage upon which human consciousness awakens. These dynamics organically stress (test) all organisms for viability, and trigger within humanity's adaptive psychology an "adverse relationship" with environment. A central focus of evolutionary fitness (rivalry with Nature's adversity) mars humanity's psyche with a sacred wound, as it appears "Mother wants to kill us?!" This sense of adversity provides evolutionary catalyst (bootstraps consciousness) and draws us to move expansively from discomfort to comfort. We are thus physically and psychologically charged to create adaptive responses, cultivating our "experience of consciousness." The sacred wound presents a paradox central to humanity's continued expansion of consciousness. It lives in all intellectual and spiritual questions of unity vs. diversity (Earth-Mother vs. humanity) as the mythologizing of Natural adversity. Resolution of paradox begins in primal innocence at The Great Leap Forward (a state of unconscious unity) and evolves towards fully-manifest awareness (god-self, unity consciousness), prompting many states of consciousness along the way. But it is adversity that awakens humanity's unique creative spirit-dynamo to birth successive states of consciousness as a principal adaptive response. Our struggle with paradox fluoresce human consciousness towards diversity and complexity, following Earth's own metabolic trend. Humanity's mirroring of Earth's evolutionary tendency (diversity and complexity) suggests functional means for human expressiveness. This expressiveness is mapped to Earth's five evolutionary dynamics, using five gender-paired archetypes.

Our mirroring of Earth's evolutionary dynamics via these five archetypes (bio-culturalism) propels human consciousness across time. Humanity's evolutionary bio-culturalism is amplified in these gender-paired archetypes and the mythic devices they enable. At a first level, "high/middle/low dreaming" traits reflect the hopes of humanity (creativity) set against Nature's adversity, also seen in humanity's triune psyche: id, ego, superego, and other important triads. Deepening interoperation of this triune psyche completes two more of the five archetypes to manifest actualized archetypes. Actualized archetypes latently emerge as diverse but interdependent "realities" for individuals, communities, social enterprises, nation-states, etc. (civilization).

**Keywords:** global, cultural, evolution, consciousness, archetype, myth, creativity, psychology, globalization

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## **ORGANIC REASONING SYSTEMS AND THE NATURE OF A PRIORI KNOWLEDGE**

*Poster*

This paper proposes that a single framework is utilized by organic reasoning systems to order, arrange, and process basic information into more complex thought and knowledge. It is argued that multiple incremental permutations of this single format eventually give rise to all abstract thought. Specifically, consciousness may be generated within a chaotic system, i.e., within a hierarchical series of iterated and interlocking frames of reference and their accompanying schematic systems of knowledge. Relying on the detailed research of Jean Piaget (Piaget: The Origins of Intelligence in Children, 1963), it further proposes that the schematic systems of knowledge -- the systems within which abstract meaning, language, and mathematics ultimately develop -- emerge via a higher order isomorphic process. The paper more closely examines the formal operational stage of mental development and the sensorimotor interactions that take place between the fundamental properties of existence and the genetically-derived physical and emotional behaviours that even the lowliest cognitive organisms are born with, and which they automatically express as they struggle to exist within an ever-changing and often hostile environment. The main argument is supported throughout by conducting a six-part investigation into the remarkable relationship between abstract mathematics and physical phenomena. First, an analogous examination of the foundations of mathematics in relation to the underlying core structure of all games - and by extension to all physical reality - is put forward. The initial treatise is followed by a historical review of the similarities between deductive and inductive thought. Next, an analysis of the meta-mathematical reasons why the brain misconstrues elemental mathematical information is carried out. The latter inquiry specifically puts forth an alternative physiological explanation for the generation of "Russell's Paradox" and the "Barber's Paradox". The fourth study examines the subconscious structure presumed to underlie language and the emergence of meaning. Last, a broad epistemological analysis of how humans actually acquire knowledge is undertaken. In the penultimate analysis Go"del's Incompleteness Theorems are utilized in order to pinpoint the major reasons behind our inability to generate machine consciousness. This preliminary study serves as the basis for the final and more

expansive frame-based examination of the isomorphic character of a priori knowledge, metaphor, and the mysterious human faculties of intuition, epiphany, and creativity. Cumulatively, the six studies indicate that the brain processes abstract information in the same manner that it manipulates all other data. Moreover, this conclusion inductively supports the hard physiological research of the German neuroscientist Otto Creutzfeldt, (Creutzfeldt, 1977, pp. 507-517) and the American neurophysiologist Vernon Mountcastle, (Mountcastle, MIT Press, 1978) that a common cortical algorithm seems to be functioning everywhere throughout both hemispheres of the neocortex. References Creutzfeldt, Otto D. "Generality of the Functional Structure of the Neocortex," *Naturwissenschaften*, vol. 64 (1977): pp. 507-517. Mountcastle, Vernon B. "An Organizing Principle for Cerebral Function: The Unit Model and Distributed System," in Gerald M. Edelman and Vernon B. Mountcastle, eds., *The Mindful Brain* (Cambridge, Mass.: MIT Press, 1978). Piaget, J., *The Origins of Intelligence in Children*, (1963). W. W. Norton & Company, Inc., New York, New York.

**Keywords:** frame of reference, feedback loop, schematic systems, infinite regression, pseudoparadox, "Russell's Paradox", isomorphism, a priori knowledge, Human intuitions.

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## **CONSCIOUSNESS AND ACTION**

*Poster*

The Necessity of a man's ratio to culture is caused by trying to attain the source of self essence. On one hand, the essence of the man (reflexive consciousness) is determined by the reflexive essence of culture, on the other hand, it is a factor producing the reflexive essence of culture. To discover culture as a source of human consciousness is possible only through the generation of culture by the man. The real space of culture is a product of human action. The ideal space of culture is a product of human dialogue (communication). On one hand, the reflexive consciousness of the man is determined by reflexive essence of culture. On the other hand, the reflexive consciousness is the essence of human action making culture. It represents the ratio of ideal and real spaces of action. The ideal space of action is the space of ideal forms of action (the purposes and ways of action). The real space of action is space of formed results and forming processes of action. The culture exists until people communicate and cooperate. Outside communication and joint action the culture loses the social sense. During communication and joint action people generate culture, reproducing the internal reflexive ratio of culture by own reflexive consciousness. The necessity of communication is caused by the necessity to design the own ratio to culture. The ratio of the man to culture is not natural. It can't be transferred genetically, as the ratio of an animal to the nature. Communication is necessary to create and recreate ideal space of action as determinants of its real space. Therefore dialogue (communication) is a way of generation of consciousness and action. The object becomes an object of culture when it gets significance (sense). The ratio of significance (sense) arises when the ideal form of an object defines the ideal form of action result (the purpose of action), and the purpose of action defines the real form of an object. Human action is a way of production and reproduction of culture. This process has a special historical significance (sense) because in culture, the nature (by "hands" of the man) accumulates own essence, does it the

object of perfection. Thereby, the man acts as the internal force of the nature providing its self-development. With occurrence of the man in history of the nature the new epoch begins. Due to the own consciousness, the man transforms the nature from the object of action of blind uncontrolled forces into the subject of own history.

**Keywords:** reflexive consciousness, reflexive essence of culture, ratio to culture, ideal space of action , real space of action

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## **CONSCIOUSNESS AND SIGN**

*Poster*

The man is the special essence operating simultaneously both in real, and in ideal spaces. The basis of its action is the preliminary knowledge of the future result of own action. The ability which allows the person to correlate ideal and real spaces is consciousness. Consciousness is only the human ability to complete the real space of nature with its ideal space by own action. The man attaches significance - to the nature, and the sense - to the own action. The man generates own consciousness by special means. Such means is a sign. The sign is artificial space of all people, created by all people to attach significance to the natural nature. The artificial sign unites people in their common attitude to the natural nature. The need for a sign arises, when there is a need to generate joint action as the attitude to the natural nature. Own consciousness is made by the man in joint action with other people. The consciousness is simultaneously both a product, and means of joint action. The consciousness takes place only during generation of a joint action as a way of the decision of new genesis problem of the individual man. As soon as the genesis problem is solved, the joint action is generated, the situation has ceased to be a problem, the need for consciousness disappears. The multi-significance consciousness ceases to be the way of genesis problems' decision and turns into a mono-significance tie of stereotypic schemes and stereotypic results. The sign loses a multi-significance and infinity and turns into a mono-significance and final signal. An "alive" action turns into a "dead" skill. Skills can be united for mechanical works, but cannot be incorporated for the decision of new genesis problem. The problem of mechanisms of genesis of consciousness and sign has not be solved yet. We offer only the scheme of its decision. The natural form of natural object has a <<natural significance>> way of its existence as a qualitative certain natural object. If the natural form of one object has <<natural significance>> for another object, these objects will interact. As the natural form of the object has <<natural significance>>, so the object is <<natural sign>>. The object becomes social sign, when <<natural significance>> turns into <<social significance>>. If the natural form of one artificial subject (sign) has <<social significance>> for all people, the people can cooperate. <<Natural significance>> will be transformed by people to <<social significance>> in a joint action when there is a need to reproduce the natural form of object by social co-action of people. As a result the <<natural sign>> turns into the <<social sign>> by combined efforts. If <<natural sign>> is the means of interacting natural object's reproduction, <<social sign>> is the means of generation of the new joint action. The <<social sign>> as the means of

generation of a joint action is space of the united consciousness. The <<social sign>> as the means of generation of individual action in the joint action is space of individual consciousness.

**Keywords:** consciousness, natural sign, social sign, joint action, natural significance, social significance

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## **THE PROBLEM OF CONSCIOUSNESS IN RUSSIAN PSYCHOLOGY**

*Poster*

Constructing the concept of consciousness in the Russian psychology falls into three main periods. In the first (pre-revolutionary) period the greatest importance must be attached to V.M.Behtere's works on consciousness stratification (1888) and energetics (1903). Behtere's achievements anticipated W.James' less detailed concept of consciousness and self-consciousness and D.Chalmers version of "dualistic naturalism". In the second (early Soviet) period the following works must be regarded as fundamental: L.S.Vygotsky's works on higher order mental functions and the role of communications in the consciousness evolution; A.N.Leontyev's works on the role of activities in the consciousness formation; A.R.Luria's works on consciousness sociogenesis; S.L.Rubinstein's works on the 'onter' - 'inner' correlation in the sphere of consciousness; B.G.Ananyev's works on the early ontogenesis of consciousness. The about-mentioned and suchlike works of the Soviet period are done in accordance with the unitary approach of consciousness phenomenology. Works by M.M.Bakhtin and G.G.Shpet belong to this trend, too. A.R.Luria's neuropsychological research is the basis of the interdisciplinary approach. The third (contemporary) period of consciousness studies in Russian psychology was initiated by V.F.Petrenko's pioneer research on psychosemantics of consciousness. Other major trends are: V.V.Znakov's works on psychology of understanding; V.M.Allahverdov's works on the cognitive psychology of consciousness. Also noteworthy are studies of consciousness in the adjacent psychological branches: works on ecological, political, professional, "folk" and other kinds of group consciousness. Four national conferences on historical psychology of the Russian consciousness, representing a number of trends in studying provincial mentality as a kind of group consciousness, were held in Samara (the Mid-Volga Region). The concept of group consciousness enabled the researches to ascertain both common and specific features of university lecturers' and students' professional consciousness, as well as define peculiarities of the academic consciousness of students living in big cities and small towns. The following factors are defined as determining an individual consciousness: \* individual - environment contact (communications); \* individual autocommunications; \* freedom of will (freedom of a choice, creativity, constructivity) in interaction and in the process of self-determination (self-realization). Comparing Russian and Western research trends, one can see that Russian researches concentrate chiefly on the problems of defining and structuring conscience (V.P.Zinchenko and its) social determination, whereas their Western colleagues give prior attention to biological determination and the so-called to "hard problem" of consciousness, including the following issues: "Why does consciousness come into being?" and "How is it connected with the physical world?". These issues are well-discussed in Russian psychology from the angle of dialectical and a historical materialism. Neurological, informational, phenomenological and cognitive models of consciousness have been equally and widely

represented. Modern discussions of methodological problems in Russian psychology and certain solutions (polyphonism by M.M.Bahtin, methodological liberalism A.V.Jurevich, communicative methodology by V.A.Mazilov) have not yet acquired a generally accepted form, which can be accounted for by the urgent need of fundamental restructuring of the whole system of psychological knowledge.

**Keywords:** History, studies, consciousness, Russia, psychology

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## **FEARS OF CHILDREN WITH VARIOUS TYPES OF DEPRIVATION**

*Poster*

The child of XXI century has to struggle against such fears as his coevals of XX century have never felt: they are provoked particularly by the subjects of horror films, personages of computer games, serial killers, thrillers with scenes of violence and murders, daily information about acts of terrorism in mass media. Series of child's fears researches executed by the author with the use of child's fears structural inquirer allowed to discover the phenomenology of primary school age child's fears in the post-soviet period. Children with Delay of Mental Development (DMD) living in the families and at the children's homes much more often than other children have fear of terrible dreams in which they are killed. Children express this fear both verbally and non-verbally. Mimic and gesture expression of fear is denoted in drawings in the following way: usually there are wide open round eyes, in some pictures the eye pupils are absent or painted red; there is threateningly open mouth with huge teeth. Afraid child is pictured mostly in the following way: somatic constituent - shoulders are greatly lifted and pulled up to head, neck is drawn, arms are hanging along the body or are raised up in the meaning of "give up"; facial expression - lips' tips pulled down, eyes are dilated. Some children make notes to pictures: "Don't kill me, please" or "I often have this dream, I'm tired of him" and so on. From the inquirer (child's fears structural inquirer) it was established that children with DMD that are brining up in children's homes often take passive defensive stand in situations of felling fear as confirmed by drawing tests. The pictures with representations of fear of depth and fear of being drowned are also interesting. Children with DMD draw not only a figure of drowning man in the water but also a bank with grass (and it's already a support) where there is a man ready to come to the rescue, sometimes a man with a ring-buoy or some object is pictured. A fear of darkness is painted usually in the form of taupe or black squares, or the whole area of sheet is heavily hatched; sometimes a room with no man in it is painted but almost always with the presence of window out of which many stars and moon are shining with yellow color. The pictures in which children are trying to express a fear through the movements and actions are also very interesting. In some picture it is painted a group of children with a dog running away of a cemetery ghost. The children's arms stretched aside, the eyes are round with heavily painted pupils, the legs are bended in the knees, and the bodies are thrown back. All the personages do not have support as if they are soaring in the air. In the pictures of 7-9 years-old children with DMD a primitive man representation is often found: a man figure with head and legs only, the absence of fingers on arms and legs, an amebiform man body and so on. It should be mentioned that inmates of children's home are more

reserved in verbal expression (there are answers of the same kind - "nothing", "don't know", etc.), but in drawing test the fears present in range wide enough. The most intensive fears of the inmates of children's home are fear of bandits and fear of "waking up at night" what can be bound up with the specificity of living in children's home where a child awaked at night remains with his fears face to face. For the children that are brining up in family children's home and adoptive family the mentioned fear is not typical. In our research the common thing for all the categories of investigated children is discovered, i.e. while drawing his fears almost every child unconsciously conducts self-therapy.

**Keywords:** fears, verbalization of fears, deprivation, drawing-test

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## **AN ENQUIRY ON THE NATURE OF THE SELF**

*Poster*

The (conscious) self has been an elusive phenomenon both for scientists and philosophers. For the most people, the self is a Cartesian ego which is the subject of experiences and the agent of the actions. While the pitfalls of the assumption of a Cartesian ego (such as the problem of interaction) were well known by the scientific community, it has not been totally dismissed due to its relevance to our subjective experiences. Those experiences include the feeling of agency when we willfully perform some act and the "concept of I" that we all seem to have. So, a competing theory should not only be armed by the scientific evidence, but also be armored with appeals to our subjective experiences. Thanks to the research on intention and willful acts combined with the background provided by the recent philosophical works, it is now possible form such a theory. In this article, a theoretical framework (the agency theory) is provided to explain why and how most (if not all) of us believe that we are selves as Cartesian egos. The agency theory is by no means as simple and straightforward like the belief of a Cartesian ego, but it relies on our needs of motor control as being complex biological agents that act within a complex, ever-changing environment.

**Keywords:** Self, consciousness, intention, free will, binding problem

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## **IDENTIFYING EMERGENT STATES FROM EEG DYNAMICS**

*Poster*

Emergence can be understood as a relation between different levels of de-scription of a system, where states at the higher level arise from a coarsegraining or partition of the space of system states at the lower level. Re-cently the hypothesis has been introduced that higher-level emergent states arise only if the coarse-graining fulfills certain stability criteria [1]. A spe-cific class of coarse-grainings, so-called Markov partitions, exhibit stability with respect to the underlying dynamics insofar as all the dynamical in-formation that is relevant on the higher level is preserved by the coarse graining. Using recent results from the theory of symbolic dynamics [2, 3], we present an approach to find an approximate Markov partition from empirical data, and demonstrate the performance of the method usingsimulated systems. We apply this approach to human EEG data in order to identify emergent states from the brain's neurodynamics (additionallyutilizing methodical input from a classic approach to EEG segmentation known as micro-state analysis [4]). The resulting emergent states are to becorrelated with mental states of the subject, which are independently assessed via report or behavioral indicators. References [1] Atmanspacher, beim Graben (2006): Contextual Emergence of MentalStates from Neurodynamics, Chaos Compl. Lett. 2(2), in press. [2] Froyland (2005): Statistically Optimal Almost-Invariant Sets, Physica D200, 205-219. [3] Gaveau, Schulman (2005): Dynamical Distance: Coarse Grains, Pat-tern Recognition, and Network Analysis, Bull. Sci. math. 129, 631-642. [4] Lehmann, Ozaki, Pal (1987): EEG Alpha Map Series: Brain Micro-States by Space-Oriented Adaptive Segmentation, Electroen. clin. Neurophysiol. 67, 271-288.

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## **EVOLUTIONARY EXPLANATION FOR MICROSACCADES AND THE CONSTITUENT OF QUALIA CONCERNED**

*Poster*

Neural adaptation does not account for artificially stabilized images' disappearing. In those experiments only the location of the spot is stabilized while an image itself within the spot is progressively changing before disappearance, thereby preventing adaptation. It is just a homogeneous background that may be considered to be stabilized due to the lack of changing within it. But the spot fades, so there is another cause to provoke the phenomena. Instead of adaptation, these changes more closely resemble a process of pattern matching (may be, mask matching), i.e. comparison between the two images whose inputs occurred just before and just after microsaccade correspondingly. Thus, the visual system preserves the previous image and, in the experiment, notices something abnormal when instead of the expected pattern there emerges something wrong. The system attempts to resolve the contradiction using intermediate variants of the image and at last removes the whole stain. The saving problem is solved by the brain by means of the different signal latency. The result is that during fixation the two successive phases of the image within the source time interval of a fraction of a second get the adjacent layers of the primary visual cortex (after the transition stage in the lateral geniculate nucleus) at the same time. It provides an opportunity to examine the latest image in comparison to the previous one, visible at the slightly

different angle and from slightly different point. Thereby, angular stimulus position in outer space can be determined uniquely. In other words, the process provides micro-stereopsis even for monocular vision. All this, with some modifications, is relevant to the eye drift which produces the same effect smoothly and steadily, at the level of a single cell. In a whole, taking into account large diversity of signal latency in the primary visual cortex, it may be suggested that the visible surface consists of the several successive images (with slightly different initial times) represented simultaneously. An image is not a plain surface but a multilayered movie. It means the capability at each single moment to observe unconsciously the short history (in the range of approximately 60 ms) of the image's mutations (see Tucson-2006, abstract number 100). This hidden parameter explains how 3D space may be seen at all (even monocularly).

**Keywords:** microsaccade and 3D vision, successive images, constituent of qualia

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## **ACCELERATED COGNITION UNDER DRUGS AND STRESS: TWO MODELS FOR EXPLANATION**

*Poster*

The effect of acceleration of cognition under drugs and stress is often observed. No clear explanation for the effect is given yet. I will propose two explanatory models. The first model is based on the conception of neurophysiological frames as discrete and elementary units of cognition. To use this model, I have to make three preliminary suggestions. First, that any mode of perception, not only visual, for which it was experimentally proven (F. J. Varela), proceeds as a flow of discrete frames. Second, that the frames flow model may be applied not only to perception, but be extended to any type of the lasting cognitive process, including the process of logical and verbal thinking. In the later case, the filling of a frame is not elementary perceptive signal, but elementary logical or speech unit, like a syllable. Third, that duration of a frame of any particular type of cognitive process is flexible. This means that a frame can stretch and compress, deflecting from the normal average value (about 0.1 sec for human vision, what roughly corresponds to the alpha-rhythm). So, the first explanatory model says that the shorter the duration of each single frame, the faster - or, rather, the denser - is the flow of frames. The larger number of frames is sequenced within a lapse of time, the faster the process of cognition. However, the frames flow model cannot explain all the types of the cognition acceleration phenomena. Along with the lasting perceptive processes, there are also non-recurring one-off cognitive acts, like instant recognition, apprehension, and insight. These cognitive acts can hardly be explained in terms of the seriate frame flow. They necessitate some other type of explanation, which is provided by the second model. The model is based on my concept of the pre-logical and pre-verbal operational mind, which, as I suggest, is intrinsic to higher animals along with humans. In the course of evolutionary development of human reasoning and speech, a rudimentary operational mind has been shelled by the more advanced logical and verbal thinking. Thinking makes a plain act of apprehension more explicit, but at the same time a need to follow sequential logical and verbal steps slows down the entire cognitive process. Operational

mind and thinking do work on different principles. The former grasps all the situative factors and compresses them in a one-off cognitive act, while the second unrolls the cognitive data in time and sequentially processes it. So, what happens in the brain when a person in a stress situation acquires the instant insight on how to escape it, is not that the flow of frames accelerates, but that the verbal and logical thinking shell is thrown off and operational mind is disentangled from there under. Stress triggers activation of evolutionary simpler and brute, but quicker operational mind. The operational mind disentanglement model does not reject, but rather complements the frames flow model. Each model is applicable to different types of cognitive activity.

**Keywords:** Altered States of Consciousness; Time Perception, Drugs, Neuroframe

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## **COLOR EXPERIENCES DO NOT REPRESENT COLORS IN COLOR PHYSICALISM**

*Poster*

Color physicalism is a view that colors are physical properties of physical objects. Due to the fact that these properties are defined independently of perceivers' experiences, these theories are also often called as objective theories of colors. For example, in the foremost version of color physicalism, put forward by David Hilbert, colors are identified with types or classes of surface spectral reflectance of objects' surfaces. One particularly important reason to favor color physicalism is its ability to accommodate the phenomenology of colors: colors do appear as being properties that inhere in the surfaces of physical objects. On the other hand, as our experiences of color provide us the idea of colors in the first place, color physicalists need to address the question what is the relationship between colors and our experiences of colors. In this, Hilbert relies on the commonly held idea that color experiences represent the colors, physical properties of objects. In other words, the contents of experiences of color are surface properties of the perceived objects. On this talk, I will argue that the usual ways to explain and determine the contents of experiences are incompatible with color physicalism. First, on theories relying something close to Fred Dretske's information theory, like Hilbert's theory does, the content of color experiences must be broaden to include a great variety of properties, such as velocity of the object and illumination conditions, in addition to surface properties of objects. This, in turn, is in conflict with our conception of colors as surface properties of objects. Second, if a color physicalist chooses to opt for Ruth Milligan's consumer based semantics, or something similar, the content of color experiences arguably would not be objective as color physicalism claims. Hence in either case, color physicalists cannot provide an explanation of colors as content of color experiences that is compatible with color physicalism. That is, color physicalist cannot hold color experiences as representing colors and thus, as our experiences presumably provide us the access to colors, color physicalism leads to an inadequate description of the status of both colors and color experiences.

**Keywords:** color physicalism, color experience, Hilbert

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## **CONTEXTUAL EMERGENCE OF MENTAL STATES FROM NEURODYNAMICS**

The concept of contextual emergence has been proposed as a non-reductive, yet well-defined relation between different levels of description of physical and other systems [1]. Stability conditions are crucial for a rigorous implementation of higher-level contingent contexts that are required to understand the emergence of higher-level properties from an underlying lower-level description. A crucial question of cognitive neuroscience, how neurobiological and mental states are related to one another, can be addressed within this framework. For a particular class of partitions of the underlying neurobiological state space (generating partitions or Markov partitions, respectively), emergent mental states are robust under the neurodynamics [2]. In this case, mental descriptions are faithful representations of the neurodynamics. Refining earlier proposals [3], this approach provides a theoretically sound and empirically applicable identification of mental states and their neural correlates [4]. [1] Bishop, Atmanspacher (2006): Contextual Emergence in the Description of Properties, *Found. Phys.* 36, 1753-1777. [2] Atmanspacher, beim Graben (2006): Contextual Emergence of Mental States from Neurodynamics, *Chaos Compl. Lett.* 2(2), in press. [3] Fell (2004): Identifying Neural Correlates of Consciousness: The StateSpace Approach, *Consciousness and Cognition* 13, 709-729. [4] Chalmers (2000): What Is a Neural Correlate of Consciousness? In Metzinger (ed.), *Neural Correlates of Consciousness*, MIT Press, Cambridge, 17-39.

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## **WHAT COULD POSSIBLY COUNT AS A PHYSICAL EXPLANATION? THE ‘VIEW FROM THE INSIDE’ AND THE CHANDRASEKHAR LIMIT.**

In the Encyclopedia of Cognitive Science Ned Block claims that: "There are two reasons for thinking that the Hard Problem has no solution. 11. Actual Failure. In fact, no one has been able to think of even a highly speculative answer. 22. Principled Failure. The materials we have available seem ill suited to providing an answer. As Nagel says, an answer to this question would seem to require an objective account that necessarily leaves out the subjectivity of what it is trying to explain. We don't even know what would count as such an explanation." The purpose of this paper is to respond to Block's challenge by producing a highly speculative physical theory that can count as a possible scientific explanation of consciousness. We do not know how to formulate neither the necessary nor the sufficient conditions that would determine whether a given physical theory of consciousness is a legitimate possible explanation or not. Current physicalist theories of consciousness can be broadly separated into those that are based on physics as we know it today (David Papineau, for example) and more aposteriori physicalist theories

that appeal to a future physics (for example McGinn, Andrew Botterell). Both approaches are problematic. The first usually demands embracing unpalatable identities while the second implicitly assumes that the unknown but immutable essence of philosophical physicalism can be fixed when appealing to an inconceivable future physics. This paper is motivated by the belief that when it comes to our deepest ontological questions physics and philosophy exhibit an irreducible need to borrow from each other. The approach that this paper will follow can be termed Minimal Aposteriori Physicalism, or MAP and while admitting certain mild forms of 'future physics' it nevertheless demands that they be both conceivable and consistent with everything that we know about physics. (For example, Jacob Beckenstein has shown that the limit on the amount of information that a certain region of space can harbor before undergoing self collapse is itself independent of the details of the physics used or of the nature of its ultimate constituents. It is precisely the remarkable theoretical stability of this property of information that makes it a good candidate for MAP.) The question that I want to ask is what could possibly count as a physical explanation of consciousness according to MAP. Instead of formulating general conditions of possibility I will try and produce a putative token theory of consciousness that could be considered as a legitimate explanation while satisfying the constraints imposed by MAP. I will begin by defining the explanandum (that which needs to be explained) and fixing the explanans (the body of knowledge on which we rely to provide the explanation.) that will enable us to produce a reasonable scientific explanation of consciousness according to MAP. (I will defer discussion of the method of entailment connecting the explanans with the explanandum to the end of the paper.) I will also demand the specification of at least one scientifically falsifiable condition whose satisfaction would turn a possible explanation into a legitimate explanation. The specification of this condition is crucial for the existence of a legitimate possible physical explanation of consciousness. Explanandum The Explanandum will consist of four problems or issues that a satisfying scientific theory of consciousness needs to address. 1) Where should we position the line of demarcation separating conscious and non conscious systems and why? 2) What are the minimal neural correlates of human consciousness and why? Are there crucial physical differences that distinguish conscious neural activity from its unconscious counterparts and if so what are they? 3) If consciousness is physical what is its causal relationship with the rest of the physical world. 4) How can MAP provide room within itself for phenomenological spaces? How can the 'view from the inside' be made physical? In other words, how can wholly non experiential elements produce inner experience? While I don't believe in the possibility of ultimate natural explanations I think that a satisfying scientific theory of consciousness should enable us to make some progress on these issues. The Explanans 1) All the physics that is considered by physicists as physical. 2) A consistent conceivable and non existent physical theory on whose truth our possible physical explanation of consciousness will be contingent. Satisfiability condition In addition I will define a theory specific satisfiability condition as a scientifically measurable and falsifiable condition that if satisfied turns a given possible physical explanation of consciousness into a legitimate explanation. The paper will rely on informational theoretic approaches to black hole ontology in the spirit of Lee Smolin's Cosmological Natural Selection which allows for an inaccessible 'view from the inside' and on the physical nature of singularities in general. The paper will argue that under certain conditions the density of self interacting physical information or some physical measure thereof can undergo self collapse producing singularities that are analogous to the singularities that result from gravitational self interaction. (This approach benefits from realistic interpretations of the collapse of the quantum mechanical wave function like that of Penrose and Hameroff in which the superposition of

different physical possibilities is real and depends on some unknown properties of space and time.) Singularities are thus used to enable the explanans to provide room for a phenomenological space without having to ask how or why it happens. I will show that if the falsifiable condition that I have chosen (and that is analogous to the Chandrasekhar Limit in the case of gravitational self collapse) is satisfied we will still have a legitimate possible physical explanation regardless of how singularities generate a view from the inside.

**Keywords:** ontology, self collapse, information, quantum, explanation, bounce.

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## **CHARACTERIZING DRUG-INDUCED ALTERED STATES OF CONSCIOUSNESS USING QUANTITATIVE SEMANTIC ANALYSIS**

Much research on neural correlates of consciousness focuses on contents of consciousness. Research on states of consciousness may provide additional insights. When pharmacologically-induced states of consciousness are studied, it may be possible to identify neurotransmitters, receptors, and signaling pathways important for different conscious states. We obtained one hundred descriptions each of well characterized (MDMA, LSD, psilocybin mushrooms, and methamphetamine) and poorly characterized drugs (2-CT-7, 5-MeO-DMT, 5-MeO-DiPT, and AMT). Independent component analysis and related dimensionality reduction approaches were applied to a term-document matrix to identify prototypical experiences associated with each drug. Results had good face validity for the well characterized drugs. The model improved classification accuracy of poorly characterized drugs to 86% versus 51% from term-frequencies. Information visualization tools were used to illustrate phenomenology of different drug-induced altered states. Differences between the poorly characterized drugs indicated that these novel hallucinogens may have different underlying pharmacological activity profiles. Study of their receptor binding and activity profiles may help clarify the neurochemical correlates of states of consciousness.

**Keywords:** hallucinogen, psychedelic, state-space, independent component analysis, states of consciousness

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## **PHENOMENOLOGY, IMAGINATION, AND MINDREADING**

Increasingly detailed versions of simulation theory (ST) promise insight into the way in which humans "mindread", that is, the way in which we represent others as conscious agents with particular mental states. Proponents of ST claim that mindreading is typically carried out with minimal appeal to explicit psychological rules/theory. ST provides an explanation of how we feign counterpart states and attribute these (as genuine states) to a target agent. In his latest work on mindreading, Alvin Goldman (2006) proposes that "enactment imagination" (E-Imagination) is the central mechanism in high-level simulation, and that E-imagination distinguishes high-level mindreading from low-level mindreading. High-level simulational mindreading is purposeful and largely conscious, he says, whereas low-level simulation is driven by imitative mechanisms that are largely automatic and unconscious. If high-level mindreading turns out to be successful, it is because some sort of resemblance or isomorphism is consciously intended and happens to be achieved between the counterpart state and a relatively complex target state. For various reasons, Goldman claims that isomorphism does not exist in any meaningful sense at phenomenological level; rather, simulation theorists ought to specify resemblance at the neurological level. I contend that resemblance at the neurological level (in the form of mirror neurons, for example) is likely to provide an account of automatic mimicry and imitation in low-level mindreading, but is highly unlikely to account for the perspective-taking mechanism in high-level mindreading. In my view, it is a perspective-taking mechanism that Goldman is attempting to isolate via his notion of E-imagination. Higher order perspective-taking occurs when the character and content of an intentional state are explicitly represented as foreign, as issuing from another spatio-temporal location. I argue that target states may be represented as foreign if and only if the counterpart states are themselves phenomenal (i.e. intuitions). Perspective-taking is successful if counterpart states turn out to be phenomenally isomorphic (in a sense to be determined) to target states. The upshot is that Goldman's notion of e-imagination does not sufficiently explain our unique capacity for occupying allocentric spatial, temporal and psychological perspectives.

**Keywords:** Mindreading, Phenomenology, Imagination, Simulation

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## **TOWARD A REVOLUTIONARY SCIENCE OF CONSCIOUSNESS**

*Poster*

**REVOLUTIONARY VIEW OF CONSCIOUSNESS AS AT THE CORE OF NATURE'S BINDING TOGETHER ONENESS** - This introduces the view of "consciousness" as the pure relationship of connection in nature (in lieu of the math-centered view promulgated by Galileo). **ONENESS TO DUALITIES** - This bifurcates into a two-directionality (like a single road traveled in two directions) of consciousness. This primordial split is here named "separationconsciousness" and "connection-consciousness" and points to physical/non-physical separations and connections. Moving toward "separation-consciousness directions," a scissor cuts a piece of paper, our minds sharply delineate an idea and our feelings become divisive - and common principles apply in understanding all three domains to bridge the mind/body gap. Because we are a microcosm of a larger order, there are vastly potent implications to this view: **LIFE** - The concentrated presence of consciousness, manifesting essentially as

connection-consciousness , is seen as evolving into organic life. Thus cut a living organism and it suffers in pain. Cut it more, it dies. **OVERALL EVOLUTION** - Bridging mind/body, the inner world innately seeks connectedness in the evolution of its consciousness - alongside the needs for physical wholeness. **PIERCING THE MATH-CENTERED VEIL**- Forget what you learned in "pure" sciences as gospel. The classical math-centered orientation has really been on trial for four centuries. Clear results are in. They include cancer epidemics from chemical pollutions and the invention of atomic weapons. If the very essence of consciousness is connection, not separation, but math symbols best abstract separation-consciousness to the extreme - the resulting mechanical view opposes the root essence of nature in a reversal illusion. Thus we need (and as the late Willis Harman intuited) a "completing Copernican revolution " - adding the inner equivalent of a vast geo-heliocentricity reversal. **NEW HEALING ARTS** - "Connection-consciousness" is relatively simple because it points back to oneness. "Separation-consciousness" moves oppositely toward progressive consciousness dualities - forming superficial "connective separations" and deeper "separative separations." In disease processes this manifests as surface/ acute symptoms (feverish, irritating, hyper-conscious of pain) evolving into depth chronic symptoms (cold, unconscious/numb, burnt out, lacking in sensations of pain). As a naturopath I have used such guiding principles to turn around lives. This understanding is thus far more than theoretical. It powerfully guides a real turnaround healing of our consciousness and of life in our surrounding environments. **HEALING OUR ENVIRONMENT** - We don't realize that by blindly accepting and impregnating the math-centered view of the 17th century, we have created both an exploitative rat race society that fails to best serve our lives and a surrounding rape of the living earth. Ecologies of life are being ravaged - and with lethal consequences that include a global dying of coral reefs and rain forests or mass pollutions and extinctions of teeming life. **BREAKTHROUGH SCIENCE** - As a century ago William James, Freud, and Jung gave us breakthrough visions toward a new science of psychology, we today must accomplish the very same toward a science of consciousness - to literally save ourselves and surrounding biological riches from yet more overwhelming waves of wanton biological destruction.

**Keywords:** Science of Consciousness

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## **LOGICAL IMPLICATION AND ATTACHMENT**

Following intuitionistic mathematics, mathematical truth is what can be obtained as a product of one's mind. It is given by the fact that our mind can grasp a conviction by reasoning. The intuitionistic interpretation of logical implication says that an implication is proved when one can conceive a method transforming any proof of the premise into a proof of the conclusion. Mathematically, the method is interpreted as a function acting on variables. As it is well known, the notions of function and variable are reached in the adolescence or later, since the subject must be able of separation/detachment from the object she is considering. Following phenomenologists, in order to understand something, we have to experiment it inside ourselves. Then, to reach the full power of implication in our mind, complete separation and full self-consciousness is necessary. In a purely phenomenological view, the concrete

origin of the notion of method is the path. The PATH schema is then considered the origin of the deductive process and of logical implication. As long as this is irreversible, one needs an oriented path. However, our mind can conceive also an unoriented notion of PATH, corresponding to a symmetric relation between the two endpoints, and equivalent to a simple connection schema. The two notions are often superposed, see for example the definition of straight line, referring to a unique layer and two orientations. In the symmetric case, the PATH schema should model logical equivalence, where the sufficient condition becomes also necessary and conversely, rather than logical implication. We know that logical implication is reversed and confused with logical equivalence in some moments of everyday life. This is due either to carelessness or, on the contrary, to excessive involvement. We claim that in the second case the subject disregards spatial orientation in favour of a symmetric connection schema, since it represents an affective bond of attachment. One agrees with this conclusion after the analysis of advertising, which, in order to force us to dis-reasoning, that is to buy unnecessary objects, tries to induce us to go back to childhood and dependence, or to induce some form of attraction. The symmetric schema is not only dis-logical. It represents also a pre-logical factor very important for our reasoning, since it allows the first intuition. In mathematics, the first intuition of a theorem often concerns a link between two truths, before realizing "to which side" the theorem goes. To cite the mathematician L.E. Brouwer, who founded intuitionism, logic is secondary w.r.t. mathematics, since the deductive component of a theorem concerns uniquely what our mind cannot see "in one view". So intelligence implies one has to deal with oriented schemata as well as with symmetric ones, and what arises from our life prior to separation and self-consciousness is fundamental also from the cognitive point of view. With this, we discover again the cognitive content of the results obtained by researches on attachment, first carried out in England in the 50's. Anyway, now, such information has got a fundamental computational content too. In addition, I think that what has been evidenced above is consistent with a theory characterizing unconscious processes as computational quantum processes, for what concerns the reversibility of such processes, the instantaneousness of intuition and the fact that an unoriented path is like the superposition of the two orientations.

**Keywords:** logic, computation, intuition, self-consciousness, attachment, cognitive schema

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## **DEPRESSION AS A DISEASE OF CONSCIOUSNESS**

*Poster*

Depression frequently causes both diminished and altered states of awareness. While these states are seen as part of the phenomenology of the disease process in depression, they can also be considered fundamental changes in consciousness with depression seen as a disease of consciousness. If one focuses on the quality of consciousness, depression represents a reduction in the intensity of sensory experience, focus of cognition, reduction in emotional expression, and intentional focus. The multiple subjective changes in awareness caused by depression include dulling of perception, including that of colors, sounds, and tastes suggesting general changes in qualia. Those afflicted with depression also report subjective problems with memory, concentration, and attention, which can also be objectively quantified

with neuropsychological instruments. The broader phenomenology of depression includes also physical changes including problems with diminished sleep, decreased appetite, weight loss, slow movement, fixed or decreased facial expression, paucity of speech. These physical changes don't define aspects of consciousness but are part of the global phenomenology of depression and define a physical as well as a mental disease process. Extreme cases of depression can better illustrate the pathology of consciousness in depression as subjective changes are more numerous and severe. Withdrawal from usual life activities and reduction in the quality and intensity of mental life are more substantial. Severe forms of depression can include catatonia in which the sufferer does not move or speak and cannot report on subjective mental life. The breadth and scope of spontaneous behavior and thought in depression can be so restricted, similar to the case of catatonia, that depression can be a real world model of the "zombies" of consciousness thought experiments. The severely depressed person illustrates some naturalistic zombie-like behavior that may better illuminate thought experiments in this area. Chalmer's "hard problem" of consciousness can be illuminated by considering depression as a disease of consciousness. Those aspects of consciousness in depression which illustrate the hard problem include a decreased intensity of a sense of self and of intentionality which change with the degree of depression. With respect to neurology of depression; there are clear neurophysiological correlates of depression. Changes related to neurotransmitters, neuronal cell loss or neurogenesis, the neuroendocrine system, markers of brain inflammation, and electroencephalograms are all noted in depression. We can model theories in which the underlying pathology rests with consciousness or with the nervous system or some combination of the two. Further, just as neurophysiology in areas like cognition, perception, and the nature of anesthetic effect can illustrate connections to consciousness, so can the clinical aspects of depression and its neurophysiological associations illustrate consciousness if we consider depression as a disease of consciousness.

**Keywords:** depression, pathology, catatonia, disease, neuropathology, biology

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## **THE PHYSICAL STRUCTURE OF CONSCIOUSNESS**

*Poster*

In recent years, quantum models of consciousness have become "the rage", but the 'classical' consequences of these quantum models have been largely ignored. That is unfortunate because a simple notion of 'classical' electromagnetic theory can be used to explain the coherence in the brain that is missing from the quantum models. MTs (microtubules) in the axon are actually microscopic quantum magnetic inductors. When the MTs 'fire' in tandem with the axon wallcapacitors, they become microscopic LRC radio transmitter/receivers. The complex signals that they transmit initiate an even more complex pattern with the MTs in the other neurons with which they resonate. In other words, coherence between neurons is a classical electromagnetic phenomenon in spite of the quantum mechanical characteristics of the individual MTs. This physical model also accounts for mind and consciousness, which are separate but related complexities that correspond to the material brain/body

biological system. A simple and more complete physical model of life, mind and consciousness can be based upon the reality of a fourth dimension of space. However, this model depends upon a unification theory that involves an Einstein-Kaluza five-dimensional space-time. Therefore, this model is uniquely different from other quantum and non-quantum models of mind and consciousness.

**Keywords:** fourth spatial dimension, magnetic potential, coherence, microtubules, LRC tuning circuit, Einstein-Kaluza model

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## **THE EVALUATION OF BODY CONSCIOUSNESS BY THE EVALUATION OF DESCRIPTIVE SPEECHES PRODUCED BY SCHIZOPHRENICS : A WORKING HYPOTHESIS**

*Poster*

Body representation and language are two fundamental problems encountered by schizophrenic subjects. This study is a first step in the investigation of the interaction between language and body representation through various sensory methods. Our notion of body representation is based on a multidimensional model: kinesthetic, sensorial and symbolic representations of the body (cfr figure 1). figure 1 : Multimodal and integrative models of representation of the body Design of the experiment The present experiment is particularly focalized on symbolic representations. The goal is to evaluate how a schizophrenic subject translates through his own speech his conceptualization of the parts of the body as well as the way in which he describes photos implying a man expressing an action, an emotion or implying a local incongruity constituting a violation of certain pragmatic rules. For each photo, the man is in a realistic environmental context. This experiment allows thus to integrate the linguistic, perceptive and emotional aspects of the body. Two groups were composed : the experimental group, composed of 15 general schizophrenic subjects diagnosed by a psychiatrist (i.e.: 295 in DSM IV) and a control group, composed of 15 non schizophrenic subjects paired by sex (6 women and 9 men), age (mean : 43 years-old, spread out from 25 to 60 years-old) and level of education. All selected subjects have no alcohol or toxico dependencies, mutilations or alterations of the body. Description of the photos used for the testing 18 photos are distributed into 3 categories (the photos were randomly presented via a computer screen) : - A person alone carrying out an action (crawling, climbing, jumping, running, walking, throwing) - A person alone expressing an emotion (neutral, sadness, anger, fear, joy )- Images with incongruities (burn, mutilation, interior absent, skull apparent, man with ladies' garment, twisted body) For each photo, two tasks are required : 1) a physical description of the character presented on the photo2) a semantic judgment of the appearance of the character by checking off a list of analysis (18 possible qualifiers) We formulate the following hypotheses : 1. The organization of the lexemes produced related to the body is different according to whether subjects are schizophrenic or not 2. The schizophrenic will carry out a description of the purely physical body, with little emotional investment 3. It will be possible to detect particular patterns of description of the body according to whether they are schizophrenic or

not 4. Local incongruities will be more quickly located by non schizophrenic subjects5. Profile judgements related to the photos via the semantic grid of analysis will be different according to whether the subjects are schizophrenic or not6. Typical mechanisms of defense of schizophrenics (cleavage, projection) could be observed in the analysis of contents as in the analysis of differentiating semantic production

**Keywords:** schizophrenia, self consciousness, body image, body schema, language, descriptive discourse, discourse analysis

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## **FREE WILL IN THE HUMAN BRAIN - A SOLUTION OF THE PROBLEM**

*Poster*

The problem of free will was activated by Benjamin Libet's findings that a conscious decision to perform an act is preceded by an unconscious process in the brain. This finding has been explained to show that there is no free will, since the unconscious processes determine the realization of the conscious decision. Libet himself, in believing on a free will, explains the freedom with the individual's possibility to inhibit or allow an act, e.g. to use a "veto" or not. - We are here considering a conscious willed decision being the final end product of a causal chain of logical/rational argumentation occurring in real time (tr). In this case there is no free will. In order a really free will to exist, there has to be processes in the brain, that do not occur in physical, real time. And in fact, such processes do exist: in psycho-physical experiments it was found (Bergström 1964) that in subthreshold conditions there appeared imaginary number concepts in subject's description of the physical stimuli. The conclusion was made that unconscious brain stem processes occur in imaginary time (ti). Since, according to Stephen Hawking, the imaginary time is orthogonal to the physical, real time (tr), the conscious processes are independent of the unconscious processes. This gives a new aspect to the problem of free will! In a series of investigations (Bergström and Ikonen 2002, 2004, 2005) an empirically founded model of the neuromental limbic Self was developed, where the space of this Self was of Mandelbrot type with two dimensions, one imaginary number dimension (i) showing the effect of the brain stem, and one real number dimension (r) showing the effect of neocortex to the limbic Self. The space of the Self is a complex number space (i,r) in which the dynamics of the complex vector (c) can be considered as representing the dynamics of thinking and the balance between the unconscious and conscious processes of the brain. It could now be simulated, using the Julia equation, cases in which the thinking was dominated by either the (tr)-dimension, being consciously logico-causal, or the (ti)-dimension, being unconscious. In the former case no free will existed and in the latter case a free will was present. This shows that thinking, leading to a decision to act (see Cotterill) can be guided by a free will. Also, the theory of a "veto" (see Libet) can be considered as being correct. This "veto" in our thinking gives us an ability to freely select the right possibilities for our thinking and decisions, and life in our environment.

**Keywords:** Free will, conscious and unconscious processes, decision making, self of Mandelbrot type

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## IS A SCIENCE OF CONSCIOUSNESS POSSIBLE?

*Poster*

1. It is claimed that the following argument must be refuted for making possible a science of consciousness: P1# If we cannot be able to formulate the mind-body problem properly, then a science of consciousness is useless. P2# We cannot be able to formulate the mind-body problem properly. C1#: A science of consciousness is useless. Because C1# follows from P1# and P2# by Modus Ponens, and P1# seems to be reasonable, the only questionable part of the argument is P2#. 2. It is argued for P2#: P3# We can be able to formulate the mind-body problem properly if and only if we know the solution to it (when we formulate it). P4# We do not know the solution of the mind-body problem. C2# We cannot be able to formulate the mind-body problem properly. Because C2# follows from P3# and P4#, and P4# seems to be reasonable, the only questionable part of the argument is P3#. 3. It is argued for P3#: P5# If we can be able to formulate a question (problem) properly, then we know the answer (solution) to it (when we formulate it). P6# If we know the answer (solution) to a question (problem) (when we formulate it), then we can be able to formulate a question (problem) properly. C3# We can be able to formulate a question (problem) properly if and only if we know the solution to it (when we formulate it). C3# follows from P5# and P6#, and validates P3#, but P5# and P6# seems to be questionable. 4. It is argued for P5# and P6#: P7# If a semantical system can be able to contribute to the proper formulation of a question (problem), then the answer (solution) to the question (problem) is deduced (known) from the semantical system itself (when we formulate the question (problem)). P8# If the answer (solution) to the question (problem) is deduced (known) from the semantical system itself (when we formulate the question (problem)), then the semantical system can be able to contribute to the proper formulation of a question (problem). C4# Any semantical system can be able to contribute to the proper formulation of a question (problem) if and only if the answer (solution) to the question (problem) is deduced (known) from the semantical system itself (when we formulate the question (problem)). C4# follows from P7# and P8#, but P7# and P8# seems to be questionable. 5. It is argued for P7# and P8#: they can be deduced from two axioms: A1# A semantical sysytem can be able to provide proper semantical values for the terms of a lan-guage if and only if the semantical system is free of any mereological bias. A2# A semantical sysytem is free of any mereological bias if and only if any question (problem) about the individuals serving as semantical values is answered (solved) satisfyingly. 6. It is claimed that it is easy to see the truth of A1# and A2#. The fine details are provided at the conference! 7. It is claimed that if these arguments are sound, then C1# can be interpreted as saying only that there is no need for science of consciousness further and above which already exists. That is to say, perhaps, an ideal physics could be able to explain consciousness one day. 8. It is claimed that a further argument based on A1# and A2# might be stated : P9# If we are able to formulate questions (problems) properly, then those are no longer proper questions (problems). P10# If we are not able to formulate questions (problems) properly, then there are no proper ques-tions (problems). P11# If there are no proper questions (problems), then there

are no proper answers (solutions) to them. C5#: Neither there are proper questions (problems) nor proper answers (solutions) to them. Here only P9# seems to be questionable, but it is easy to see that P9# can be deduced from A1# and A2#. 9. It is claimed that we can expose the argument given in 1. in a more general way: P12# If we cannot be able to formulate scientific questions (problems) properly, then science is useless. P13# We cannot be able to formulate scientific questions (problems) properly. C6# Science is useless. 10. It is claimed that, after making the relevant changes, one can be able explain 10. similarly to 1. 11. It is claimed that if these arguments are sound, then C6# can be interpreted as saying that science is useless if and only if science is nothing more than the sum of scientific questions and answers: i.e. some kind of science might be possible, perhaps a pure practical one. 12. It is claimed that, without the refutation of these arguments, one does not even know how to start to answer the question: might any kind of science be possible?.

**Keywords:** mereological bias, proper formulation, proper question (problem), proper answer (solution), pure, practical science vs. propositional science.

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## **THE WORLD OF "CONCEPTS" IN RELATION TO CONSCIOUS PERCEPTION AND ACTION**

*Poster*

In this presentation I will discuss a method of understanding conscious perceptions and conscious choices or actions (in general: conscious events). In every conscious event elements from the following three realms come together: 1) the realm of consciousness, I, self, subjective awareness, 2) the objective world: space-time with all its matter, particles, energies, 3) the conceptual world of for example mathematical objects such as circles, lines and numbers. However, not only rational perceptions such as thoughts and understanding (and their related decisions) have concepts corresponding to them. Other categories of perceptions and choices have corresponding 'generalised concepts' as well. Sense perceptions for instance have qualia (such as the redness of a certain red) as 'generalised concepts'. Emotional perceptions and choices also have 'generalised concepts', or 'qualia'. With the use of examples I will explain why these qualia can be considered 'concepts'. All inscrutable specific aberrations of the perfect circle are part of the conceptual world, not only the perfect circle. In the perception or the making of a specific real circle they are bound together in one conscious event. The same applies for the other categories of perception and choice/action. This will be discussed in the framework of a quantum mechanical interaction between self and the objective world.

**Keywords:** Conceptual world (ideas), perception, action, subjective awareness, qualia

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## **EMBODIED KINDS AND NON-REDUCTIVE MATERIALISM**

*Poster*

I will look at the issue of non-reductive materialism through the lens of a theory of natural kinds in embodied cognitive science. Kim's arguments, that, because of the causal closure of the physical, mental kind terms must reduce to the physical kind terms on which they supervene, rely on a simplistic notion of the referents of natural kind terms. I will argue that a more nuanced understanding of natural kinds, one that takes into account the practice of cognitive scientists, does not lead to a reductive conclusion. The two most popular accounts of natural kind terms, causal theory and descriptivism, will be examined, leading to the conclusion that they need each other. Without a causal theory of reference descriptivism leads to a pernicious incommensurability. Without some descriptive help, causal theory is unable to successfully 'baptise' a kind by ostensively picking out a token. However, allowing descriptions a role means that the essentialism normally associated with causal theory is untenable. Without this microphysical essentialism Kim's reductionist arguments don't succeed. I will make particular reference to Joseph LaPorte's "Natural Kinds and Conceptual Change" (2004), illustrating these ideas using a recent example of meaning refinement of a kind term, that of Pluto and the planets, and extending the argument into the realm of the cognitive sciences, where conceptual change is more profound and potentially more problematic, due to the self-referential nature of our naming aspects of our own minds. Embodied cognitive science shows how complex kinds can develop that are not synchronically dependent on local physical substrates, and how such kinds can emerge within a monistic, materialist universe.

**Keywords:** Natural kinds, non-reductive materialism, emergence, essentialism, descriptivism

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## **TOWARD A NEW SUBQUANTUM INTEGRATION APPROACH TO SENTIENT REALITY**

Recent experimental results have proved intractable to explanation by resorting to existing physics paradigms. This fact, along with certain fallacies inherent in mainstream physical-cognitive theories of mind, have encouraged the authors of this paper to transcend the currently operative limits of investigation, thus to explore the abyssal depth of the still uncharted, but highly rewarding, SubQuantum regimes. The subquantum is herein assumed to co-existentially accommodate proto-units for matter, energy and Information, which are thereby brought onto an equal ontological footing, in the subquantum domains. Devolving its argumentation and orientation from the Nobel Prize winning Fractional Quantum Hall Effect, which opened the perspective toward a further divisibility of the Quantum domain, hitherto considered as an irreducibly fundamental description of nature, the hereby proposed inter-theoretic model claims to satisfy advanced scientific and philosophic requests as reformulated for a conceptually new working hypotheses. Subquantum potentials evolving in the Prime Radiation Matrix

result in organizing functions able to interfere with classical local determinacy chains, operating at the Quantum levels of randomness inherent in space-time-like matter configurations, leading to highly complex representational patterns, linked to their phenomenal correlates in macroscopically detectable systems. Our model is strongly rooted in an overwhelming experimental evidence derived from multidisciplinary contexts of scholarly pursued exploration tracks as amply documented in this presentation. Our basic understanding identifies the Quantum Potential (Quantum Field Theory) as a superluminal Sub Quantum Information-carrying aether able to interact with matter and physical forces at well defined Space-time positions injecting their Information content into our world of observables by modulating the event potential. This interaction is possible as soon as matter is defined by an n-degree entanglement state of SQ complexity. Absolute void refers to lack of matter which equals to a space-time sequence contending Information in its nascent, non-aggregative form (the Sub quantum plenum) as observed from our Space-Time perspective. It contains implicated layers of increasingly subtle pre-quantum domains, which each one at its manifestation range may be organized in complete worlds of the kind our own is, each one of them ranging till its own "absolute void" as transition state to the next implication level of reality. These smooth transitions are made possible by the hyperdimensional feature of the pre-quantum Unit, its multi-layer holographic distribution in entangled reality domains, as well as their ensemble ability to exhibit multiple simultaneous velocity values in multi-patterned holographic matrices. Introducing a quite innovative approach to the most controversial nature of Brain/Mind interaction, the pre-quantum tenets rely upon experimentally testable assessments. Our proposal has a strong outreach into unprecedented explanatory options for anomalous output data distribution in non-conventional exploration fields, whose statistically significant results become logically integrated into epistemologically sustainable blueprints. Constructively debating reasoning tracks suggested by eminent scholars with most impressive credentials in widely quoted references across our presentation, we emphatically challenge the current paradigmatic tenets that are obviously inspiring endless sterile controversies disseminated in widely accessible and mass-media supported literature. We hope to succeed in our attempt to persuasively reverse misleading ontological tendencies relying upon their disqualified metaphysical backgrounds by asserting an upside-down epistemological approach for the primary determinism that Information structures have upon their physical counterparts. Our views are perfectly consistent both with conventional empirical treatment of space-time defying representational variables, and their causal primacy upon Quantum implementation systems of their content, in the integral range of their polyvalent manifestation. Detailed descriptions of mind/matter entanglement patterns are supplied, as running in the holistic superimplicative sentient reality domains, under the overarching regulation of Cosmic Harmony, underpinning a continuous creation cosmogenetic process. As our analysis addresses a pre-temporal range, the thus defined endless time vector allows, ab-initio, existing inherent resonance links in any SQ subtlety domain to turn into fluxes and organization effects, leading to sequential entelechial self-contended worlds. These primeval harmonic SQ resonances are the very pattern of our overarching cosmic harmony just mentioned, representing the source of all conceivable manifestation and interconnectedness.

**Keywords:** subquantum, fractional quantum hall effect, mind brain interaction, information, information transport, quantum potential, quantum field, information field, DNA phantom effect, cytopathogenetic effect , coherence, decoherence, exocytosis

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## THREE FEATURES OF PERSPECTIVAL CONTENT

Sensorimotor accounts of perception (Noe", O'Regan, Hurley) have introduced reasons to identify two types of perceptual content. On one hand is the perspectival content of perception, which is perceptual content which changes with our perspective on the world. On the other hand we have the factual content of perception which remains constant despite changes in perspective. Once these types of perceptual content are identified, it becomes a challenge for any theory of perceptual content to account for the way in which these types of content relate to one another, or perhaps to reduce one type of content to the other. We suggest that first steps towards meeting this challenge can be made by gaining a clearer notion of perspectival content itself. Specifically, we suggest that the treatment of sensation (*Empfindung*) in the Husserlian phenomenological tradition (especially work by Gallagher and Sokolowski) offers results which can be used to elucidate the nature of perspectival content. These are the three features of perspectival content that we discuss:

1. phenomenal equivocality This first feature focuses on a basic difference between perspectival and factual content. One type of perspectival content can correspond with different types of factual content and one type of factual content can correspond with different types of perspectival content. For example, a perspectival sensation of whiteness can either correspond with the factual representation of a white surface or with the factual representation of the glossiness of a non-white surface. Also, the perceptual representation of the fact that the surface of an object is uniformly white corresponds with a variety of color sensations as the object is seen from a variety of perspectives.
2. the lived body as carrier of sensation We are able to gain different perspectives on things because we are embodied perceivers. Perspectival content, then, is made possible through the skillful movement of the body.
3. dependent upon immanent temporality A final, and perhaps most important, feature of perspectival content is that it is essentially bound-up with the temporal structure of one's experience. Unlike facts which hold over time, perspectival sensations are always experienced as a part of the temporal flow. These features suggest that perspectival content is neither an ineffable quality of experience, nor is it easily reduced to facts about the way the world is "from here." Rather, perspectival content admits of a rich structure that we can access in reflection. What remains is to understand how this structure relates to our factual representations of the world.

**Keywords:** perspectival content, Husserl, sensorimotor, temporality, embodiment, sensation

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## THE TWO FACES OF NEW MYSTERIANISM

*Poster*

The position known as new mysterianism (NM), whose chief proponent is Colin McGinn, states that some problems (philosophical or scientific) will never be solved by humans. With respect to the problem of consciousness, NM argues that the knotty problems of consciousness, particularly the hard problem and the explanatory gap, will never be solved. Some philosophers have suggested that there are several plausible versions of NM. In fact, I argue that there are two main types of NM possible, what I call strong NM and weak NM. Strong NM is ontological in the sense that it argues that consciousness can never be fully explained nor completely understood due to inherent limitations in human cognitive capabilities. Weak NM, on the other hand, is epistemic, meaning that humans can understand a good deal about consciousness (for instance, what it is, how it works, how it came about) by studying it scientifically. However, it leaves open the possibility that the fundamental puzzles of consciousness may or may not be completely explained and understood at some point in the future. By far the more controversial view is strong NM and it is this position that I wish to argue in favor of. In doing so, I will show how strong NM is closely related to a philosophical tradition which recognizes some fundamental limits to human knowledge.

**Keywords:** new mysterianism, Colin McGinn, consciousness, hard problem, explanatory gap,

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## **ROBOT'S PROTO-INTENTIONALITY**

*Poster*

I propose the notion of proto-intentionality as the name of a feature one may attribute to a robot who fulfills the criteria derived from works by such thinkers as Valentino Braatenberg, Rodney Brooks, Aristotle, Christof Koch, Richard Dawkins, Isaac Asimov, and Selmer Bringsjord. Braatenberg (1984) proposes that a kind of free will can be attributed to his Vehicle 12 - a robot equipped with a module that, based on the number of brain elements activated at a given moment calculates the number of brain elements to be activated in the next moment. Indeed, the generated numbers were virtually unpredictable for a human observer. Brooks (2002) discusses Genghis - a legged insectlike robot, whose brain is a collection of augmented finite-state machines. When perceiving a moving infrared source, the robot treated it as prey and chased it scrambling over anything in its path. Brooks argues that it was the robot's own will, since there was no place inside the control systems of Genghis to represent any intent to follow something. Buller (2006) mentioned simulated creatures who evolved a habit of entering a dangerous zone in order to discharge fear and this way get some pleasure in Aristotelian meaning. Koch (2004) suggests that one of the signs that a creature may be endowed with consciousness is a behavior revealing hesitation about what to do. Although the suggestion applies to living creatures, we could apply it also to artifacts, provided that hesitation is not a programmed masquerade. Dawkins (1999, p. 59) hypothesizes that consciousness may arise when the brain's simulation of the world becomes so complete that it must include the model of oneself. Let us also recall the scene from I, robot movie where the detective watches a recorded lecture by Dr. Lanning who speaks from behind the grave: Random segments of code, that have grouped together to form unexpected protocols. Unanticipated, these free radicals engender questions of free will. Creativity. And even the nature of what we might call

the soul. The above Isaac Asimov vision has a good chance to make the vision reality through the MemeStorm psychodynamic working memory (Buller 2006) when developed to process multimodal memes. Yang and Bringsjord (2003) state: Cognitive modelers need to step outside the notion that mere computation will suffice. They must face up to the fact, first, that the human mind encompasses not just the ordinary, humble computation . . . but also hypercomputation: information processing at a level above Turing machines. The collected criteria of protointentionality, i.e. Braitenberg criterion, Brooks criterion, Aristotelian criterion, Koch criterion, Dawkins criterion, Asimov criterion, and Bringsjord criterion, are proposed as a toolset for analyzing or comparing robotic solutions as for their potential of intentionality.

**Keywords:** robot, proto-intentionality

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## **THE COGNITIVE PROCESS CONSCIOUSNESS MODEL OF THE MIND**

*Poster*

The Science of the Mind A guided tour of 20 systemic laws of the operation of the mind A. How the body supplies functionality ex-adaptively for the mind. L1. Conditioning of the senses is necessary to make directable Attention possible. L2. Awareness lies at the intersection of perceptual learning and memory. L3. The full functionality of the Mind depends upon prior bipedal development. L4. Mental 'moves' co-opt both bi-pedal motility and digitated bi-manual analyticity. At this stage, it is possible to define CONSCIOUSNESS as a feedback-based conditioning frame on sensory information. B. The symbolism of language must conscript prior bodily management protocols. L5. Mental processing is discretized into episodic segments around symbols. L6. Language competence (all basic competences) requires four-part processing functionality. L7. Bodily management templates are specialised through attention for symbolic language. L8. Linguistic templates are further specialised through dual attention for tasking. At this stage, it is possible to define the MIND as a closed four-process, three mode, case-management system over learning. C. Learning builds stereotyped competence templates to preserve attention. L9. Basic templates manage input/output processing, and tri-layer data coherence. L10. Tri-layer templates encode memory primitives into a remembered repertoire. L11. High functionality in performance depends upon four-template phrases called competences. L12. Tri-level templates and four-part competences provide a recursive model for adaptiveness. At this stage, encapsulating competence-based PERFORMANCE keeps attentive resources free to monitor contextual outcomes. D. Competent performance in context provides re-assessable experience. L13. All knowledge grows in three disjoint but index-able perspectives (private; shared; common). L14. In unfamiliar scenes, learning prioritizes attention to new objects ahead of processes. L15. Object memory (conceptual knowledge) is segregated from process memory (know-how). L16. Competent understanding requires reflective symbolic recollection of contextual experience. Here, vignettes of EXPERIENCE-BASED KNOWLEDGE in discrete aspects must be recollectively compiled into local integrations of understanding. E. Intelligence comes from broadening the repertoire of linked understandings. L17. Recollective thought builds a

localized, six-part contextualised repository of discrete understandings. L18. The Self develops through four overt stages (self, self-awareness, self-authorship, navigation). L19. The prototype domain of the Self becomes the template for each new domain of development. L20. Overt stages of experience and interspersed reflective understandings builds depth & intuition. At this stage, INTELLIGENCE grows combinatorially from infilled repertoire, as

Ndomains\*Ordersdepth\*2suborders\*3perspectives\*4templates\*3layers become globally integrated. F. Wrap-up discussion of model and resolution of 'mysteries' of consciousness. Overview of the integrated Cognitive Process Consciousness (CPC) model of learning and framework of development: a coherent model of human higher brain function from consciousness to intelligence. Validity tests: learning disabilities, emotional distress and empirical trait assessment in personality. Explanation of the direct impenetrability of each level of the model, when looking back upon each multidimensional formulation, from the habitual view-point of mature operational consciousness.

**Keywords:** integrated cognitive & developmental model: brain, consciousness, mind & knowledge

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## **ESSENTIAL NATURE OF HUMAN CONSCIOUSNESS**

Consciousness is carefully positioned in relation to a range of cognate issues that may be construed as either inclusions or derivations of consciousness. Other aspects or associates of consciousness not so disposed include memory, attention, awareness and perception. The precise inter-relation of these four is teased out to leave a clear and identifiable role for consciousness. However, we cast all five of these co-associates into two clearly differentiable sub-types, called Type I and Type II. The views of William James (who discards Type I consciousness in favour of its functional or 'knowing' components), David Chalmers (who focuses particularly upon Type I consciousness) and Daniel Dennett (who denies anything more than Type II conscious processing, explicitly denying existence for Type I consciousness) on consciousness are all challenged or developed by the presentation here of a novel scientific conception of pure consciousness.

**Keywords:** pure consciousness, adaptive system, regulatory framework, directable attention

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## **THE PROPRIOCEPTIVE NATURE OF SYMPTOMS IN CLINICAL MEDICINE**

*Poster*

The clinical situation (from klinikos -bed Gk) has existed from time immemorial. Symptoms have always played an essential part in clinical endeavour and have always been regarded as perceptible, but their etymology originally suggested "falling together" (Gk) rather than "subjective" (as against

objective signs), as they have connoted under the influence of Cartesian dualism. In the Anglo-American world, following the supposed demise of introspectionism and the advent of behaviourism, with its subsequent evolution into cognitivism based on the computer model of mind, the place of symptoms and illness experience in general has had a trying and uncertain time in clinical medicine with its tendency to diminish the accuracy and authority of symptoms as a result of an emphasis on mechanistic disease models separated from a Cartesian psychology. The concurrent development of European Husserlian phenomenology and its evolution into the post phenomenology of Heidegger, Merleau-Ponty, Potocka and Pylkko, as well as the continuing practice of Buddhist meditation, has not seemed to make much difference. However the subsequent evolution of classical cognitive science into embedded/embedded models of mind/body suggests a possible reprieve. The key practices of clinical medicine on-line consist of an observational group of diagnosis, prognosis and disability assessment, and an action group which includes therapy, prevention and rehabilitation. If the bedside observation of a sick person is regarded as the core clinical situation, this can be regarded as a second person relationship between a professional observer/healer and a sentient being who is continually proprioceiving her/himself in a nondual, pre-subject/object situation, and that the symptoms are not subjective qualia to be observed in a situation that is named by Heidegger as *Vorhandenheit*, occurrence or presence-at-hand (a dualistic observational context that is presupposed to be already extant by introspectionism, behaviourism, classical cognitivism and much of modern medicine). But symptoms are first observed on-line in the nondual reversing observational context of patient proprioception, and key clinical terms change their meaning in this context- e.g. dis-ease become deviation from ease, and dis-ability becomes deviation from ability; proper diagnosis (Gk. knowing through) and therapy ( Gk. medical attendance) become more dependent on the direct dynamic observation of the patient in real time, quantified using deictic coordinates which will include identifying and following relevant and salient variables which travel together ( form a syn-drome Gk. travel together along a track) without distinguishing whether they are subjective or objective until later, during the confirmation stage, which may of course include Cartesian coordinates leading to more objective certainty within the context of occurrence. Clinical observation thus provides the original context in which a patient lies sick in bed in dialogue with and under observation by a physician, and thus can give rise to a more accurate and authoritative description within the deictic coordinates within which she/he actually lives and experiences her/his illness.

**Keywords:** proprioception, clinical, symptoms

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## **A GENERALIZED ARTIFICIAL PERCEPTION LOOP IN CICEROBOT, A ROBOT FOR MUSEUM TOURS**

*Poster*

The current generation of systems for man-machine interaction shows impressive performances with respect to the mechanics and the control of movements; see for example the anthropomorphic robots produced by the Japanese companies and universities. However, these robots, currently at the state of the art, present only limited capabilities of perception, reasoning and action in novel and unstructured

environments. Moreover, the capabilities of user-robot interaction are standardized and well defined. A new generation of robotic agents, able to perceive and act in new and unstructured environments should be able to pay attention to the relevant entities in the environment, to choose its own goals and motivations, and to decide how to reach them. In a word, new robotic agents must show some form of artificial consciousness. To reach this result, a robotic agent must be able to simulate different functions of the human brain that allow humans to be aware of the environment that surrounds them. Epigenetic robotics and synthetic approaches to robotics based on psychological and biological models have elicited many of the differences between the artificial and mental studies of consciousness, while the importance of the interaction between the brain, the body and the surrounding environment has been pointed out. The described approach takes into account the externalist point of view about artificial consciousness by hypothesizing that the conscious perception process is based on a generalized perception loop between the brain, body and environment. In particular, the perception loop is in part internal and in part external to the robot, and it comprises the interactions among the proprioceptive and perceptive sensor data, the anticipations about the perceived scene by means of emulators of the external environment, and the scene itself, through a focus of attention mechanism. The role of simulators in motor control has been extensively analyzed from the neuroscience point of view. Grush proposes several cognitive architectures based on emulators. The basic architecture is made up by a feedback loop connecting the controller, the plant to be controlled and a simulator of the plant. The loop is pseudo-closed in the sense that the feedback signal is not directly generated by the plant, but by the simulator of the plant, which parallels the plant and it receives as input the efferent copy of the control signal sent to the plant. In this case, the sensations are generated by the system as the output of the simulator. A more advanced architecture proposed by Grush and inspired to the work of Gerdes and Happee, which is at the basis of the implemented perception loop, takes into account the basic schema of the Kalman filter. In this case, the residual correction generated by the comparison between the effective plant output and the emulator output are sent to the plant simulator via to the Kalman gain. In turns, the simulator sends its inner variables as feedback to the controller. In this case, the sensations are output of the simulator process and they are of the same type of sensory inputs, while the perceptions are the inner variables of the simulator. The emulator inner variables are more expressive than rough sensations and they may contain also information not directly perceived by the system, as the occurring forces in the perceived scene, or the object-centred parameters, or the variables employed in causal reasoning. The Robot Vision System takes into account the concept of Kalman filter in order to implement the generalized perception loop. The robot receives in input the proprioceptive data from internal sensors as the odometric sensor, and the perceptive data from the external sensors, as the scene acquired by the video camera. The perception loop works as follows: the robot vision system receives in input the robot position, speed and so on from the proprioceptive sensors and it generates the scene anticipations, i.e., the expectations about the perceived scene by means of emulators of the external environment. The perception loop is then closed by the perceptive sensors that acquire the effective scene by means of the video camera. In the current implementation, the process of emulating the scene is performed by a computer graphics simulator that generates the expected image scene on the basis of the robot movements. The mapping between the anticipated and the perceived scene is achieved through a focus of attention mechanism implemented by means of suitable recurrent neural networks with internal states. A sequential attentive mechanism is hypothesized that suitably scans the perceived scene and, according to the hypotheses generated on the basis of the anticipation mechanism, it predicts and detects

the interesting events occurring in the scene. Hence, starting from the incoming information, such a mechanism generates expectations and it makes contexts in which hypotheses may be verified and, if necessary, adjusted. The robot perception loop The perception model has been tested on an effective robot architecture implemented on an operating autonomous robot RWI B21 offering guided tours at the Archaeological Museum of Agrigento. Several public demos, some in the presence of media, validating the capabilities of the robot have been given over the last years. The task of a museum guide is a hard one for the robot because it must tightly interact with its environment which is dynamic and unpredictable; moreover the robot must be able to rearrange its goals and tasks according to the environment itself.

**Keywords:** Robot perception, Artificial consciousness

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## **SYNTHETIC PHENOMENOLOGY: EXPLOITING EMBODIMENT TO SPECIFY THE NON-CONCEPTUAL CONTENT OF VISUAL EXPERIENCE**

An important, but relatively neglected, aspect of a science of consciousness is the requirement for a scientific phenomenology, or systematic means of characterizing the experiential states, whether they are being explained or are being used to explain something else (e.g., behaviour). In those few cases where need of such a phenomenology is acknowledged, the default approach is usually to use languagebased specifications, such as "the visual experience of a red bicycle leaning against a white wall". Such specifications are problematic for several reasons: 1. They are not fine-grained enough to capture the full detail of the experience being modeled; 2. They are overly conceptual, in that they can specify the experience only of subjects that possess the concepts used in the specification (e.g., \*bicycle\* or \*lean\*); 3. They are "cold" in that there is no essential connection between the experience so specified and affect, while many experiences are "hot", having constitutive implications for action; 4. They are disembodied, in that no explicit reference is made in the specification to the kinds of abilities necessary for being in an experiential state with that content. What is needed, then, is an alternative means of specifying the content of experience that overcomes some or all of these limitations. An obvious way to deal with problems 1) and 2) for the case of visual experiences is to use visual images as specifications. For example, one might try to specify the nonconceptual content of an experience a given robot is modeling by displaying the raw output of its video camera on a computer screen. Although perhaps a step in the right (non-linguistic) direction, this is too simplistic to model, say, mammalian visual experience. For example, the "output" of a human retina at any given time contains gaps or blindspots that are not part of experience. Furthermore, our visual experience, as opposed to our retinal output, at any given time is stable, encompassing more than the current region of foveation, and is coloured to the periphery. This talk reports on progress in our lab toward developing a means of specification that attempts to do justice to these aspects of visual experience. The method employed is that of synthetic phenomenology: the specification of experiential states by reference to the states of a

robotic model of consciousness. The means of specification consists of a depiction constructed from actual and counterfactual states of the robot's expectations of what its sensory input would be were it to make this or that action. The 2D spatial structure of the possible actions (head movements) generates the 2D structure of the depictions. In this way, some progress is made toward overcoming problems 1-4, above. If possible, a demonstration of experiential specifications using a robot (currently an AIBO platform) will be given, in the context of modeling a non-trivial experiential phenomenon: change blindness.

**Keywords:** synthetic phenomenology artificial intelligence nonconceptual content vision change blindness machine consciousness

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## **QUANTUM BASED MICROTUBULE CELLULAR AUTOMATA AT PHYSIOLOGICAL TEMPERATURE**

*Poster*

Over a decade ago Hameroff and Penrose put forth the Orchestrated Objective Reduction (Orch OR) theory of consciousness. Since that time the theory, which posits that consciousness is the result of quantum computations within protein structures called microtubules located within neurons, has generated much controversy. The leading objection against this theory states that interactions of a microtubule system with an environment at physiological temperature would cause any quantum states within the system to decohere thus destroying any quantum effects. It has been argued that biologically relevant temperatures may enhance quantum processes, and that isolation of microtubules by biological mechanisms, such as actin gel states or layers of ordered water, could protect fragile quantum states, but to date no conclusive studies have been performed. As such working quantum based models of microtubules are required. To investigate the possibility of quantum processes in relation to information processing in microtubules a computer microtubule model based on the cellular automata models of Smith, Hameroff and Watt, and Hameroff, Rasmussen and Mansson is used. The model uses a typical microtubule configuration of 13 protofilaments with its constituent tubulin proteins packed into a seven-member neighbourhood in a tilted hexagon configuration known as an A-Lattice. The interior of the tubulin protein is taken to contain a region of two areas of positive charge separated by a barrier of negative charge and is based on electrostatic maps of the protein interior. The interior arrangement constitutes a double well potential structure within which a mobile electron is used to determine the states of an individual tubulin dimer. Dynamics of the system are determined by the minimization of the overall energy associated with electrostatic interactions between neighbouring electrons as well as thermal effects. Classically the model allows transitions for electrons with sufficient energy to overcome the potential barrier in which the new configuration lowers the system's energy, or if the configuration raises the system's energy with a finite probability. Quantum mechanically the model allows the electron

to tunnel through the potential barrier allowing transitions for which the system's energy is lowered even if the electron does not possess the necessary energy to overcome the potential barrier, or for configurations that raise the system's energy with the same finite probability as in the classical scenario. The emergence of self-organizing patterns that are static, oscillating, or propagating in time are taken as the determining factors of the system's capability to process information.

**Keywords:** cellular automata, quantum, microtubule, information processing, orch OR

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## TOWARDS A CONSCIOUSNESS OF SCIENCE

*Poster*

In order to arrive at a science of consciousness, it is necessary to have a firm consciousness of science. Science can be seen as an attempt to escape from our ordinary everyday involvement with the world. Appearances, illusions or doubts due to our sleepiness, moodiness or stress cannot play a role in scientific knowledge and are actively removed in its formation. In everyday life we may guess a distance, in science we must measure it. This implies a change in the stance we adopt towards the world. Only by adopting an objectifying perspectiveless stance can scientific knowledge be achieved. In this way we correct our everyday pre-scientific experience of the world [1]. In the light of the fact that the scientific knowledge is a 'purified' version of our experience of the world, it seems natural to assume that the only essential and true approach to reality is the through the application of this objectifying stance. This, however, implies that our only access into our initial involvement with the lived world is through the scientific method. Science as the judge over the reality of all our deepest and intimate experiences. This philosophical self-interpretation of science is a danger to many science. But this particularly true for a science of consciousness, since this field is an explicit attempt to find the structures of the original lived experiences through which we place ourselves in the world. This danger can be exemplified by contrasting the abstract space to the lived space [2]. The space in which I live contains things that are within reach or far away, left or right of me, either high or low, depending on the position and length of my body. This space cannot exist not independently of myself, but stretches itself around me. It is always already oriented in relation to my bodily capabilities. My experiences of this lived space is subject to change as my capabilities change through growth, training or habit acquisition. The dependence on the subject and the variability of the structure of space are removed by adopting the scientific objectifying stance, which leaves us with an objective abstract space. We see however that the empty abstract space is nothing like the oriented lived space. The abstract scientific version of space does not provide us any means to construct a theory of the lived space [3]. And it is this realm of lived experiences that it is interesting to us in a science of consciousness. References [1] R.C. Kwant, De Wijsbegeerte van Merleau-Ponty, Spectrum Utrecht, 1968.[2] M. Merleau-Ponty, Phénoménologie de la Perception, Gallimard Paris, 1945. [3] F.J.J. Buylendijk, Algemene Theorie der Menselijke Houding en Beweging, Spectrum Utrecht, 1968.

**Keywords:** Scientism

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## **WHAT MARY DID ALREADY KNOW AND JACKSON DID NOT: WHY THE KNOWLEDGE ARGUMENT FAILS**

The famous Knowledge Argument against Physicalism presented by Frank Jackson in his paper "Epiphenomenal Qualia" is already 24 years old. But Jackson's paper has a tempting lure. Many are induced to follow Jackson's conclusion, although the author himself does not subscribe his early conclusion. He tries to show that the knowledge about "all physical facts of the world" does not imply "all knowledge about the world", for it leaves something out of the physical explanation, viz the qualitative features of conscious experience, or the qualia. Then Physicalism must be false. If qualia are non-physical entities, then they could be only epiphenomena. The argument is based on an intuitive idea: Mary, a color-blind neuroscientist. She never saw colors. One day she is released from her black and white room, and then a ripe tomato is shown to her. Will she learn something new, namely, "What it is like to see a ripe tomato"? The spontaneous response would be, yes. But I don't think so. In this paper I try to show that Mary could previously realize that she will see no ripe tomato or no blue banana (as Dennett imagines). In reality she will not see any color. At most, she will see a grayscale object. I will examine three points in Jackson's argument. The first point was already stated: is it possible someone who lived in a black and white room and who never saw colors, when she is released could immediately recognize colors? Second, is the concept of 'physical information' correct? And last but not least, does "to know" only in the mastering of a set of propositions (knowledge as a propositional phenomenon)? The main question is the plausibility of the Thought-Experiment. To the first question I say no, because Mary did not learn how to see colors, and therefore her neural mechanisms were not developed to detect wavelengths between 400 and 700 nm (the visible spectrum). The second and third questions are akin. In order to answer it I propose a cognitive model of knowledge based on information-processing: before being a propositional process, to know is an informational-cognitive process. The conclusion is that the argument is self-contradictory, for if Mary knows everything about color vision (as Jackson supposes), then she knew prior that she would see no color. Therefore the argument does not present a challenge to Physicalism. In fact, the argument is faulty, and Jackson did not realize that.

**Keywords:** Qualia, information-processing, process of knowledge, physicalism

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## **PRESUMED EXISTENCE, A REFLECTION ON THE HUMAN RESPONSIBILITY.**

*Poster*

A contribution to the discussion of Free will and Consciousness In the last decennia there is a discussion going on on Free Will, Consciousness and Determinism and in the end Responsibility and Moral behavior. Especially Antonio Damasio (Feeling of what happens and The Error of Descartes) and Daniel Wegner (The illusion of Conscious Will) did research on this subject. Earlier Bernard Baars, Daniel Denett and now days Suzanne Blackmore, Roger Penrose and others make statements about this subject. In 1980 Kees Ruys and Peter den Hollander wrote a paper called: Verondersteld Bestaan (Presumed Existence). In this paper they show how to look at the existence in the whole. They subtitled it as "bezinning op de menselijke aansprakelijkheid" (reflection on the human responsibility.) Its this paper that is used as a basis for the tutorial of Free Will en Consciousness. There are three different meanings of consciousness in: knowing, knowing to know, and controlled by the known. Reality is something that exists not only in a subjective way: an object takes place and time. Do you need more proof? But even non-material things can be proved to exist: when you sense them they exist. Men live because of a need for (self-)confirmation positively and negatively. Therefore one can not speak of a Free Will. But still we experience a Will. So lets call it than Will, lets leave the Free behind. This Will is inspired by the (self-)confirmation based on reality and causes Consciousness. But we can only witness the things that had happened, we can't witness things that lay in the future. We always must determine after the event that this event had taken place. And what do we do now with our responsibility? Well lets talk about first thing first and then see how we will in our responsibility.

**Keywords:** Free Will and Consciousness

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## **PLAY, ENACTION AND THE DIALECTICS OF WORLDMAKING**

Enactivism (Varela et al 1991, Thompson, 2007) articulates several major shifts towards embodied cognition in terms of its biological and experiential roots. In order to prosper, enactivism must move beyond its basis on sensorimotor skills into the problems of higher mental function. To this end, it should provide accounts for transitional activities that deploy novel sense-making capabilities, thus overcoming the paradox of situated action that avoids representationalism by a deep engagement with the environment but apparently constrains cognition to the here-and-now. We find in human pretend-play an example of how cognition is both tightly coupled to the circumstances and yet capable of producing novel meaning as a result of a dialectic process of value-generation. Play cannot be understood without taking experience seriously since otherwise its lack of obvious purpose renders it mysterious. Play is the controlled, often socially-mediated, experientially-guided creation of norms and strict submission to the emerging rules. Play is not mostly assimilation (Piaget, 1951); it is in fact a breaking of the constraints of self-equilibrating cognition. It does not confront an environment that places demands on an agent. The urge to play pre-exists the game, but becomes definite as an experience only through the game. It seems impossible to account for play if we resist the active participation of the child in transforming her world, hence its appeal to enactivism. In play, the child detaches meaning (how something is perceived and what it demands) from a situation. Such 'detachment' is an embodied activity. It begins by relying on concrete similarities - a doll resembling a person - but soon these

similarities are mostly given by the child's own use of gestures (movements, sounds, etc.) and their recursive effect on perception (Vygotsky, 1966). The resulting experience of ambiguity can be fun; the bringing into presence of the absent, a partial cheating of 'reality'. Once objects are imbued with new sense by actions, which in turn demand an interpretation, these objects partially share the meaning of cars, houses and creatures. The child brings forth alienated meanings, and novel experiences, through gestures and then - and here is the equally radical trick - submits to the reality thus created through adaptive equilibration (the absence of which would make play unchallenging and 'un-realistic'). The combination of a concrete situation with embodied alienated meaning is the freedom-engendering paradox of play. When the child becomes the regulator of play, the activity takes off as a proper form of life, a skilful manipulation of consciousness through situated action. Over time, play is a self-structuring process governed by the dialectics of expansion and contraction of possibilities. Its freedom lies in the capability that players acquire of creating novel non-arbitrary constraints. The playful body can now steer its sense-making activity and set new rules for itself and others. Piaget, J. (1951). Play, dreams and imitation in childhood. London: Routledge. Thompson, E. (2007) Mind in Life: Biology, Phenomenology, and the Sciences of Mind, Harvard UP. Varela, F. J., Thompson, E. and Rosch, E. (1991) The Embodied Mind, Cambridge, MA: MIT Press. Vygotsky, L. S. (1966). Play and its role in the mental development of the child. Soviet Psychology, 12, 62-76.

**Keywords:** pretend play, enaction, situated action, gestures, sense-making, value-generation, dialectics

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## **CHANGES OF SPEECH EMOTIONAL PROSODY RECOGNITION FROM VOCAL CUES IN AGE COURSE**

*Poster*

Process of humans' adjustment to the environment and, particularly, to the acoustical environment, is the important aspect of cognitive development. On the other hand, understanding of a speech utterance includes cerebral processing both linguistic and affective information that it contains. The aim of the study was to examine the changes in speech emotional perception at noise background induced by human development and signals' acoustic parameters important for recognition of emotional valence. The speech material has been obtained by recording of professional actor's emotion portrayals. A brief sentence was of neutral semantic content. The simulated emotions were neutral, happiness, anger. The data obtained by acoustic analysis of speech signal included mean values of energy, fundamental frequency (F0), first two formant frequencies (F1, F2), utterance duration, articulation rate. The neural mechanisms underlying the perception of positive and negative emotions in speech signal were studied by comparing the accuracy of recognition (AR) and reaction times (RT) in 42 adults (2035, 3650, 5165

years old) and 63 children of different ages (710, 1113, 1417 years old). The data obtained on AR, RT and set of parameters obtained by acoustic analysis of speech signal were submitted to analysis of variance and stepwise (forward) linear regression analysis (LRA). This method allowed to reveal the main factors influencing the values of AR and RT. AR obtained for the sample of children was shown to depend on the predictors of F0, F2, signaltonoise ratio (s/n), age, while results for each age group had different significant predictors. The data for 710yearolds and 1113yearolds had no significant differences (main predictors were F0, s/n, sex). In the 1417yearolds recognition depended on F1, F2, s/n, and gender of the listeners. The emotional recognition performance in adults depended statistically significant on the age, emotion valence factors in the whole and on the emotion valence within each age group. The averaged AR decreases with ageing, positive emotion being better recognized in all age groups. LRA revealed acoustic parameters significant for perception of emotional prosody: F0 for the whole sample and for each age group and also articulation rate for 2035yearolds. Support by grant RFH 070600821.

**Keywords:** emotion recognition, speech prosody, cognitive development, acoustic parameters

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## **CAPGRAS SYNDROME – A CASE STUDY IN PHILOSOPHY OF PSYCHIATRY**

*Poster*

We will start by presenting a new case of Capgras syndrome in a Dutch schizophrenic male. Capgras syndrome is a delusional misidentification syndrome where the patient believes that familiar individuals are actually replaced by (non-human) duplicates. This patient responds well to the drug risperidon with respect to his schizophrenia, but not with respect to his Capgras. Based on the literature about Capgras syndrome, lesions were expected in the right hemispheres, especially in the frontal or temporal regions (Edelstein & Oyebode 1999; Papageorgiou et al. 2003). Neurological research, however, showed that that this was not the case (only minor damage elsewhere). We conclude the paper by presenting three suggestions, one for psychiatry, one for neurology and one for the philosophy of mind and cognition. The psychiatric suggestion First of all it is not always clear whether the mental illness is caused by brain damage or by a neurochemical deficit. In psychiatry all too often it is assumed that only the latter is the case. We recommend that psychiatric patients should more often be examined for brain damage using techniques like MRI. The neurological suggestion Secondly, with respect to the syndrome of Capgras, we have good reasons to believe that some individuals have Capgras because they have brain damage in the mentioned brain regions. However, Capgras can also be caused by something else, for the disorder can arise with these brain areas intact. This means more research should be done (e.g. look at the neurochemical balance in these areas). If there are different types of Capgras, we will need different types of treatment. Neurological studies should reveal this. The philosophical suggestion We believe that philosophy should clarify concepts using scientific data. In the Capgras case there seems to be nothing wrong with the cognitive capacities of the patient: he recognizes his family and has beliefs about them.

However, there is something wrong with the feeling accompanying the intentional state: the feeling of familiarity is missing. The cognitive state does not function properly. At least in this case we can draw the conclusion that for proper recognition of familiar persons, intentionality alone is not sufficient, one should also have the phenomenal feel of familiarity. This makes this case of recognition an emotion rather than a cognitive state (interpreted as having only intentionality). If this conclusion can be generalized to other cognitive states, we will not be able to solve the problem about how cognitive states fit in a physical world, unless we also have solved the problem of phenomenal consciousness. We argue that from an evolutionary point of view this makes sense. We believe that this is on a par with a certain mild interpretation of skill theories of consciousness and is supported by research in other areas, like the memory research done by Elisabeth Loftus.

**Keywords:** Capgras syndrome, evolution, intentionality, philosophy of psychiatry, qualia

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## **PECULIARITIES OF SOCIAL PERCEPTION AND SELF-IMAGE IN TEENAGERS WITH IMPAIRED VISION**

Peculiarities of social perception and self-perception in teenagers with slight degrees of myopia formed in school age were studied. The following methods were applied: sociometric questionnaire, Leary questionnaire (real-Self & ideal-Self), Bass-Dark questionnaire, Life Style Index questionnaire (Plutchik, Kellerman & Conte). The experimental set was formed by pair design method. Males and females were studied separately. The teenagers were selected in pairs by such parameters as class, age, family structure, family living standard. All the teenagers belonged to the same health category, those who were currently suffering or had been suffering in the past from any serious pathologies or other vision deficiencies were excluded. In all, the compared groups comprised 86 teenagers aged from 14 to 16. Adequacy of social perception was found to be reduced in short-sighted children and teenagers, with compensatory increase of expansivity in interpersonal relations. The distance between real-Self and ideal-Self ('what I am' and 'what I want to be') in interpersonal communications in shortsighted senior teenagers is greater than in teenagers without vision deficiencies, which is a reflection of more pronounced interpersonal conflicts. In females this distance tends to increase due to non-acceptance of non-conformal tendencies in their behaviour, while in males it does so due to non-acceptance of conformal tendencies. One may assume that short-sighted teenagers' desire for self-change is motivated by wish to avoid failures in interpersonal contacts. Females attempt to achieve this objective by seeking to become less aggressive, while males tend to isolate themselves (i.e. to reject the forms of behaviour related to support and cooperation). While the correlations of conformal and conflicting tendencies in interpersonal behavior as well as in self-made description of it are similar, short-sighted teenage females perceive their Self-image as comprising relatively more non-conformal tendencies, and their behaviour as containing less resentment reactions, than their teens without vision deficiencies do. The obtained results may indicate parallelism of visual perception, social perception and selfperception. It was supposed that myopia may form as a symptom integrating such Self-identity components as 'I am

myself' and 'I am what other people want to see in me'.

**Keywords:** myopia (impaired vision), social perception, self-image

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## **INVARIANT VISUAL-RECOGNITION LEARNING IN CONDITIONED BEHAVIOR: EFFECT OF HEMISPHERIC SPECIALIZATION OF THE PREFRONTAL CORTEX**

We believe that I.P. Pavlov principles of higher nervous activity are quite fruitful even today in investigation into the problems associated with current neurophysiological trends as, for instance, cognitive processes and awareness. I.P. Pavlov has shown, that the visual system includes not only the occipital cortex, but also the frontal cortical areas. Now it is clear, that the prefrontal cortex plays the important role in the visual recognition processing. I.P. Pavlov used already such modern notions as thinking, understanding, and its concept of the analysis and synthesis included complex sensory processing. Conditioned behavior (classical and operant conditioning) includes visual recognition as one of the basic stages, its function - the best current interpretation and understanding of visual scenes and objects. Storing of the information necessary for it is realized by means of learning and is connected with two aspects of long-term memory: with forming, storage and reproduction cognitive structures and with selective increase in their biological significance. To understand a possible mechanism of hemispheric specialization of the prefrontal cortex for invariant visual-recognition we studied learning processes involving visual discrimination of stimuli with different visual attributes on three groups of rhesus monkeys. The left and the right prefrontal cortices sulcus principalis were removed in monkeys of the first and of the second groups, accordingly. The remaining intact animals (third group) served as control. The monkeys were tested for invariant recognition after complete training to visual discrimination and after stimuli transformations (variation in size, shape, orientation and spatial relationships). Monkey's correct decisions, refusals of task decision and motor reaction time were recorded. The results obtained demonstrate "transfer of training" after transformations of conditioned stimuli in monkeys of control group. The invariance of recognition is provided due to presence of the common sensory properties of visual objects, which are selected during sensory processing and are retained after transformations. It means, that visual discrimination learning processes form in long-term memory certain demarcating features representing cognitive structures providing recognition and classification of visual objects. As compared with control monkeys, after removal of left and right prefrontal cortices sulcus principalis learning processes became unstable for discrimination of all stimuli, and as a result the training periods were significantly lengthened, especially for spatial information. The transformation of stimuli involving nonspatial information: geometrical figures of various shape, size and orientation did not influence correct decisions though refusals of decision and reaction time were increased. The invariance of this discrimination was achieved. However, the

invariance for discrimination of stimuli connected with spatial information after transformation of spatial relationships was not achieved only in monkeys after removal of left prefrontal cortex sulcus principalis. These results indicate that left (but not right) prefrontal cortex sulcus principalis takes part in invariant visual-recognition by forming demarcating features and providing spatial information processing. It is clear, that invariance of nonspatial information recognition is provided by other cortical areas, first of all, the inferotemporal cortex.

**Keywords:** visual-recognition learning, invariance, rhesus monkeys, prefrontal cortex, hemispheric specialization

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## **IMPLICATIONS OF INDIVIDUAL DIFFERENCES IN EEG COHERENCE AND PHENOMENOLOGY DURING AYAHUASCA EXPERIENCES**

Ayahuasca is a psychedelic sacramental brew used by indigenous Amazonian communities that in some individuals facilitates spiritual archetypal experiences similar to the core revelations of many religions. Studying ayahuasca may provide a reliable laboratory approach to use qEEG and phenomenological methods to reveal the neural correlates of archetypal spiritual experiences. EEG gamma coherence has been suggested to be a mechanism for "binding" disparate kinds of information processing and this research hypothesized that ayahuasca would enhance gamma coherence because ayahuasca reports have emphasized the enhanced meaningful interconnection of experiences. Participants varied in their Ayahuasca reports. The most intense experiences occurred about 45 minutes post ingestion. Experienced participants reported brilliant fast morphing colored multilayered visions which they navigated relatively easily at which point their journey experiences began with exploring other realms and communicating with entities. Less experienced participants had similarly intense experiences accompanied by overwhelming feelings of fear, nausea, and vomiting considered to be purifying in shamanism. Reports did not include journey experiences but re-living of traumatic experiences accompanied by bodily sensations, insights, and feelings of being healed. Other less experienced participants reported mild experiences and visions and the importance of insights. Some participants reported trying to understand their experiences, which they assumed to be projections of their own mind, during their ayahuasca sessions. They reported less intense experiences and their assumptions may have attenuated their experiences. Other participants assumed their ayahuasca experiences to be as they appeared which may have made them more vulnerable to being overwhelmed and fearful during difficult experiences. Experienced participants reported that they learned to relax with unfamiliar experiences and withhold judgment and that by inquiring actively and patiently they could gradually uncover the meaning of their experiences. Participants had different EEG changes during ayahuasca. While all participants showed decreased alpha and theta power related to increased alertness and information processing congruent with ayahuasca reports, participants undergoing intense experiences exhibited the greatest alpha and theta decreases. Less experienced compared to experienced participants had more muscle artifacts during peaking making determination of ayahuasca power and/or coherence changes difficult.

Experienced participants with intense experiences had more enhanced gamma coherence than inexperienced participants with milder experiences suggesting that gamma coherence may be a marker for ayahuasca intensity. EEG during Tibetan Buddhist compassion meditation revealed greater EEG gamma coherence and power in long term meditators compared to less experienced meditators. Meditation skills refined over years establish special states related to special EEG patterns and comparable ayahuasca navigation skills may exist. Tibetan Buddhist cosmology has roots in the shamanic Bon religion and both cosmologies include many worlds and entities. Buddhist, Bon, and ayahuasca visualization practices enable practitioners to create visionary realities and communications with archetypal entities. Such communications are highly relational inner experiences related to knowledge acquisition, identity, and self transformation. Future research is required to determine how individual differences impact the acquisition of the skill development required in creating visionary compassionate relational worlds and accompanying EEG coherence patterns.

**Keywords:** EEG gamma coherence binding ayahuasca shamanism phenomenology spiritual experience

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## A PHENOMENOLOGICAL APPROACH TO DAMASIO'S NEUROLOGICAL THEORY OF CONSCIOUSNESS

*Poster*

Many attempts have been made to explain mental phenomena using purely physical properties of matter, yet most have intentionally neglected to consider the phenomenological aspect of consciousness. Damasio (1999) details the process of a stimulus becoming an experience by starting from the ground up. Neurons function together in broadly accessible groups. Shared similarities between groups enable the formation of neuronal ensembles. The interactions between different assemblies of neurons create an organized architecture within the brain. The function of each ensemble depends on its placement within the system and illustrates how individual neurons are incorporated into larger ensembles to form cooperative coalitions. Signals produced by outside stimuli are relayed to the appropriate early sensory cortices where they encounter vast amounts of cross-signaling. These signals move over many synapses and create patterns of activity in small ensembles. When these ensembles are topographically organized in the early sensory cortices of the brain, images are created. Damasio suggests that reasoning strategies, the connection between emotions and the neural machinery of bioregulation, and a broad based knowledge of the numerous systems active in the body are required in addition to the above described phenomena for conscious experience to occur. What remains to be explored beyond Damasio's complex theory is the possibility of phenomenology and its role in explaining consciousness. The model shown here proposes that a necessary and missing link is discovered by disengaging the current arguments over philosophy of mind and considering a phenomenological perspective that incorporates knowledge of neuroscience, social psychology, and ontology of mind as a structural framework with which to engage a refined version of Husserl's concept of intentionality alongside Heidegger's dispensation of being. Beings need to be considered in the context of active engagement with the world. Separating the concepts of physical extension and mind destroys the most basic and essential quality of experience,

which is the very thing that needs to be considered.

**Keywords:** Damasio,

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## **A RELATIONAL MODEL OF THE CONCEPT OF TIME AND ITS IMPORTANCE IN CONSCIOUS EXPERIENCE**

*Poster*

Most scholarly discussions of cognitive science limit themselves to a particular method of conceptualizing the individual. Such assessments neglect the similarity between the way time is experienced by the individual and the complexity of consciousness. Using Heinz Kohut's concept of the nuclear self, this model suggests a five-tiered structure of the maturation of the human psyche that determines the way in which an individual experiences time. I stipulate that the individual is born with innate qualities that drive it toward forming a strong, nuclear self. The first of these is the desire for maturation. Each individual, regardless of its particularity, is inclined to develop from its infantile, grandiose energy, into a being capable of self-actualization. Out of this universal experience, individual particularity has the space to develop and the psyche becomes much more receptive to transformation. The energy for the transformation of the soul develops at birth when a new life, full of infantile grandiosity is brought into existence. The a priori, innate desire for completion produces longing for the individual to be alive and active. The inertia of this act sets the soul in motion, where the soul is what is moving and the self is what experiences transformations. This movement occurs through time that is not linear, but a spiraling structure where each circular completion transforms the soul into its next beginning. The circular movement of the soul is mirrored in the particularity of the individual and their conception of time. In the development of self, time is not measured as a series of repetitive, equal increments we judge using the hands of clocks or planetary cycles. Instead, time, subjectively experienced and stored in memory, more closely resembles the completion and movement of the psyche. This model focuses on the formation of the transformation itself. Looking more carefully at the structure within each transformation reveals a progression of the psyche that is critical for the development of the self. Each element enables the next, and any deficiency slows the process of transformation until the lacking element is adequately fulfilled. Once each element in the cycle has been practiced and developed, the individual experiences genuine activity, where it is able to reach a 'eudemonia' of sorts. The individual then falls from its understanding and is cast forward towards its next possibilities. Grasping an understanding of this cycle lends an important perspective on understanding consciousness and the way self is perceived.

**Keywords:** time, structure, development

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## **THE MIND-MATTER PROBLEM IN TWO WAYS: QUANTUM MODELS OF MIND AND THE INVERSE PROBLEM OF QUANTUM MEASUREMENT**

*Poster*

The present paper addresses the problem of explaining the mind through quantum mechanics without using neither dualism, in which the mind is not explained by the brain functions, nor the subjective interpretation of measurement in quantum theory, in which the mind of the observer has a role in the observed physical system. If we use the quantum theory to reduce the mind to the brain together with the subjective interpretation of quantum measurement, we could have a recurrent problem of explaining the mind by quantum phenomenon which is reduced to the mind. To avoid this inverse problem of mind, we need an objective interpretation of the quantum measurement. We concentrate our discussion in the Hameroff and Penrose quantum model of the mind. We discuss its compatibility with decoherence theory of quantum reduction, as well as we relate it to the inverse problem in quantum measurement. Therefore, we fall into the questions of dualism versus naturalism in the theory of mind, realism versus positivism and objectivism versus subjectivism in quantum mechanics.

**Keywords:** quantum models of mind, quantum measurements.

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## **QUANTUM GAMES IN BRAIN MICROTUBULES**

In this article we propose an optimization quantum procedure of the information in brain microtubules. This procedure is based on Quantum Games (QGs) which is applied to the biophysical Fro"hlich system. Through QGs we can analyze the entropy degree on possible microtubules quantum states under environment interactions. The possibility of constructing a game in this level may be the key to describe a kind of information processing criterion based on natural selection in biophysical systems. This criterion works like a quantum optimization process such that, for some values of noise insertion, an ordering of the quantum states may emerge. The Fro"hlich system models the physical dynamics of a coupled bimolecular net. Inspired in this dynamics, the Hamiltonian of Fro"hlich has been used to describe the physical relation of the neuronal microtubules from a quantum perspective. Several models claim that the microtubules process quantum information in a sub-neuronal level. This information processing would help to produce some mental functions such as the human consciousness. By applying the theory of games to open quantum systems we can link information storage capacity to physical

stability points in microtubules. These models are able to show whether there are or not physical equilibrium points close to physiological temperature and protein frequencies. In a general way, this technique plays a fundamental role in describing any information processing in biophysical systems.

**Keywords:** quantum games; information processing; microtubules; quantum darwinism.

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## **MIND, MATTER, MEANING AND INFORMATION**

*Poster*

In this paper I take up and modify, combine and extend some ideas of Daniel Dennett with one from Wittgenstein and another from physics. Dennett introduced the concepts of the physical, design and intentional stances [Den87], and has suggested (with John Haugeland) that "some concept of information could serve eventually to unify mind, matter, and meaning in a single theory." [DH87] (Emphasis in the original.) The concept of physical information is now very well established. The famous bet between physicists Stephen Hawking and John Preskill that Hawking conceded he'd lost in July 2004 concerned whether physical information is conserved in black holes. [Pre04] Physical information is basically material form. The concept derives from C.E. Shannon's information theory [Sha48] and has no semantic component. When this concept is taken to its logical conclusion, an energy flow becomes an information flow and an object becomes its own description. The crucial distinction is between form and substance. Dennett's physical stance could be renamed the "substantial stance," while I introduce an additional stance to account for information, called the "formal stance," in which we attend to form rather than substance. The common concept of information is intentional. Intentional information is encoded in physical information, being decoded (and reencoded) in use. This is consistent with the Wittgensteinian concept of meaning as use in context (or in a "language game" [Wit72]), where the context is the key. Thus the colour of an apple is encoded in the characteristics of the light entering the eye of an observer, where a tree or a fruit bowl and the pre-existing concept of "apple" or "fruit" contribute to the context, and further analysis might indicate probable degree of ripeness. Human communications involve additional levels of en/decoding and complexity but the same principle of intentional information encoded in physical information obtains. Brains encode intentional information too, provided that we adopt the formal stance and the intentional stance towards them. (The intentional stance actually implies the formal stance, as substance cannot be intentional.) To adopt Dennett's intentional stance toward an object is to suppose that the object encodes intentional information. Dennett suggests that the stance is adaptive in evolutionary terms primarily due to its utility in predicting behaviour. [Den87] I view the intentional stance as one element within a bigger picture of information sharing in a community, with the most important relevant genetically inherited traits being intelligence and empathy. To adopt Dennett's design stance is to view something as the product of an intentional information process. A mind is a user or processor of intentional information, matter is substance or physical information depending on the stance adopted, meaning is intentional information (though multiple levels of en/decoding might be involved), and consciousness is the use or processing of intentional information. Thus Dennett's prediction is fulfilled. [480 words approx.] References [Den87]

Daniel C. Dennett. *The Intentional Stance*. MIT Press, Cambridge, Massachusetts, 1987. [DH87] Daniel C. Dennett and John Haugeland. *Intentionality*. In Gregory[Gre87]. [Gre87] Richard L. Gregory, editor. *The Oxford Companion to the Mind*. Oxford University Press, Oxford, 1987. [Pre04] John Preskill. On Hawkings Concession. [http://www.theory.caltech.edu/~preskill/jp\\_24jul04.html](http://www.theory.caltech.edu/~preskill/jp_24jul04.html), July, 2004. Accessed 12February 2007. [Sha48] C.E. Shannon. A mathematical theory of communication. *Bell System Technical Journal*, 27:379-423,623-656, July and October, 1948. [Wit72] Ludwig Wittgenstein. *Philosophical Investigations*. Blackwell, Oxford,1972. Translated by G.E.M. Anscombe. First published in 1953.

**Keywords:** mind, matter, meaning, information, intentionality, consciousness

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**PANPSYCHISM: A COMPARISON OF CONCEPTUAL MODELS IN THE WORK OF STRAWSON, CHALMERS AND WHITEHEAD**

*Poster*

A key paper by Galen Straws on published recently in the Journal of Consciousness Studies has reignited an interest in that most maligned of mind-body models, panpsychism. Often quickly written off as an outrageous or silly idea, it has nevertheless engaged the minds of some of the most notable philosophers in the history, and arguably should deserve much more serious attention today. Strawson's argument and the arguments of most of the many responding authors, are framed strictly within the analytical tradition. Neglectfully, only a cursory mention was made of the one major twentieth century philosopher who promoted a form of panpsychism based on an event ontology, Alfred North Whitehead. In this paper I will look at the panpsychic models not just of Strawson but also of David Chalmers, and compare them with Whitehead's theory. His work I believe has insights that could prove valuable in countering some of the criticisms that both Strawson and to some extent Chalmers have met in presenting their seemingly radical approaches to the problem. In concluding I will use the problems that beset the thinkers of the 17th century with regards to the mystery of magnetism, as an analogy to the present issues with the mystery of consciousness. Among the early Moderns one can find dualists, emergentists and eliminativists with respect to theories of magnetism. Yet it was a kind of proto-magnetism -- large magnets are in fact coordinated collections of little magnets (molecular dipoles) -- that was in the end the successful theory. Far from being a side-show in the philosophy of mind, panpsychism may very well be an idea whose adventure has just begun.

**Keywords:** panpsychism, analytical philosophy, process philosophy, conceptual models

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## TOWARDS ARTIFICIAL CONSCIOUS CONTROLLERS: A VIABLE SOLUTION TO MANAGE COMPLEX SYSTEMS

In previous works, the authors have taken into account the quantum field and the synergetics perspectives to advance a theory of consciousness, called FMQB (Framing Model of the Quantum Mind), intended as the process of observing ourselves to adapt, mainly by learning, to the environment, where by adapting we mean the process of matching the inputs by restructuring ourselves and the environment too. Open problems left for further study were the following ones: Is it possible to construct artificial conscious systems according to the biophysical model of mind claimed by FMQB? Can be the simplified version of FMQB based on synergetics productive for people, e.g., for creating better human-human and human-machine interfaces? Is the subjects tension towards the social life, in the terms illustrated in the previous works, enough to overcome the monadic nature of the mind and able to create effective/efficient societies, e.g., community of practice? As a continuation of our discourses on consciousness, this paper points out features and possible applications of artificial conscious controllers (ACCs) inspired by FMQB, i.e., control devices mutually dependent on the environment which don't follow the classical feed-back control scheme proposed by cybernetics where controllers and environment are separate systems. In particular the paper aims at demonstrating that, thanks to the mutual dependence between ACCs and environment, such new controllers may have a more powerful opportunity of performing the right action for the right context, thus increasing safety and liveness of the control loop, especially in complex environments. To identify how to structure an ACC from how humans adapt themselves to the environment according to FMQB, in the paper we first recall that in FMQB the human mind reaches this aim by reusing experience packages called scenes stored in a quantum memory activated by the signals coming from the neural sphere corresponding to the environmental inputs. The scene that best accommodates the inputs and the self is the prevailing scene among the ones activated by the environment. The effectiveness of this process, called consciousness, increases with the increase of the number of relevant scenes activated by the inputs. Thus recall and precision of the retrieval process implemented at neural level is a key point of consciousness, but another key factor is the density of similar scenes stored at the quantum level depending on the expertise of the subject. To clarify that such a control scheme greatly differs from the classical ones, where the solution of a problem is obtained by slightly adapting similar existing relevant cases to manage the problem at hand, in the paper we further discuss the main ACC features, i.e.: ACC inputs cannot be fixed a-priori: classical control systems (e.g. the ones based on Case Based Reasoning - CBR) are provided of a set of indices to retrieve similar cases relevant to solve the problem at hands starting from prefixed inputs, whereas ACC is coupled with the environment thus any portion of the inputs may serve as a pointer to recall relevant scenes depending on its attention; ACC expertise changes in time: the case knowledge bases of a classical controller are mainly built off-line, whereas ACC should be provided with an expertise that is increased, modified or deleted by learning on-line, and finally the scene to be managed by ACC becomes clear a-posteriori to it (as to the human mind too): the classical controllers depict the reality according to a more or less immutable case where the context is assumed to be a container for action, whereas ACC is always ready to change/restructure the current scene by another one belonging to a set of scenes linkable to (or compatible with) the inputs. On the basis of this

discussion, the paper claims that, with respect to the classical controllers, ACC may control the situation by either resorting to control variables (or affordances in Gibson's terms) hopefully offered by the environment or trying to modify the current scene into a one that better accommodates the inputs received from the environment. In a certain sense, ACC extends the characteristics of the today's emerging control systems such as the context aware or attentive control systems since it has an active role in creating contexts useful for action. After the mentioned methodological considerations, the paper will show how ACC could be obtained in practice by a layered control scheme that has at its basis a layer dedicated to manage the current scene and possible small deviations according to the synergetics theory, an upper second layer provided with a control scheme governed by the context-action equation previously proposed by the authors able to identify if the current scene has to be changed into a more suitable/convenient one, and a third layer that is responsible to change the form of the above context-action equation according to an attentive scheme possibly implemented by a multi-agent system. A case study dealing with an artificial conscious pilot of a sail boat will demonstrate that ACC may be a viable solution to manage in real time complex situations at reasonable costs and with the needed safety and liveness properties.

**Keywords:** Machine consciousness, Robotics, Cognitive architectures

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## **MODERN CONSCIOUSNESS SCIENCE AS FECHNER'S "INNER PSYCHOPHYSICS"**

Modern Consciousness Science was made possible by methods which develop ?bridge laws? between stimuli, physiological processing, and conscious awareness of them. This began with the 19th Century psychophysics of Weber, Fechner, and Helmholtz. Fechner (1860) wanted to study scientifically ?constant or lawful relationships? between the ?material world? and the ?mental world?, which ?has up to now remained merely a field for philosophical argument without solid foundation and without sure principles and methods for the progress of inquiry?. He called his techniques "outer psycho-physics": deriving bridge laws between physics (presenting tones) and psyche (reporting which has a higher pitch), but, for then, ignoring mediating physiology. While Fechner practiced ?outer psychophysics?, he anticipated a later "inner psychophysics" to develop bridge laws between physics and physiology (brain processing of stimulus energy), and bridge laws between physiology and psyche. Neuropsychology and Biopsychology work on one set of bridge laws-- how natural or experimental assaults on physiology affect psyche. Psychophysiology (despite its name) works on the other set of bridge laws between physics and physiology, by manipulating stimuli and measuring physiological responses through EEG brain waves and evoked potentials and the like. The 1980s? dramatic new technologies in brain scanning, using PET, SPECT, fMRI, and other methods, represent a sophisticated development of psychophysiology which, together with EEG evoked potentials, have created the new fields of Cognitive/Affective Neuroscience and Consciousness Science. Brain scanning has expanded the search for the neural correlates of consciousness: the NCC, which uses all of the techniques of outer and inner psychophysics to understand very specific parts of the "psyche" ? differentiating among conscious, pre-conscious, subliminal, and non-conscious: perceptual, mental, emotional, and motor functioning.

Because Fechner wanted to understand how conscious experience and external events relate ? while establishing that there are not linear relationships between them -- Consciousness Science is most precisely the science that fulfills Fechner's projection for an "inner psychophysics"! After setting forth this framework, I will set many of the dominant paradigms in modern Consciousness Studies within this historical and methodological framework : PerceptualConsciousness, Cognitive-Consciousness, Interpersonal-Consciousness, Animal-Consciousness, Infant-Consciousness, Machine-Consciousness, Altered-Consciousness, Expanded-Consciousness, Transpersonal-Consciousness, Motivational-Consciousness, and Quantum-Consciousness/Unconsciousness.

**Keywords:** NCC, Psychophysics, History, Consciousness Science

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**ON THE HORNS OF A DILEMMA—PHENOMENAL CONCEPT STRATEGY AS A DEFENCE OF PHYSICALISM**

*Poster*

This paper offers a critical review of the so-called Phenomenal Concept Strategy--a contemporary defence of physicalism. The heading 'Phenomenal Concept Strategy' (PCS hereafter) covers several different approaches which all share a common motivation of avoiding ontological conclusions rejecting physicalism by introducing conceptual dualism. The approaches of PCS, then, are admittedly committed to the metaphysical thesis of ontological monism, and emphasize that phenomenal concepts interestingly and importantly differ from other concepts. According to PCS, it is due to this very difference that the main anti-physicalist arguments are non-conclusive: PCS locates a gap in the relationship between our concepts of physical processes and our concepts of consciousness, rather than locating a gap in the relationship between physical processes and consciousness themselves. However, it is not enough just to explain the peculiarities of phenomenal concepts in terms of features like e.g. 'phenomenal concepts grab the essence of their referents directly'. Citing conceptual features alone will not suffice on its own. These features are all compatible with property dualism, unless a physical story about the workings of phenomenal concepts is put forward. Without such a physical story anchoring phenomenal concepts into the physical world, it might still be the case that, although phenomenal concepts refer to the very same physical-functional states as our physical-functional concepts, they themselves are not identical with certain physical-functional states, but rather are e.g. emergent phenomena. This paper investigates what physical story might be told in accordance with PCS being able to navigate between the Scylla of dualism and the Charybdis of functionalism. The task such a physical story has to complete is to explain how irreducible concepts might be rooted in physical processes without collapsing into a version of functionalism denying the very existence of the explanatory gap.

**Keywords:** phenomenal concept strategy, explanatory gap, physical story, physicalism, dualism, functionalism

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**THE ROLE OF FANTASY IN UNCONSCIOUS AND CONSCIOUS REPRESENTATION  
THROUGH BODY IMAGE AND BODY SCHEMA ACCORDING TO WORKS OF FREUD  
AND VYGOTSKY AND THEIR IMPORTANCE TO PSYCHOMOTOR FUNCTION,  
PSYCHOANALYSIS AND COGNITIVE THEORIES.**

*Poster*

Fantasy is one of the fundamental elements in the constitution of the psychic process. Freud and Vygotsky are authors that support the dimension of fantasy in the mind formation. However their perspectives are different in the manner in which they highlight their construction in the area of consciousness and unconsciousness. The fundamentals of the two theories are part of contemporary ideas regarding psychoanalysis and cognitive behavior theory. The aim of this research is to study the dimension of conscious representation defended by cognitive behavior theory and the dimension of unconscious representation in psychoanalysis, along with its outcome in the constitution of image and body schema. The fantasy as the essence of the psychic gives support for understanding the total subjective dimension of being. However many questions need to be answered: What is the real role of fantasies on contemporary social, educational and the clinical symptoms? How do psychoanalysis and cognitive therapies interact on the comprehension of these phenomena and the several therapeutic, educational and social strategies inside their practical interventions? We can see that the therapeutic strategies depend upon each individuals' or social groups' different subjectivities. So, the image and body schema constitution are the real way to different proposition types, linked to their own symptoms, not only in their singularity but also in the social function. We can say that culture, intersubjective relations and each subject's experiences, consciously or unconsciously, compose the net beneath which different subjectivities are built up, in common and singular specificity. The fantasy, in its imaginary dimension, sustains the mental elaborations experienced by each individual. This kind of mind formation comes from the experience in their interaction with culture, with other individuals and with language. The contemporary symptoms are signs of this articulation between image and body schema. This is the research subject of psychomotor function study. Understanding the strategy that forms these symptomatology structures, in a dialogue between psychoanalysis and cognitive behavior therapies, shows the real complexity of human phenomenon in its own history, specially, on the present time. Summary: The aim of this research is to find a real dialogue between psychoanalysis and cognitive behavior therapies, showing the importance of fantasy concepts in Freud and Vygotsky works and their influence on psychomotor function.

**Keywords:** Key words: fantasy, representation, body image, body schema, psychoanalysis, psychomotor function, Freud and Vygotsky

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**MACHINE CONSCIOUSNESS: AN ENACTIVE ANALYSIS OF THE STATE OF THE ART**

In the last few decades the field of cognitive science has undergone a significant shift from pure cognitivism towards a more embodied-embedded understanding of mind and cognition (Wheeler 2005). This change has been strongly influenced by practical dissatisfaction with the problems faced by cognitivist GOFAI in real-world contexts (Dreyfus & Dreyfus 1988), as well as the development of a new style of AI and robotics in which intelligent behavior is seen as emerging from the dynamics of a brain-bodyenvironment systemic whole (e.g. Beer 1995). More recently, a further shift is gaining momentum in cognitive science, namely towards an understanding of cognition as "enaction" (Varela, Thompson & Rosch 1991). This approach builds on the insights of the embodied-embedded perspective, but is additionally driven by a central concern with subjectivity in its dual aspects of biological autonomy and the phenomenology of lived body experience (Thompson 2005). It is with respect to this more recent shift that the role of AI in cognitive science needs to be reevaluated, in particular because most work in machine consciousness continues to ignore the enactive account of subjectivity, as evidenced by the sample of work that appeared in a recent JCS volume (Holland 2003). The aim of this talk is therefore to propose ways in which the field can move beyond its current preoccupation with engineering the emergence of sensorimotor loops, and thereby maintain a mutually informative dialogue with the enactive paradigm. In this regard it is helpful to consider that the enactive viewpoint distinguishes three interrelated "dimensions of embodiment", each relating to the subjectivity of a conscious agent in a distinctive way: 1) organismic regulation, 2) sensorimotor coupling, and 3) intersubjective interaction (Thompson & Varela 2001). Most of the recent work on embodied-embedded AI and robotics has mainly been concerned with 2), but some significant advances have already been made with 3), namely in terms of social interaction (e.g. Di Paolo 2000). In the near future 3) is probably the most promising area for more investigation, and indeed, if we accept the claim that the conscious observer arises in the relational domain of language (Maturana 2006), then this kind of research could even provide us with another potential path toward the development of machine consciousness. Nevertheless, the principles of biological autonomy underlying the subjectivity which enactivism associates with 1) are still practically unexplored by AI research and remain a significant challenge to the current methodologies (Di Paolo 2003). In order to clarify this situation the talk will outline a continuum of increasing organizational requirements which, according to the enactive viewpoint, culminates in the constitution of a subjective self. It will be argued that a more concerted attempt at expanding the field of AI and robotics along this direction will not only make sure that its findings will continue to be relevant to the development of an enactive cognitive science, but also that, following Ziemke (2007), it has the potential to provide current research in machine consciousness with a much needed operational foundation of subjectivity.

References:

- Beer, R.D. (1995), "A dynamical systems perspective on agent-environment interaction", *Artificial Intelligence*, 72(1-2), pp. 173-215
- Di Paolo, E. A. (2000), 'Behavioral coordination, structural congruence and entrainment in a simulation of acoustically coupled agents', *Adaptive Behavior*, 8(1), pp. 25-46
- Di Paolo, E.A. (2003), "Organismically-inspired robotics: homeostatic adaptation and teleology beyond the closed sensorimotor loop", in: K. Murase & T. Asakura (eds.), *Dynamical Systems Approach to Embodiment and Sociality*, Adelaide, Australia: Advanced Knowledge International, pp. 19-42
- Dreyfus, H.L. & Dreyfus, S.E. (1988), "Making a mind versus modelling the brain: artificial intelligence back at a branch-point", *Daedalus*, 117(1), p. 15-44
- Holland, O. (2003), "Editorial Introduction", *Special Double Issue: Machine*

Consciousness, Journal of Consciousness Studies, 10(4-5), pp. 1-6 Maturana, H.R. (2006), "Self-consciousness: How? When? Where?", Constructivist Foundations, 1(3), pp. 91-102 Thompson, E. (2005), "Sensorimotor subjectivity and the enactive approach to experience", Phenomenology and the Cognitive Sciences, 4(4), pp. 407-427 Thompson, E. & Varela, F.J. (2001), "Radical embodiment: neural dynamics and consciousness", Trends in Cognitive Sciences, 5(10), pp. 418-425 Varela, F.J., Thompson, E. & Rosch, E. (1991), The Embodied Mind: Cognitive Science and Human Experience, Cambridge, MA: The MIT Press Wheeler, M. (2005), Reconstructing the Cognitive World: The Next Step, Cambridge, MA: The MIT Press Ziemke, T. (2007), "What's life got to do with it?", in: A. Chella & R. Manzotti (eds.), Artificial Consciousness, Exeter, UK: Imprint Academic, pp. 48-66

**Keywords:** Machine consciousness, artificial intelligence, robotics, enaction, autonomy

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## EMOTIONAL REACTIONS TO CELEBRITIES IN A PROSOPAGNOSIA PATIENT

My study investigates knowledge in the absence of awareness in a special population. Covert recognition in Prosopagnosia (PA) has previously been demonstrated using a variety of techniques (to name a few: Semantic Interference effects (Young & De Haan, 1988); SCR (Bauer, 1984); Eye-tracking (Rizzo, Hurtig & Damasio, 1987)). In a previous study I provided evidence for emotional covert recognition by demonstrating that a PA patient's emotional reactions to pictures of family members are correlated ( $r = .639$ ) with his explicit emotional evaluation of the family members. In that study the patient's evaluations of the pictures, overall, were highly positive. In the current study, I examine several potential confounds that might compromise conclusions drawn from my research. Specifically, I control for familiarity and the mere exposure effect (perceptual fluency) by collecting data on the PA patient's emotional reaction to faces of celebrities he likes and celebrities he dislikes. A significant difference between the patient's emotional reactions to the two groups would provide evidence that accurate emotional information in the negative as well as positive direction is available in the absence of awareness, and that this information is not based simply on familiarity with the targets. Data implying that PAs are not conscious of their emotional knowledge suggests that emotional reactions, or some component thereof, may be non-conscious while simultaneously remaining highly relevant to the evaluative functions of the conscious mind. The theoretical implications of my research as they relate to the work of Antonio Damasio, Jaak Panksepp, and James Russell are discussed.

**Keywords:** Prosopagnosia; covert recognition; affect

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## ARRANGEMENTS OF MATTER AND MIND

Poster

Both dualism and materialism use concepts of matter that are generally accepted, in stark contrast with the controversies that attend discussions about consciousness. This paper will discuss the concept of matter and show that the connections between commonsense ideas about matter and theoretical physics lead to a conceptual scheme in which the traditional view of matter is recast allowing for generalizations that are sufficiently broad and flexible to be extended to include mental events. For some matter is whatever is the subject matter of the physical sciences: for others it is the unproblematic and familiar world of table and chairs, constructed ultimately of molecules and atom, and these in turn of electrons and nuclei, protons etc. These objects can all be observed in some sense but the quarks that constitute these objects at a more fundamental level cannot. Further, quarks are thought to be structures of strings which are small unobservable multidimensional objects. There is a natural hierarchy among these all these objects, but one that is not closed at its most fundamental levels because of uncertainties in physics. In addition, the idea that any given object is made of simpler objects of a more fundamental kind fails at the level of quarks, as these are never visible to us as free particles, and fails more completely at the level of strings, because of both our present ignorance and also the unfamiliar multidimensional world that they inhabit. A proper conceptual scheme must abandon the traditional concept of matter and replace it with the concept of an arrangement where the arrangement is to be identified with the object. Down at the level of quarks conceptual drift occurs and down at the string level a confession of ignorance has to be made. The great advantage of considering arrangements as the fundamental objects of science is that it gives an opportunity to extend the hard sciences in a seamless way to other sciences: they all become the study of arrangements; that is the subject matter of all the sciences becomes united and the concept of an arrangement is sufficiently rich to include the scientific theories themselves as further examples of arrangements. It also corresponds to the way we think of everyday objects. However, the awkward fact remains that mental objects have many characteristics that are quite different from those of tables and chairs. A particularly interesting difference, and a starting point to investigate the mental realm further, is the inescapable fact that some mental events have meaning. It is therefore proposed that the over-worked category of the mental shall be eliminated and these objects will also be regarded as arrangements, some of which have the special property of having meaning. All things are then seen as arrangements and this provides a route from the hard sciences to the rest of human knowledge and eliminates all talk of materialism and dualism.

**Keywords:** Physics, Materialism, Dualism, Mind

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## FREUD AND THE INTRINSIC HIGHER ORDER THEORIES OF CONSCIOUSNESS

The aim of this communication is to support the idea that the Freudian theory of consciousness is, when expressed in modern terms, an intrinsic higher order theory. In spite of the fact that Freud never published a paper about consciousness he exposed in several passages his theory about it, in correlation with his theory of the unconscious. If we read that passages too literally it would seem that he supports there a higher order theory of perceptive type (known by HOP). Notwithstanding thinking about his

whole work, including his concept of repression and his statements concerning the necessity of emotions to be conscious, we can consider that Freud's thought combines better with the intrinsic higher order theories, which maintain that the higher order mental state isn't extrinsic to the taking of consciousness. One of these theories, the Van Gulick's higher order global states theory (HOGS), seems to me the most connected with Freudian ideas about consciousness. One of the reasons is that HOGS theory admits that the higher order state can be perceptive-like as in the Freudian descriptions. Also the systems of different level that Van Gulick talks about can be related with the Freudian complex view of mind. Moreover it deserves to note that Freud affirmed in one of his last writings consciousness is a fact that resists all explanation or description, although he had been tried to explain it all his life. Likewise Van Gulick acknowledges that for the time being there is a remainder that isn't explainable due to its phenomenal aspects. Still the two authors have a functionalist approach and they believe that many aspects of consciousness can be explained. References: Freud, S, Standard Edition, Hogarth Press. Gennaro, R. (forthcoming) Between Pure Self-Referentialism and the (Extrinsic) HOT Theory of Consciousness. In Kriegel/Williford (eds.) Consciousness and Self-Reference, MIT Press. Gomes, G. (2003) Freudian Theory of Consciousness. In Psicologia: Teoria e Pesquisa, 19:2, Brasi'lia. Natsoulas, T. (1995) A Rediscovery of Freud. In Consciousness and Cognition 4, 300-322. Rosenthal, D. M. Consciousness, Interpretation, and Higher-Order Thought. (Google). Van Gulick, R. (2001) Inward and Upward: reflection, introspection and self-awareness. In Philosophical Topics 28:2, 275-305.----- (2004) Higher Order States (HOGS) : an alternative higherorder model of consciousness. In Gennaro, R. (ed.) Higher Order Theories of Consciousness: An Anthology, John Benjamins.----- (2006) Mirror Mirror - Is That All?

**Keywords:** intrinsic Higher Order Theories of Consciousness, Freud, Higher Order Perception, Higher Order Global States.

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## **THE EFFECTS OF EMOTION AND TIME REVERSAL IN VISUAL WORDS RECOGNITION**

*Poster*

The present study investigated the effects of emotional words and time-reversal in visual word recognition using a traditional technique called lexical decision with masked priming. In this paradigm the subject is presented with strings of letters of various durations on a computer screen. The first string is a forward mask (usually a sequence of non-linguistic symbols such as hash-marks), which is followed by the target letter sequence. The subject's task is to decide whether the target letter sequence is a word or not. A prime, usually related (e.g. one letter different from the target) or unrelated (e.g. all letters different from the target), is presented briefly after the forward mask and before the target. The subject is usually unaware of the prime. In this type of experiments, it has been shown that presentation of a related prime facilitates the processing of the target thereby producing faster reaction times when compared to trials where the target is preceded by an unrelated prime. The current study attempted to

move beyond conventional applications of this paradigm by introducing a post-prime that follows the target in addition to the common pre-prime that precedes the target. The latter addition was aimed at exploring some of the current ideas of time and retro-causation by comparing the amount of priming obtained in the following conditions: (i) a 50 ms either identical or unrelated pre-prime with a dummy post-prime (presented as a row of x's), (ii) a 30 ms identical pre-prime with either a 30 ms identical or a 30 ms unrelated post-prime, (iii) a 30 ms unrelated pre-prime with either a 30 ms identical or a 30 ms unrelated post-prime, and (iv) a 50 ms either identical or unrelated post-prime with a dummy pre-prime. Additionally, half of the words in this experiment were emotional (e.g. murder) and the other half were neutral (e.g. garden). This was done to test whether emotional words would produce more priming than neutral ones. The results of this study are intended to shed light on the influences of emotional states on visual word recognition, as well as provide evidence for small-scale temporal reversal effects in conscious and unconscious processes.

**Keywords:** visual word recognition; masked priming; lexical decision; emotional words; time reversal; retro-causation

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## **A QUANTITATIVE MODEL DESCRIBING BRAIN'S ACTIVITY**

*Poster*

The human brain is one of the most complex organisms of the Universe. Its understanding requires the most recent results of biocybernetics, theoretical biology, quantum theory, neuropsychology, and more. On the basis of biocybernetics, we estimate the rate of information processing of our brain at the levels of self-consciousness, consciousness without self-consciousness, and biological organization. On the basis of theoretical biology, we show that the only the dead brain's processes are governed by physical laws that are consistent only with "simply coupled" systems. We consider the origin of spontaneous brain activity and determine related physical processes. Developing a quantitative model, we derive some observational consequences for empirical testing. On the basis of our biological model, we point out to the connections of our brain activity with biological organization at the ultimate basis of the Universe.

**Keywords:** collapse of wave function, Stapp's theory, biological organization

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## **A PARADOX IN SELF-REFERENTIAL THEORIES OF FIRST-PERSONAL THOUGHTS**

Are self-referential theories of de se thoughts paradoxical? Among the reasons why conscience has long lagged behind other properties of the mental in the recent efforts to make the mind amenable to a

scientific treatment, one could cite the fact that the privileged access we have to this phenomenon - i.e., introspection - was put aside, as a source of *sui generis* problems, from the early methodology of cognitive science. Even if a number of cognitive psychologists<sup>1</sup>, nowadays, feel more sympathetic towards introspective methods of investigation, their discipline historically earned its scientific status when it renounced first-personal testimonies in favour of public and objective techniques of observation, like mental chronometry, or the analysis of behavioural responses to cognitive tasks. Interestingly, this historical mistrust of first-personal, or *de se*<sup>2</sup> thought, hasn't given way yet to any fully convincing theory of egology. It is, in particular, very difficult to account for some of the specific properties that philosophy of mind has traditionally attached to first-personal thoughts: immunity to error through misidentification<sup>3</sup> and misascription, privileged cognitive access, first-person epistemic authority, etc. Following Hector-Neri Castan~eda<sup>4</sup>, David Kaplan<sup>5</sup> and John Perry<sup>6</sup>, an important family of authors have endeavoured to capture these peculiarities by means of the semantic analysis of first-personal utterances, like "I see a red patch", or "I have a sore throat", which may voice the egocentric thoughts under consideration. One of the most recent and sophisticated attempts of this kind is the self-referential theory presented in James Higginbotham 2003. Extending to the *de se* case Davidson's introduction of event variables in the parsing of action-sentences, Higginbotham construes individual *de se* thoughts as mental events whose propositional content include a constituent referring to their very occurrence, on the model of token-reflexive indexical utterances. This construal is apt to provide contrasting paraphrases for the two readings of an utterance like (1) "Se'gole`ne thinks that she will be elected": the genuinely *de se* reading, (1') (\$e) thinks(Se'gole`ne, [s(e) will be elected], e), on the one hand, as opposed to the accidentally reflexive reading (1") (\$e) thinks(Se'gole`ne, [x will be elected], e), on the other hand. This second reading may be illustrated by a scenario in which Se'gole`ne thinks that the most popular candidate will be elected, but ignores that she herself happens to be the unique individual who presently satisfies this description. This theory not only captures precisely the asymmetry between the first- and the third-person perspectives, but also explains the above-mentioned epistemic peculiarities of *de se* contents. However, the present study purports to show that this self-referential theory is subject to a *prima facie* problem of circularity, due to the presence, within each first-personal thought, of a constituent, e, which 1 Stanislas Dehaene, among others, has famously endeavoured to provide theoretical space for the subjective measurement of consciousness. 2 After David Lewis 1979. 3 After Sydney Shoemaker 1968. 4 Hector-Neri Castan~eda 1966. 5 David Kaplan 1989. 6 John Perry 1993/2000. is identical to the said thought. This self-referential structure exposes such contents to a Russellian indeterminacy paradox<sup>7</sup>. The content of *de se* thoughts is not, *stricto sensu*, a proposition, but rather a propositional function, f(s(e)), whose domain cannot be defined independently of, and prior to, the definition of the function itself, since for each particular *de se* thought, the value of the variable e is identical to the total thought. In other words, the latter being its own constituent, its content is indeterminate. I will examine a few ways in which the *prima facie* appearance of a paradox could be dispelled. However, I will argue that suitable reformulations of the theory, to this end, would come down to reintroducing the initial mystery of first-personal access at a higher level. My discussion will lead to a disjunctive thesis, according to which self-referential theories of *de se* thoughts are either paradoxical, or so restricted as to provide an explanation that is only suited to first-personal utterances, but not to introspective conscious thoughts. References Castan~eda, H.-N. 1966. << 'He' : A Study in the Logic of Self-Consciousness >>, Ratio 8, 130-157. Davidson, D. 1965. 'Theories of meaning and learnable languages.' Reprinted in D. Davidson, *Inquiries into Truth and Interpretation*. Oxford:

Clarendon Press, 2001: 3-16. Higginbotham, James, 2003. << Remembering, Imagining, and the First Person >>, in Alex Barber, ed., Epistemology of Language. Clarendon Press. Lewis, David, 1979. << Attitudes, De Dicto and De Se >>, in Philosophical Review, Vol. 88, No. 4, 513-543. Perry, J. 1993/2000. The Problem of the Essential Indexical and Other Essays. New York: Oxford University Press. Russell, Bertrand 1902. "Letter to Frege," in van Heijenoort, Jean, From Frege to Go"del. Cambridge, Mass.: Harvard University Press, 1967, 124-125. Russell, Bertrand 1903. "Appendix B: The Doctrine of Types," in Principles of Mathematics. Cambridge: Cambridge University Press, 1903, 523-528. Shoemaker, Sydney, 1968. << Self-Reference and Self-Awareness >>, Journal of Philosophy 65 (19), 555-567. 7 Bertrand Russell 1902 and 1903.

**Keywords:** First-personal thought; self-reference; event-reflexivity; indeterminacy paradox

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## **THE ROLE OF CONSCIOUSNESS AS MEANING-MAKER IN SCIENCE AND CULTURE**

Thesis: Human consciousness is the Governor of Mental Life<sup>1</sup> through its function of constituting the world by meaning-making or intentionality. There is no explanatory science of consciousness, but there is a phenomenological wissenschaft of consciousness. The forms of meaning-making are syntheses that may be perceptual, theoretical (explanatory), or practical. The theory of classical physics that reveals only the universal theoretical symmetries of Nature; in contrast, quantum physics is a practical synthesis of both universal and local symmetries of Nature. An explanatory science yields no more than a 'thin' description of reality (narrowly contextualized and isolated from general culture); a rational practical synthesis is a cultural science yielding a 'thick' description of reality.<sup>2</sup> I: Meaning-making and the 'hermeneutical circle' Meaning-making is accomplished through a recursive transcendental and sequential fourfold process that defines human rationality; it has four constitutive processes; Experiencing, Theory formation, Theory testing, and Decision-making. These constitute the 'hermeneutical circle' of meaning-making a. Experiencing combines perceptual meaning with the presence of a perceived object. Perceptual objects are given in Space and Time; visuo-somatic Spaces are non-Euclidean and directly connected with biological evolution; scientific Spaces are constructed by measurement and define modern cultures. b. Theories define meaningful relationships among objects of experience; scientific theories involve measurement and mathematics. c. Theory testing introduces multiple sources of Uncertainty: (i) the universalizing of principles (e.g., inductive reasoning?); (ii) the contingency of empirical evidence (imprecision of measured values?); (iii) the contextuality of horizons (place, time, circumstances?); (iv) the demand for cultural agreement (public role?); (v) the historicity of public cognition (always under review, correction, development?); (vi) the dynamic of action motivated by a priori ethical, aesthetic, religious and other value-added meanings(?). II: An explanatory (theoretical) Science of human consciousness as a 'thin' description is not possible, because the engine of meaning-making for such a science is fueled only by common public experience with causal linkages, while the data of the self-awareness (arguably) are not common public experiences but interpretive, and not causally linked. III. A Science of human consciousness as a 'thick' description is possible if it is a rational practical synthesis of interpretive dialogical experience. General culture has Submitted as

Abstract to Conference: Towards Science of Consciousness, Budapest 2007 its own rationality, involving the rationality of practical dialogical syntheses of both universal and local symmetries, i.e., 'thick' descriptions involving multiple 'thin' descriptions. IV. The 'orthodox account' of the quantum theory (so-called by Wigner, Dirac, and von Neumann), is a 'thick description,' a rational practical synthesis of both the universal symmetries of Space, Time, Motion, and Energy (classical physics) and many practical local symmetries (local laboratory cultures in which Space is differentiated from Motion, and Time differentiated from Energy). Two key terms are re-defined: 'measurement' is taken in the practical sense, and 'mathematical intuition' is taken to include Hilbert Vector Spaces. 1 This term is used by Donald, Merlin, *A Mind So Rare*, Chap. 3 (New York: Norton, 2001); Pribram calls it 'central processing complement.' In Pribram, K. *Brain and Perception* (Hillsdale, NJ: Erlbaum, 1991), p. 96. 2 Geertz, Clifford, "Thick Description: Toward an Interpretive Theory of Culture" in Geertz, C. *The Interpretation of Cultures* (New York: Basic Books, 1973).

**Keywords:** consciousness, meaning-making, perception, theoretical symmetries, practical symmetries, hermeneutical circle, science of human consciousness, quantum theory, measurement, mathematical intuition, Wigner, Dirac, culture, Geertz

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## **DETECTION OF EMOTIONAL STATES AND THE EXPERIENCE OF MUSIC IN NEUROFEEDBACK EXPERIMENTS**

Biofeedback has been a growing field since the late 1960s because the electrical functioning of the brain is of particular interest to psychologists. The method of biofeedback that enables people to get feedback of a body function in order to change the brains electrical activity is called "neurofeedback" or EEG biofeedback. The reason that "neurofeedback" is of special concern to psychologists is because the brain evokes emotions, physical symptoms, thoughts and behaviour that define problems for which people seek psychological consultation. The goal of the work is to design neurofeedback experiments that detect emotional states such as relaxation, anger and chills that are shown as an output to a specific input. The experiments designed measure alpha waves during relaxation tasks and theta waves when experiencing emotional feelings such as anger. Furthermore the relaxation task was expanded on the basis of a popular experiment carried out by A. Blood and R. Zatorre in 2001. The idea was to measure the "chill" effect using EEG as a method of investigation apart from measuring the heart rate, pulse and skin tension. For this the patient has to listen to sample music he gets provided, in addition to sample music he is familiar with and music that he likes. The experiment investigates the neurological condition of the chill effect and its output.

**Keywords:** Neurofeedback, Biofeedback, EEG, alpha waves, theta waves, chill effect

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## **GESTALTS, RATIONALITY AND FREE WILL**

Theories that treat the brain as an information-processing machine have no place or role for consciousness and do not account for non-algorithmic plausible reasoning. Opposing views have generally been unsuccessful in giving a substantive account of how consciousness could contribute to rational conduct or to plausible reasoning in ways not available to non-conscious information-processing machines. This paper argues that conscious systems can respond to feature-rich experiences as gestalt wholes, whereas non-conscious information-processing machines can at best respond only to constituent features of such experiences; that the responses of conscious systems to such whole experiences cannot be pre-determined by pre-choice circumstances and laws of nature and/or computational rules; but that such responses can nevertheless be rational. Such a view provides a plausible place and role for consciousness, and a substantive account of how consciousness contributes to rational conduct and to plausible reasoning in ways not available to non-conscious information-processing machines. It can also base an account of free will and responsibility that answers the following argument propounded by Galen Strawson: we do what we do because of the way we are, so we cannot be responsible for what we do unless we are responsible for the way we are; and we cannot be responsible for the way we are when we first make decisions in life, so we can never become responsible for the way we are later in life. This paper argues that in our consciously chosen actions we respond rationally to whole 'gestalt' experiences in ways that cannot be pre-determined by pre-choice circumstances and laws of nature and/or computational rules; and that this means we are partly responsible for what we do, even if we are not responsible for the way we are.

**Keywords:** Gestalts, Rationality , Free Will, Responsibility, Rules and Laws, Consciousness, Plausible Reasoning

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## **FOUR OBSTACLES TO A SCIENCE OF CONSCIOUSNESS**

My paper categorizes four major obstacles that would appear to make a "science" of consciousness an oxymoron. The first difficulty is in the "science". I use as my starting point the article by W.A. Adams, "Transpersonal Heterophenomenology?" (J.C.S., 13, no. 4, 2006), at the end of which your conference announcement appeared. Adams' article impugns the evidence from first-person introspective studies because there is no "physical" separation between observer and observed, unlike in the physical sciences. The same argument can be used against a science of consciousness as well, unless the researcher could somehow free himself from his own consciousness in order to attain an unprejudiced view of this phenomenon without it being at the same time the very instrument he is using in order to

attempt objectively to study it. The "view from nowhere" (Nagel) may be a workable fiction where separable lines can be agreed upon between self and object, but not when the fiction rests on the very question at issue. Irretrievably, the data is skewed by the fictional starting point of nowhere. The second obstacle arises in trying to define consciousness. Here I refer to J.R. Searle's article, "Why I am not a property dualist" (J.C.S., 9, 12, 2002, 57-64). I argue that language tends to comfortably slot and categorize in terms of "thisness" and "thatness", and to imply individuality, number, separability and location and object status, when in fact there is far from agreement on these issues when it comes to consciousness. Is the experience realm that comprises my consciousness - unlike the things of which I am conscious - sufficiently separable, detachable, and stable so as to constitute a linguistically definable object? The ongoing debate about consciousness suggests otherwise. The fact that consciousness is given a name should not imply that "consciousness" represents anything which we know about other than by the experiential feel of what it is from a first-person perspective. If my (or your) presence and my and your presence now are an integral part of what consciousness means, how can this topic be investigated without getting into the much larger issues of personal presence and time? After all, how can consciousness exist without presence? Equally, can we say that presence and time can exist without consciousness? The problem then is that language `s power to define is hamstrung by questions about what can be represented by language and by the variables at stake. One might add, if consciousness, presence, and time are in league, this has ramifications for the ontological status of space. To speak of the "location" of consciousness becomes problematic despite the close correlation between brain processes and the presumed proximate activity of consciousness (if indeed "activity" is the word). The third obstacle concerns the dilemma of Cartesian v. non-Cartesian pre-orientation at the very start. Do we step into or out of conscious experiences in order to understand the notion of consciousness? Of course, we can't step out of our own conscious experience (obstacle 1 above), but in approaching other people's conscious experiences, we have to accept either the premise of Cartesian dualism, or risk losing our rational distance, raising the possibility of ourselves becoming empathically "first person", reporting data deemed - by the Adams standard - not "worthy of the name". (Adams, JCS, 13, no, 4, 2006, 92) The fourth obstacle concerns the nature of the data to be selected to configure a model of what consciousness is. In quantum science investigations, as Neils Bohr has pointed out, "however far the phenomena transcend the scope of classical physical explanation, the account of all evidence must be expressed in classical terms." (quoted in Atmanspacher, JCS, no. 3, 2006, 22) What this does is already change the nature of the data to fit classical parameters based on a pre-determined concept of time. If, as Plotnitsky and others have speculated, the brain processes responsible for consciousness are "fundamentally quantum rather than classical in nature" (Gordon Globus, Brain and Being, 2004, 29), any experiment as to the nature of consciousness would be contextually biased from the start unless - as stated before - one could shed the limitations of one's own humanity. This paper develops these points and ends with brief remarks as to how language as non-representation and the concept of "data" may evolve in novel ways.

**Keywords:** obstacles, science of consciousness, Cartesianism, quantum

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## **IN OUR OWN IMAGE: A ROBOT WITH A SELF WORTH HAVING**

In the last few years a new discipline has begun to emerge: machine consciousness. This talk will present a line of thought showing how the problem of constructing a truly autonomous robot may also constitute an approach to building a conscious machine. The basis of the theory is that an intelligent robot will need to simulate both itself and its environment in order to make good decisions about actions, and that the nature and operation of the internal self model may well support some consciousness-related phenomena. As part of an investigation into machine consciousness, we have developed a robot that we hope will soon possess and use a self-model similar to our own. We believe that this requires a robot that does not merely fit within a human envelope, but one that is anthropomimetic - with a skeleton, muscles, tendons, eyeballs, etc. - a robot that will have to control itself using motor programs qualitatively similar to those of humans. The early indications are that such robots are very different from conventional humanoids; the many degrees of freedom and the presence of active and passive elasticity do provide strikingly lifelike movement, but the control problems may not be tractable using conventional robotic methods. We have also developed a sophisticated and realistic physics based model of the robot. This is being used both to develop control strategies, and also to serve as a first iteration of the self model. The physics based environment has also allowed us to create a world model within which the robot's self model exists. Since the physics based technology guarantees the correctness of the interactions between the self model and the world model, the modelling system as a whole meets our requirement that the robot can use the model to predict the outcomes of imagined actions in the world. We are currently investigating ways of using the robot's visual system to instantiate external objects in the internal world model with the appropriate physical characteristics. Having developed the main components for investigating our hypothesis, we now have to ask ourselves what else will be needed, beyond some necessary architectural features to support perception, planning, a value system, decision making etc. The most intriguing possible answer to this question is 'nothing at all' - the self model, transparent in the sense identified by Metzinger, may itself constitute a phenomenal self model. The talk will be supported by a live demonstration of the robot using its internal modelling system to trial, evaluate, and select a suitable action that is subsequently executed.

**Keywords:** machine consciousness, robotics, internal modelling

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## **NEUROBIOOLUMINESCENCE AND THE EVOLUTION OF SENSORIUM CONSCIOUSNESS**

*Poster*

A completely comprehensive model of consciousness must have at base a robust conceptual framework upon which all of its diverse constituent parts may be squared, firmly linked, and mutually validated.

The theory of neurobioluminescence in the evolution of sensorium consciousness makes a bold hypothesis that may provide just such a basic frame for the field of consciousness studies. Abstract: The brain performs a wide variety of functions, but with respect to consciousness, the brain is fundamentally an organ of presentation. The sensory cortices of the cerebral cortex are composed of intricate configurations of presentation neurons arranged in focused cortical columns, whose bright, explosive, coordinated firings directly pixelate all of the specific qualia discernible within the visual, auditory, and somatosensory realms of experience, projecting them directly onto the translucent surface of the pia mater through the crystal clear medium of cerebral interstitial fluid and cerebrospinal fluid.

Consciousness resides within this quantum electromagnetic field presentation itself, as a minutely organized, microscopically fine-grained, vibrant field of "light" which has been sculpted by hundreds of millions of years of evolutionary pressures into the sensorium, whose spherical projection of a "realistic," multisensory presentation effectively mimics the forms, colors, textures, and sounds of the surrounding world. The subjective "I-sense," the sense of being the center of this presentation, is also an essential cofactor in the evolution of sensorium consciousness--this apparent self-centrality motivating the animal in all situations to engage in the "selfish" behaviors that assure its self-preservation. The "self" is an illusion, however--an inference drawn from the spherical topology of the presentation. "I must be the center of this surrounding world I see." The modern human brain that supports our own subjectively experienced, fully elaborated sensorium consciousness is traced back through evolutionary history to its point of transition from the non-conscious, cybernetic brain structures of an early ancestor. The primary visual cortex is postulated as the most likely anchor and pivot point for this seemingly miraculous evolutionary development: the advent of the first self-conscious, sentient being upon this earthly plane. What began as an epiphenomenal "leakage" of electromagnetism from the firing neurons engaged in purely computational analysis of visual data upon the incurvate cybernetic visual cortex just happened--in so doing--to form the first crude images of the exterior world, which could be experienced as a "point of view" by the bare awareness inherent in the quantum field itself. The astounding complexity and verisimilitude of the presentation of human consciousness tends to obscure the primitive functionality that first prompted its deployment in our animal lineage--the basic fact that animals can move their bodies--either in pursuit of the desirable or in flight from the aversive. More than a hundred neuropeptides and neuromodulators now function to shift the sensorium experience into many subtle variations of these two themes: pleasurable and aversive mind states. The role of consciousness, therefore, is fundamentally "aesthetic," this function made possible by a subset of these same cerebral cortex neurons, those arranged in rings of various specific sizes, capable en masse of resonating pleasing, rational chordal structures in the auditory cortex and comparable harmonious patterns in all sense cortices. The brain is not a computer, but a luminous chaotic resonator, a Light-violin. Although far too challenging for me to attempt to encapsulate here, the present theory also incorporates some aspects of Jason W. Brown's provocative theory of microgenesis.

**Keywords:** neurobioluminescence, presentation neurons, neural resonance, light, electromagnetic field, cortical columns, pixels, qualia, nondualism

**EVIDENCE OF NON-LOCAL PHYSICAL, CHEMICAL AND BIOLOGICAL EFFECTS SUPPORTS QUANTUM BRAIN**

Previously we carried out experiments from the perspective of our spin-mediated consciousness theory to test the possibility of quantum-entangling the quantum entities inside the brain with those of an external chemical substance. We found that applying magnetic pulses to the brain when an anesthetic was placed in between caused the brain to feel the effect of said anesthetic as if the test subject had actually inhaled the same. Through additional experiments, we verified that the said brain effect was indeed the consequence of quantum entanglement. These results defy common belief that quantum entanglement alone cannot be used to transmit information and support the possibility of a quantum brain. While our reported results are under independent verifications by other groups, we report here our experimental findings of non-local chemical, thermal and gravitational effects in simple physical systems. With the aids of high-precision instruments we have found that: (1) We have found that the pH value of water in a detecting reservoir quantum-entangled with water in a remote reservoir changes in the same direction as that in the remote water when the latter is manipulated under the condition that the water in the detecting reservoir is able to exchange energy with its local environment; (2) We have also found that the temperature of water in a detecting reservoir quantum-entangled with water in a remote reservoir can change against the temperature of its local environment when the latter is manipulated under the condition that the water in the detecting reservoir is able to exchange energy with its local environment; and (3) We have further found that the gravity of water in a detecting reservoir quantum-entangled with water in a remote reservoir can change against the gravity of its local environment when the latter was remotely manipulated such that, it is hereby predicted, the gravitational energy/potential is globally conserved. These non-local effects are all reproducible, surprisingly robust and support a quantum brain theory such as our spin mediated consciousness theory. Perhaps the most shocking is our experimental demonstration of Newton's instantaneous gravity and Mach's instantaneous connection conjecture and the relationship between gravity and quantum entanglement. Our findings also imply that the properties of all matters can be affected non-locally through quantum entanglement mediated processes. Second, the second law of thermodynamics may not hold when two quantum-entangled systems together with their respective local environments are considered as two isolated systems and one of them is manipulated. Third, gravity has a non-local aspect associated with quantum entanglement thus can be non-locally manipulated through quantum entanglement mediated processes. Fourth, in quantum-entangled systems such as biological systems, quantum information may drive such systems to a more ordered state against the disorderly effect of environmental heat. On a more fundamental level, our findings shed new lights on the nature and characteristics of quantum entanglement and gravity, provide vital clues for resolution of the measurement problem in quantum mechanics, and support non-local hidden variable based theories such as Bohmian mechanics. With respect to applications, our findings enable various quantum entanglement assisted technologies be developed. Some of these technologies can be used to manipulate and/or affect remotely various physical, chemical and/or biological systems including human bodies. Other such technologies can be used for non-local signaling and communications between remote locations of arbitrary distances in various ways. Finally, we urge

all interested scientists and the like to do their own experiments to verify and extend our findings.

**Keywords:** non-local effect, quantum entanglement, spin, mind-pixel

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## **QUANTUM CONSCIOUSNESS AND THE REMOTE VIEWING PARADIGM**

*Poster*

We will analyze studies of remote viewing experiments (Targ and Hurtak, 2006) wherethe mind is projected to a distant place and is able to nonlocally see a different reality. Here we examine these studies in terms of the undetermined state in quantum mechanics as put forth bymodern physics known as the "Schroedinger Cat paradox". Schroedinger proposed his thoughtexperiment to solve one of the conceptual problems in quantum mechanics called themeasurement principle of indeterminacy, which says that a quantum state is undetermined until it is measured or observed, introducing the real meaning behind the superimposition of states inthe quantum mechanical wave function. Here we will examine if consciousness, seen through remote viewing, may be sufficient to change the event from an undetermined state to adetermined state. We will further examine the pioneering efforts of Russell Targ (USA) and V.P.Kaznacheev (Russia) and investigate recent methodology used in studying remote targets in North America, Russia and the Mauritius Islands. Finally, we will seek to define the bridgebetween the spontaneousness of the wave function in quantum models of consciousness and the determinacy of the observer's perceptions of our world. Targ, Russell, Hurtak, J.J. (2006) The End of Suffering Fearless Living in Troubled Times.Charlottesville, VA: Hampton Roads Publishing.

**Keywords:** remote viewing, Schroedinger, indeterminacy, superimpositio

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## **A CRITERION FOR THE INDIVIDUATION OF THE SUPERVENIENCE BASE OF PERCEPTUAL STATES**

*Poster*

According to Noe"'s version of vehicle externalism, the minimal supervenience base of conscious perceptual state is constituted by brain activities and relevant dynamic sensorimotor factors which are beyond the brain. On the one hand, given the empirical facts that perceptual experience is world-involving, being embedded in the surround environment, it is uninformative for one to hold that the brain by itself alone is sufficient for conscious perceptual experience. Neural activities seem give no clue for us to informatively explain why and how there is perceptual experience as such. The

consequence is, sharply cutting the external world from the internal brain leaves a mystical gap to make sense of the metaphysical or ontological base of perceptual experiences. It turns out to be a mystical ontological claim. On the other hand, by incorporating the extra-cranial factors into explanation, we have positive reasons to believe that the minimal supervenience base of perceptual state involve something more than the brain. Sensorimotor vehicle externalism boosts serious back-strike from neural vehicle internalists. One of the leading philosophers, Ned Block, draws a line on the issue of causal base and constitutive base. Block argues that Noe" conflates the distinction between the notion of causation and constitution, which, if it goes, undermines the sensorimotor vehicle externalism. However, it is hardly to deny that in some circumstance the causal base can be reasonably taken as the constitutive element. Thus, as I will argue, the notion of causal base and constitutive base is not mutually exclusive and there is room for compatibility. What is required is a normative criterion to make judgment of incorporating the causal base into the constitutive base. If the sensorimotor account of perceptual experience meets the criterion, then Block's challenge could be refuted. Key words: vehicle externalism; sensorimotor; perceptual consciousness; supervenience base; causation; constitution

**Keywords:** vehicle externalism; sensorimotor; perceptual consciousness; supervenience base; causation; constitution

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## **TYPES OF (LINGUISTIC) CONSCIOUSNESS: OBSERVATION, INTROSPECTION, EMPATHY AND INTUITION**

It is advisable to distinguish between the following (potentially) conscious acts of knowledge, based on the differences between their respective objects: observation about spatiotemporal entities, introspection about one's own mental states, and intuition about norms. All three coincide in acts of communication: when someone says to me 'Christmas is approaching', I hear (= observe) this sentence, I intuitively know that it is correct English, and I introspect the 'feeling-tone' (Sapir 1921: 40) that I personally attach to Christmas. The precise relationship between observation and intuition is reasonably well understood today. By contrast, the status of introspection remains less clear. Therefore it is good to illustrate it with a couple of unequivocal examples (in addition to the Christmas example above): First, in analyzing the sentence pair That mountain range goes from Canada to Mexico vs. That mountain range goes from Mexico to Canada (Talmy 2000: 104), I introspect the fictive motion connected with these sentence (which I intuitively know to be correct English); and the same is true of the use of mental imagery, more generally. Second, the process of grammaticalization is generally divided into such subprocesses as a) reanalysis and b) extension: a) I know that: He is sick o"" I know that he is sick b) I know that he is sick o"" I am convinced that he is sick. As stated by (Itkonen 2003: 181) "I as a linguist (and you as well) can identify such processes only because I can [introspectively] imagine performing them myself" Notice that in the grammaticalization case, there is not just introspection but also empathy, insofar as I 're-enact' in my mind a process that others have performed a long time ago. The following 'logical reconstructions' may now be given: A) Introspection o"" Empathy: i) I now feel X o"" ii) I would have felt X if I had been in situation Y o"" iii) I would have felt X if I had been person Z in situation Y (=

Weber-type Verstehen, Collingwood-type re-enactment). B) Introspection o''' Intuition: i) I introspectively know that I mean 'Y' by X o''' ii) I empathically know that also others mean 'Y' by X o''' iii) I intuitively know that X means Y (i.e. that one ought to mean 'Y' by X). The latter part of B) is summarized in the slogan 'Linguistic intuition is conventionalized empathy'. What we have here is an account of the emergence of (linguistic) normativity. It follows that before X has become fully conventional, there is (and must be) a period of uncertainty when it is unclear whether X is known (still) introspectively or (already) intuitively. References Itkonen, E. 2003. What is language? A study in the philosophy of linguistics. University of Turku: Publications in General Linguistics 8. Sapir, E. 1921. Language. New York: Harcourt. Talmy, L. 2000. Toward a cognitive semantics, vol. I. The MIT Press.

**Keywords:** observation, introspection, intuition, empathy, normativity, mental imagery

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## ROBOTIC FREE WILL AND CONSCIOUSNESS

This paper firstly explains our robotic program; the program has an initial program and component programs at the beginning. The initial program forms programs by assembling components as it makes actions and receives inputs from its outside world. The robotic program keeps formed programs in its memory, retrieves them later at a new situation, and executes them. When the robot is asked to achieve its goal, the robot generates more than one temporary program to achieve the goal and selects one. Its selection criteria are based on its experiences (its success or failure). For example, suppose the robot has acquired more than one route to a specific place. Suppose that a human tells the robot to go there, but does not tell which route the robot should take. The robot selects one route. Then the paper argues that our robotic program has a free will. When a human tells our robot to achieve a goal, the human does not tell how, or physical constraints of a world do not determine how. The robotic free will makes the robot decide a way out of several possibilities. The robotic program actually selects one program out of several temporal programs and executes the one to achieve the goal. The paper also argues that our robotic program makes a robot conscious of self. Programs formed by our initial program describe parts of self, and the descriptions about the parts of the self control its current actions in such a way that results of the current action become consistent with descriptions in the formed program. Namely a described part of self controls a current part of self, and the described part of the self is a robotic experience.

**Keywords:** robot free will consciousness introspection

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## CONCEPTUAL IRREDUCIBILITY: A BRUTE FACT, OR IS THERE A COGNITIVE EXPLANATION?

A posteriori physicalism about phenomenal properties is the view that although phenomenal states are identical with physical-functional ones, this identity is a posteriori necessary. This means that even a complete physical description of the world that (i) necessitates all the phenomenal facts about our minds, and that (ii) we know, that is, mentally represent in a sufficiently sophisticated system of concepts, is insufficient for us to know, by acquaintance, the phenomenal facts already entailed by the known physical ones. In addition to even complete conceptual knowledge of the physical facts, one needs to make further empirical discoveries in order to find out about the identity relations between physicalfunctional states on the one hand, and phenomenal ones, on the other. In order to spell out this view, the notion of conceptual irreducibility has been introduced. Conceptual irreducibility is the claim that no a priori definition or analysis of phenomenal concepts is possible in non-phenomenal terms. The next question is, exactly why are phenomenal concepts not a priori analyzable in non-phenomenal terms? Michael Tye offers an explanation: phenomenal concepts are simple recognitional concepts, that do not refer via functional descriptions (unlike, for instance, 'water'), but rather, they do so directly. That is why the description of a sensation Q in physical-functional terms does not allow the subject to deduce what it is like to undergo Q. However, as Mohan Matthen has recently argued, on undergoing sense experience Q we instinctively know what epistemic actions (co-classification, discrimination, recognition, inductive generalization, and inference based on these), and overt actions (like reaching out for an object having a certain color) the situation is right for. This suggests that Tye is wrong to claim that no amount of a priori reflection on phenomenal concepts alone will reveal phenomenal-physical, or phenomenal-functional connections, even of contingent type. However, to this one could reply that the instinctively associated functional roles are symmetrical in many cases; they can replace one another, and that is why spectrum inversion is so straightforwardly conceivable. I shall argue that such symmetrical functional roles obtain in some cases, but not in others. Spectrum inversion is conceivable; not so, apparently, an inversion of shape appearances. Similarly, word forms (verbal labels) like 'fork' and 'wheel' could take each other's role in a dialect of English without this switch demanding structural (syntactic and semantic) changes in the rest of the language. However, sentences like 'Gasoline engines typically run at higher RPMs than diesel engines' and 'The present prime minister of Canada is a conservative' cannot replace each other - not at least without widespread adjustments in the structure of the whole language. The reason, I contend, is that words and color experiences are representationally atomic states whereas sentences and shape percepts have constituent structure, and their functional role - in the language and in the mind respectively - depends on their constituent structure. Thus functional symmetry in these cases is not warranted. Consequently, the ultimate explanation of conceptual irreducibility lies in representational atomism, rather than phenomenal concepts lacking inherent functional attributes.

**Keywords:** phenomenal concepts, conceptual irreducibility, functional roles, direct reference, a posteriori necessity

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**HIERARCHIC MODEL OF CONSCIOUSNESS, INCLUDING THE DISTANT AND**

## NONLOCAL INTERACTIONS

In accordance to our Hierarchic model of elementary act of consciousness (HMC), each specific kind of neuronal ensembles excitation, accompanied by jumpway reorganization of big number of synaptic contacts (elementary actual act of consciousness) corresponds to certain change of hierarchical system of threedimensional (3D) standing waves of following kinds: thermal de Broglie waves (waves B), produced by anharmonic translations and librations of molecules; electromagnetic (IR) waves; acoustic waves; vibrogravitational waves, excited by coherent translational and librational vibrations of molecules. The changes of de Broglie waves of atoms and molecules, participating in elementary act of consciousness modulate the virtual pressure waves of Bivacuum (VPW+) (VPW). These modulated standing virtual waves form the Virtual Replica (VR) of 'tuned' neuronal ensembles. The notion of VR of any material object was introduced by this author in Unified theory of Bivacuum, duality of particles, time and fields (Kaivarainen, 2006 a,b). The surface VR have resemblance with hologram. The jumpway transition of the VR, as result of elementary act of consciousness the bodies of neurons group/ ensembles pulsation, accompanied by redistribution of synaptic contacts between the starting and final states, can be named: virtual act of consciousness. The listed above hierarchic system of different kinds of quantum excitations, reflects all properties of any condensed matter, including biosystems. Most important collective excitations providing the entanglement and quantum background of consciousness, as a sequence of number of elementary acts of consciousness, are coherent water clusters (primary librational effectons), representing mesoscopic Bosecondensates (mBC) of water in microtubules of neurons. The quantum beats between the acoustic (a) and optic (b) states of primary librational effectons (mBC) are accompanied by superradiation of coherent librational IR photons and their absorption. The intensity of these photons radiation absorption is interrelated with dynamic equilibrium between open (B) and closed (A) states of nonpolar clefts between and tubulins. These IR photons exchange interaction between 'tuned' systems of MTs stands for distant interaction between neurons. This collective shift in geometry of nonpolar clefts/pockets equilibrium to the closed one, accompanied by shrinkage of MTs is a result of turning of clusterphilic interaction to hydrophobic ones. This process induce the disjoining of the MTs ends from the membranes of nerve cell bodies and gel sol transition in cytoplasm, representing disassembly of actin filaments. Strong increasing of free actin monomers surface and corresponding increase of fraction of hydrated water decreases the internal water activity and initiate the water pumping in nerve cells from external space. The cell swallows and its volume increases. Corresponding change of cell volume and shape is followed by synaptic contacts reorganization. The necessary for such process destabilization of water clusters and conversion of clusterphilic to hydrophobic interaction is a consequence of such known quantum optic phenomena, as bistability the polarization change as a result of ab equilibrium shift in librational primary effectons to the right, as a result of light pumping and system saturation. This saturation can be accompanied by the pike regime (light pulsation, depending on bstate saturation in librational effectons and collective superradiation). The related selfinduced transparency is a result of light absorption saturation in primary librational effectons (Andreev, et al., 1988), described in Chapter 1 of this book. The exchange between distant MTs by means of IR librational photons induces the tuning of internal water clusters (mBC) in MTs, as a precondition of the entanglement between remote cells. The entanglement between coherent nucleons of opposite spins of H and O of remote water molecules mBC in accordance to our theory of nonlocality can be realized via bundles of virtual guides VirG{sme} of spin, momentum and energy

((Kaivarainen, 2006a,b). The gelsol transition in the number of entangled neurons is accompanied by decreasing of viscosity of cytoplasm. The tuned parallel orientation of MTs in tuned remote cells change as a result of Brownian motion, accompanied by decoherence in exchange interaction and entanglement between water clusters in MTs. This is followed by relaxation of the internal water + microtubules to normal dynamics and grows of (+) ends of MTs up to new contacts formation with cells membranes, stabilizing cells dendrites new geometry and synaptic contacts distribution. This new configuration and state of the nerve system and brain, corresponds to their another Virtual Replica. We assume in our model the existence of back reaction between the properties of Virtual Replica of the nerve system of living organisms, with individual properties, generated by systems: [microtubules of neurons + DNA of chromosomes] and the actual object the organism itself. The interference of such individual (self) virtual replica VR{self} with virtual replicas of other organisms and inorganic macroscopic system may modulate the properties of VR{self}. Because of back reaction of VR{self} on corresponding organism, the interaction of this organism with resulting virtual replica of the external macroscopic world may be realized. The twisting of centrioles in cells to parallel orientation, corresponding to maximum energy of the MTs interaction of the new or same remote neurons, as in previous act starts again. Our approach have some common features with HameroffPenrose (2002) and Jibu, et al., (1994) models. Kaivarainen A. (2001). New Hierarchic Theory of Condensed Matter and its Computerized Application to Water and Ice. <http://arxiv.org/abs/physics/0102086>. Kaivarainen A. Unified Theory of Bivacuum, Particles Duality, Fields & Time. New Bivacuum Mediated Interaction, Overunity Devices, Cold Fusion & Nucleosynthesis. <http://arxiv.org/ftp/physics/papers/0207/0207027.pdf>

**Keywords:** act of consciousness

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## CAUSAL CURRENTS AND EINSTEIN'S RAZOR

If a scientific approach to consciousness is truly possible, then it also follows that one must use a scientific methodology to study this topic. One important weapon in the scientific arsenal is Einstein's variant of Occam's razor, in which Einstein famously stated that a theory should be simple, but not too simple. Although this is merely a guiding heuristic, it served Einstein, and indeed has served all of science well through the years. This dictum is applied as follows. We begin with what has become almost a default assumption in the scientific community, namely, that mental states are supervenient on neural dynamics, and ignore without argument other possibilities such as substance materialism and behaviorism. This constrains the universe of theoretical possibilities to four (see Table 1). In the first consciousness is a function of neural dynamics qua the algorithm this activity implements. In the second it is a function of the trajectory through state space implied by the relaxation process. In the third it is function of causal currents, which can be defined as the set of mutual causal influences between active neurons at any given moment in time. In the fourth, it is a function of the state vector representing the firing rates of the neurons in question. All of these theories are problematic, of course, and subject to arguments regarding absent qualia, inverted qualia, the hard problem, etc. However, the last is particularly untenable. Theoretically, this claim follows because neural activity alone (abstracted from

neural interaction) cannot demarcate separate conscious entities (for example, it cannot state why activity in brain A and brain B do not combine to form a longer vector and thus a single consciousness); empirically, it follows from binocular rivalry (Blake and Logothetis, 2001) and similar experiments. Thus we can cull this theory as being too simple to be scientifically productive. Table 1. Four theories of consciousness, and the plausibility and relative complexity of such. Einstein's razor suggests that the third theory is the most promising candidate. Theory Plausibility Relative complexity Algorithmic functionalism problematic high Dynamical trajectories problematic medium Causal currents problematic low State vectors untenable very low The complexity of each theory is also shown in Table 1. Algorithmic functionalism is the most complex as it requires a mapping from a putative program running in possibly multiple neural modules and during an unspecified time period to conscious states. A dynamical approach is considerably simpler, but like algorithmic functionalism requires that the mapping be made over a time window, in this case the time taken for the system to relax. With causal currents the mapping is simply from a network of causal relations to conscious states. This approach can be shown to be the simplest of the remaining theories, but also retains sufficient theoretical power by virtue of its inclusion of causal relations. Thus it is selected by Einstein's razor as the most promising. The consequences of this claim are then examined. In particular, the connection between causal currents and theories that stress the importance of reentry (Edelman and Tononi, 2000) and neural synchrony (Singer and Gray, 1995) are drawn, and the notion of a causal horizon is introduced.

**Keywords:** Einstein's razor, causal currents, functionalism, synchrony, reentry

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# THE COGNITIVE DEVELOPMENTAL INVESTIGATION OF THE ATTRIBUTION OF PRIVILEGED ACCESS TO MENTAL STATES

Research on mindreading is one of the central topics of present-day cognitive science. Within this research, children's thinking about the mind is especially important. The present paper will be about the relationship of the so-called ideal speech situation developed by Habermas and the child's theory of mind. First, I will analyse the ideal speech situation from which I pick out the importance of the ascription of privileged access to mental states. Then I will present the history of first person authority within general psychology, social psychology and cognitive developmental psychology. One of the conclusions of this historical presentation is that within adult folk psychology we often ascribe privileged access to intentional states when we interpret other people's behaviour. The paper will show how we operationalised the ideal speech situation of the universal pragmatics of Habermas. In a word, we naturalise this philosophical concept. I will investigate the notion of the ideal speech situation from the point of view of contemporary empirical theory-of-mind research. Then I raise two questions: When

and how does the child acquire the notion of the ideal speech situation? I will show a cognitive developmental experiment which aimed to answer the above questions. During the experiment we used a modified version of the classic theory-of-mind task developed by Bartsch and Wellman. In this task, the child has to infer the mental states from the action of a protagonist. Then we tested whether the child could select the main character on the basis of his first person verbal report. We argued that if the child was able to do this then he attributed first person authority to the character. Finally, I will present the task analysis of our experiment. I will close with the suggestion that the acquisition of the ideal speech situation is related to the imaginative abilities of children, particularly to his or her capability to participate in imaginative conversations.

**Keywords:** theory of mind, attribution, first person authority

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## **THE ROLE OF EMOTIONS IN THEORIES OF SELF**

*Poster*

In this paper I expand on the view that emotions, not cognitive states like beliefs or desires, are most apt in the task of articulating a theory of the self. The three criteria for assessing aptness are individuality of the emotive attitude, synchronic continuity, and self-involving content. Leveraging some recent work on emotions by philosophers, psychologists, and neuroscientists, I show how these criteria are fittingly satisfied. Doing so also provides a sketch of what a theory of the self articulated in terms of emotional states would look like. An added benefit of using this approach is the connections it sustains to an analysis of character and motivation.

**Keywords:** emotions, self

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## **'THE HIGHEST STATE OF CONSCIOUSNESS': THE RELEVANCE OF THE CONCEPT TO THE SCIENTIFIC STUDY OF CONSCIOUSNESS**

*Poster*

The nature of consciousness, although illuminated by external behavioral studies (physiological, sociological, and psychological), cannot be understood without a solid grounding in the phenomenological characteristics accessible only by direct experience. Within traditions that are concerned with those experiential characteristics, it is clearly recognized that consciousness admits of various levels or states, and that there is a highest state. They also hold that the understanding of that highest state of consciousness (HSC) has both theoretical and pragmatic importance, particularly in the dedication of human energies towards the development of individual and, more recently, collective or

species-wide consciousness. In that these traditions claim that the fullest manifestation of consciousness is found in the HSC, it is important for scientific studies to take these claims into consideration within its basic paradigm. Among those traditions there is a sharp difference of opinion about the nature of the HSC. A useful distinction here is that made by W. T. Stace between what he designate as extrovertive and introvertive mystical experiences. Although limitations pertain to that dichotomy, it nevertheless provides a basis for grouping the conclusions of the various traditions into one or the other type. Particularly relevant is that this distinction reveals a difference in view concerning the nature of consciousness per se. The difference between the two perspectives has been recognized by writers such as Robert Forman, Ken Wilber, and others. In this paper the first issue addressed is a clarification of the major phenomenological characteristics attributed to the HSC from the extravertive and the introvertive perspectives as found in two important traditions of each perspective. These are a) traditional Christian mysticism's 'unitive state,' b) Mahayana Buddhism's Nirvana as identical with samsara, c) Patanjali's Yoga view of asamprajnata samadhi (kaivalya), and d) Hinayana Buddhism's understanding of Nirvana. This is followed by a second concern of considering a number of arguments for and against the validity of the extrovertive and introvertive views as descriptive of the HSC. The arguments considered for the extrovertive view focus on a) its being most comprehensive and b) its leading to greater social responsibility, while the arguments against it focus on a) its being deficient in certain respects b) its egoistic residue, c) its illusory pragmatic consequences. Those for the introvertive view focus on a) its involvement of total consciousness, b) its fundamental logical coherence, while arguments against it focus on a) its incompleteness in regards to the range of experience, b) its negation of the reality of other conscious subjects c) its negative social consequences. Finally, some ramifications of each of the two main opposing views for the scientific study of consciousness particularly in regard to a) the role of rigorous scholarly assessment of phenomenological accounts of the HSC, and b) the determination of psychological parameters for experimental study.

**Keywords:** highest state of consciousness, introvertive mysticism, extrovertive mysticism

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## **SEMANTIC SIMILARITY AND INATTENTIONAL BLINDNESS**

Inattentional blindness refers to our failure to notice the appearance of an unexpected object that we may be looking at directly when our attention is elsewhere. Previous studies have revealed that objects with prior signal value will capture attention and are easily noticed. Here it was studied whether a stimulus without any prior signal value and presented in different physical format, but whose meaning is relevant to the attentional goals of the observer, will capture attention and escape inattentional blindness. In each trial, a stimulus display consisting of four items was presented for 1 second. In Experiment 1 the items were pictures and in Experiment 2 they were words. The participants attended to either animals or pieces of furniture and listed the items from the attended category after each trial. In the third trial, the critical stimulus appeared without any expectation for 1 second in the center of the screen. In Experiment 1, this unexpected stimulus was a word (while the attended items were pictures) and in Experiment 2 it was a picture (while the attended items were words). For half of the observers the unexpected stimulus

belonged to the attended semantic category and for half it was not from the attended category. After the critical trial the observers were asked "Did you notice anything new or additional that was not present in the previous trials?" The results showed that an unexpected stimulus belonging to the attended semantic category but not sharing physical features with the attended stimuli was noticed more often than a semantically unrelated stimulus. The results imply that the semantic relation between the observer's attentional set and the unexpected stimulus plays a crucial role in inattentional blindness: an unexpected stimulus semantically related to the observer's current interests is likely to be noticed whereas unrelated stimuli remain unnoticed. Attentional selection may thus be driven by purely semantic features: meaning may determine whether we notice a stimulus or not.

**Keywords:** attention, inattentional blindness, perception

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## IS CONSCIOUSNESS RELEVANT TO PERSONAL IDENTITY?

*Poster*

Mainstream materialist philosophers (Parfit, Nozick and Perry among others) usually accept a (broadly understood) neo-Lockean theory of personal identity: our identity consists in some sort of psychological continuity and/or connectedness. Behind these theories lurks the assumption that we are most fundamentally persons - that is, the correct answer to the question "what we are" is: we are persons endowed with consciousness, goal-directed behaviour, and perhaps free will. To be one of us is to be a person. This assumption is so widely accepted that philosophers often do not even bother arguing for it, nor they state it explicitly - they just take it for granted. Recently, however, animalist theorists such as Snowdon, van Inwagen, Olson and Hershenov have contested this assumption. According to animalism we are most fundamentally biological organisms of the species Homo Sapiens Sapiens. Organisms have no psychological persistence conditions: they can cease to be conscious without ceasing to exist, and human animals are no exception. Hence consciousness, and therefore being a person, has nothing to do with our identity. There is no deep philosophical problem of personal identity - no more than presidential identity, student identity or basketball player identity. In my presentation I argue for animalism and consider some objections against it including alleged dissociation cases - scenarios in which the person and the human animal seem to come apart -, and the so-called Corpse Problem, according to which the main argument against constitutionalism poses a problem for the animalist too. I also consider escape routes for neo-Lockeanism. The main focus of my inquiry is the most popular solution, constitutionalism. Many contemporary philosophers (Shoemaker, Baker, Rea, Corcoran) believe that there is an intermediate relation between identity and distinctness. Two objects, they claim, can exactly occupy the same spatiotemporal region. Yet they are not identical because they differ in their modal properties. According to constitutionalists we are strictly speaking not identical to animals, but we are constituted by them: the 'is' in the sentence 'x is an animal' means 'is constituted of', and not 'is identical to'. I argue that constitutionalism yields unacceptable consequences. These are the following: there are many conscious beings under our skin with whom we share our mental states; we can never

know which we are; and probably all our self-referential sentences are false. It is also argued that the putative constitution relation violates a widely accepted thesis about supervenience. Some other escape routes, such as four-dimensionalism (Lewis, Brennan, Noonan, Hudson) and relative identity (Geach, Gibbard) will also be taken into consideration. I argue that these are also implausible and not worth their price. My conclusion will be that there is no compelling argument against animalism, so we should try to live with it.

**Keywords:** personal identity, neo-Lockeanism, animalism, identity and constitution, self-reference, supervenience, many-thinkers problem

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## **INFLUENCE OF MEDITATION STYLES ON VISUAL-SPATIAL COGNITION**

The current study examined the effects of concentration versus open-ended meditation on visual/spatial processing. Although previous research suggests that different meditation styles might differentially affect cognition, the distinctions between the above two styles of meditation have often been overlooked by many researchers, and the question of how different types of meditation affect perceptual and cognitive processing remains unanswered. We were particularly interested to contrast the effects of a deity yoga meditation (concentration style) that employs focused attention and requires extensive visualization to emptiness meditation (open-ended style) that employs distributed attention. We administered pre- and post- tests of visual-spatial ability to the following four groups of participants: deity-yoga meditation, open-ended awareness meditation, resting control, and imagery control groups. Twenty participants in the deity yoga and open-ended awareness meditation group were experienced meditators from Tibetan Buddhist and Zen monasteries in upstate New York as well as from the Tibetan monasteries in Nepal. In addition, we examined the performance of two control groups (twenty-seven non-meditators); one control group merely rested during the intervening time, thus serving as a comparison group for any test-retest effects, while another control group solved a number of computerized visual/spatial tasks during the intervening time, thus serving as a comparison group for any effects of general (non-meditation) imagery processing. Deity yoga and emptiness meditation groups completed computerized Shephard & Metzler (1971) mental rotation and visual memory tests before and after meditation, and their performance on these tests was compared to the performance of the two non-meditator control groups. The results showed that only the deity yoga meditation group improved from pretest to posttest on the visual/spatial tasks. The differential effect of two styles of meditation on visual/spatial cognition could be attributed to the involvement of different attentional networks. The deity yoga meditation requires sustained attention, that is, holding the focus of attention steady for the duration of the intervening task, while open-ended awareness meditation requires the switching of attentional resources and the ability to engage and disengage attention with each new

sensation, image, or thought. It is possible that the ability to maintain focused attention is more important for the successful performance on visual/spatial tasks than an ability to switch attention. The findings from the present study might also have significant implications for visual/spatial ability training.

**Keywords:** visual imagery, spatial ability, meditation

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## **ALTERNATIVE APPROACH TO THE MIND-BODY PROBLEM**

The history of physics offers several examples when a new theory with less axioms explained essentially more phenomena than the old one, based on greater number of assumptions. As an example, general theory of relativity explains, with just two axioms, phenomena which were even unknown to the classical physics. Moreover, the axioms of the new theory used to be less evident than those of the old one -- many times even counterintuitive, as witnessed by quantum mechanics. If we push this analogy formally to an extreme, one could expect that the final theory, searched for by physicists, could rely on a single axiom which would be intuitively utterly unintelligible but would explain everything. I believe that what holds for physics can be expected to apply to the problem of consciousness as well. In the present contribution I outline a proposal how to adopt the above approach to the science of consciousness. Sharing the views of C. McGinn, that we will possibly never understand the essence of consciousness, I believe, nevertheless, that we may use the hypothetico-deductive approach to explain the properties of a conscious system resulting from a (possibly strange) hypothesis. The real problem is accordingly being shifted to the question of how to find such a hypothesis. Consider a set of behaviors  $B_i$  of type expected of a conscious system. The precise specification of the behaviors is not the most important here because we suppose that there are no objectively verifiable criteria to know whether a system is conscious or not. It is, instead, sufficient to base our choice on our intuition. Adding new types of behavior to the system  $B_i$  we obtain a new system, say  $B_{i+1}$ . In such a way we can create a series of sets  $B_i$  ordered in such a manner that the set  $B_j$  includes all types of behavior found within all the sets with  $i < j$ , i. e.  $B_i$  is a subset of  $B_j$ . Let then to any of the sets  $B_i$  correspond an explanation (explanatory "theory")  $E_i$ , explaining all types of behavior found in  $B_i$ . We can imagine  $E_i$  as being e. g. a computer program simulating the behaviors found in the set  $B_i$ , departing from a set of principles, or "axioms". In such a way we obtain a series of explanations  $E_i$  corresponding to the series of behaviors  $S_i$ . We need not to insist on precise explanation of why and how  $E_i$  explains  $B_i$ . What is important here is to have a well defined correspondence between every  $B_i$  and  $E_i$ . The crucial point then is to have sufficient number of couples  $(B_i, E_i)$  so as to be able to analyze the simplicity of explanations  $E_i$ . If we would succeed in finding such selection of sets  $E_i$  that with growing  $i$  the explanations  $E_i$  become simpler (as judged e. g. by smaller number of axioms needed to construct the explanation) we could claim that we are approaching the scientific explanation of consciousness, not troubling ourselves with the question what is it like to be conscious for the given system and thus avoiding the problem of other minds. It will probably happen that the simpler the theory  $E_i$  becomes, the less understandable it will be. We have a

priori no reason to expect more understandable theory of more complicated behavior. But the theory closer to the true state of affairs can be expected to be simpler since it will contain less ad hoc hypotheses introduced with the sole purpose to match up the theory with the behavior. The possibility to simplify a theory by broadening the set of behaviors to be explained can be considered a hallmark of successful approach of explanations to the acceptably plausible theory -- without claiming that what is being approached is a causal or necessarily "true" explanation of consciousness. In my view this is the best possible result one can expect given the elusive nature of consciousness. These general ideas are illustrated with an example of behaviors Bi which simulate a system learning to move within a hostile environment. With growing i the "subject" is facing more obstacles and it turns out that simulations are based on less rules which are progressively less evident.

**Keywords:** mind-body problem, hypothetico-deductive approach, scientific explanation of consciousness

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## WHERE NEXT FOR CONSCIOUSNESS?

*Poster*

The apparent trade off between processing styles encompassing systematising (extreme male) brain and empathic (extreme female) brain is well documented (Baron-Cohen etc). This suggests a fundamental switching mechanism between two different pathways, and that these pathways select information for conscious processing (where next?), or, due to cognitive demand preferentially devote resource to conscious processing. The cognitive pathway is Acetylcholine initiated in the form of attention at the LGN/PGN complex (which of necessity must integrate audio-visual information and the emotive pathway is a parallel pathway mediated via serotonin and an Amygdalic pathway. Asperger's individuals have left frontal eye field deficits which may be considered to equate with a failure of some form of retinotopic mapping of the left visual hemifield for non-conscious pathways only. Eye tracking data for such individuals also suggests that they do not scan the nonconscious information available for face recognition, which normally requires a triangulation of two eyes and a mouth, instead, they overfocus on the mouth area, as an alternative form of attentional switching. It is suggested therefore that a specific deficit in left hemisphere information pathways to the left frontal eye field can explain a number of the symptoms normally recognised in Aspergers. Asperger's individuals also have a 50% deficit of serotonin 2 B receptors in the LGN, and these have been associated with deficits in social cognition. This deficit also contributes to reduced gain function at the LGN, and may be considered to be the faulty switching mechanism. The faulty switch may result partially from deficits in pre-attentional pathways and lack of information being present at the Thalamic Reticular nuclei. Asperger susceptibility genes have association with the audio visual pathways as follows. 1q21-22 - phosphocin in retina cells; 3p21-24, containing DFNB6 sensory cell defects in inner ear; 3q25-27 myopia and corpus callosum, 4P14 contains the GABRG1 gene; 4q32 freckles and retinal pigmentation?, night blindness and peripheral vision; 6p25 glaucoma phenotype; 6q16 macular dystrophy and myopia; 13q31 nystagmus and vestibulo-cerebellar disorder; 18p11 high myopia, bipolar disorder and GABA associations. It is further considered that rod derived information may be compromised and therefore the aspergic individual has

to rely on attention mediated conscious pathways to build a big picture of the world built upon information from the central foveal area of the retina. The paper will also discuss implications arising from the Von Economo neurons in the Anterior cingulate which for humans support the cognitive emotive interface and for Aspergics have a deficit of empathic type information due to failure of information transmission via the serotonin system which deals with social threat via the Amygdalic route.

**Keywords:** Asperger's, "Frontal eye field", social cognition

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**MATERIALIST EMERGENT REPRESENTATIONALISM: AN ONTOLOGICAL AND EPISTEMOLOGICAL FRAMEWORK FOR NATURALIST RESEARCH OF THE ORIGIN OF CONSCIOUSNESS**

*Poster*

Any theory on the origin of consciousness necessarily presupposes some general ontological and epistemological claims dealing with three groups of questions: (a) What is the relationship between physical and mental properties? Is the mind an eternal property in the universe, or it did arise at some stage of the evolution of the universe? (b) How the mindbody relationship could be discovered and presented in the scientific knowledge? (c) What is the relationship between conscious and unconscious mental states? Could an entirely unconscious mind exist? The general claim that 'consciousness exists in virtue of the brain activity' is insufficient as a basis for development of a naturalist theory on the origin of consciousness. During the last decade many philosophers (Lycan, Tye, Rosenthal, Carruthers, Van Gulick, and others) have proposed theories of consciousness based on the combination of materialism, emergentism and representationalism. I design this onto-epistemological view as materialist emergent representationalism (MER). In the first section the three views incorporated in MER are presented: (a) Materialist ontology: the view that the particles on the fundamental level in the universe (sub-atom particles, atoms, and non-organic molecules) have no mental properties. (b) Emergentist epistemology: the view that the mind is a system of states and processes which supervene on neuronal processes in the brain. Emergentist explanation is a specific kind of explanation of the link between the lower-level physical properties and the higher-level mental properties in brain. (c) Representationalism: the view that the primary mental property is the representational ability (intentionality, ability to have semantic content). Representational ability is not necessary linked with existence of conscious experiences. The primitive (and evolutionary first) forms of mental activity are unconscious. Conscious mental states did arise at some later stage during the evolution of animals. In the second section I consider the explanatory gap in the contemporary representational theories of consciousness. I agree that it is missing an acceptable explanation of the phenomenal ('experiential', 'feel', 'qualitative') character of conscious states. But I deny the conclusions, often made on basis of this criticism, that the existence of the explanatory gap gives a good reason for:- refuting materialism, and accepting panpsychism (Chalmers); - refuting representationalist view on mind (Velmans);- refuting emergentist epistemology, and

accepting an eliminativist view on conscious experiences (Dennett) or an agnostic view (McGinn). I maintain that most of the strong arguments for MER are entirely independent of the question, whether we have some theories on the origin of consciousness, and if we have, is there an explanatory gap in these theories or not. The conclusion is that the set of ontological and epistemological principles of MER is well-grounded, and it forms an adequate framework for the naturalist research of the origin of consciousness.

**Keywords:** mind-body materialism emergent representationalism consciousness animals evolution

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## **SPIRITUAL COMMUNICATIONS BETWEEN MEDIUMS AND LIVING BEINGS: A STUDY OF CASE**

*Poster*

What are the healing potential of spiritual communications performed between mediums and living beings? What are the physical, emotional and spiritual benefits of a communication between disabled patients and physicians developed through people with mediumship? The main objective of this article is to present a study of case in which mediumship communication has demonstrated to help a person with suicide impulse. The reviewed study has happened in Casas Andre' Luiz. One of the fundaments of the institution is the religious practice of spiritualism. Therefore, the application of prayers and the organization of mediumistic se'ances are practices that have been carried out at the institution for many years. These practices do not come into conflict with the proceeding of conventional medicine. The spiritual communication involves a process of therapy by which a person that never has talked before in his life, because of physical limits, has experienced an opportunity to express himself. By the therapeutic conversation, the patient has deal successfully with his destructive impulses, discovering a purpose for his life, creating positive meaning and hope. Keywords Spiritual Communications, Mediumship, Altered States of Mind, Consciousness and Behavior Change, Complementary Healing Process.

**Keywords:** Spiritual Communications, Mediumship, Altered States of Mind, Consciousness and Behavior Change, Complementary Healing Process.

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## **THE MECHANICAL IMPLEMENTATION OF HUMAN CONSCIOUSNESS AND COGNITION**

*Poster*

A "conscious room" metaphor is used to represent all the known operations of the human consciousness. The conscious room is run by a mechanical robot called "consciousness," and everything the robot

knows represents the content of our conscious awareness. Functions replicated in the conscious room include a communication console by which the robot can communicate with the outside world, a language translator, working memory, explicit memory, an imaginary theater where thinking and mental image manipulation can occur, and various means the conscious can communicate with the unconscious via thoughts and feelings. A method for the "conscious" robot to activate the various unconscious operations will also be described. It will be shown that the setup of the conscious room can simulate all features of human consciousness, including subjective experiences, and everything in the conscious room can be implemented by purely mechanical processes. An "English Room" metaphor will be used to refute John Searl's "Chinese Room" metaphor to argue that purely mechanical processes can understand the meaning of language. Novel ways to simulate thoughts and emotions and human reasoning are also presented.

**Keywords:** machine consciousness; metaphoric representation of consciousness; artificial emotions; the mechanics of thinking; unconscious homunculus; mental switches; conscious robots with feelings.

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## **MEMORY AND TIME: EVOLUTIONARY DEVELOPMENT OF MEMORIZATION CAPACITY ANALYZED FROM THE FIELD CONCEPT PERSPECTIVE**

Are there any limits for memorization capacity, which is a core of human consciousness? Accepting a view that scientific progress grounded on human mental activity will never reach the stage when "everything has been discovered", one can suggest that brain capacity for memorizing is similarly almost endless. The purpose of the studies is to elaborate a model of brain functioning, which would be compatible with brain potential capacity to memorize any amount of possible events and facts. From evolutionary perspective, the following premises are taken into account: 1) Memorization capacity of hominid brain is to depend on brain size (overall number of neurons); 2) However, during the hominid phylogenetic evolution, a drastic extension of brain size ("great encephalization") was not accompanied by immediate adequate enrichment of the brain functional activity to be expressed by respective enrichment of behavioral pattern of life. Hence, there is no accord between rather monotonous course of "ordinary" genetically determined biological evolution and accelerating pace of human mental development. Namely, the anatomical completion of *Homo sapiens s.* is accounted to occur about 130,000 (Africa) - 90,000 (Near East) years ago, while the vertiginous burst of human mental development happened during historical (civilization) period. This means that throughout a long period, anatomically perfect human brain was out of full use while ready for maximal use. Such situation leads to assumption of evolutionary trend consisting in preliminary (as if in advance) development of a highly specific anatomical basis sufficient for subsequent origination and development of consciousness per se. The inference is that the "great encephalization" phenomenon observed in the hominid lineage but absent in apes' lineages (although the respective species sojourned in similar conditions of African savanna) was not in accordance with classic Darwinist principle of trait selection providing immediate advantage for the fittest. Such highly specific evolutionary trend is unexplainable within the existing paradigm. The suggested approach is associated with the theory of autonomous biological field (A.

Gurwitsch, 1944) irreducible to physical fundamentals while based on strictly defined postulates deeply rooted in biological reality. These postulates concern vectorial repulsive character of the field, field anisotropy, concept of elementary field "flash", field sources, mechanism of field influence upon molecular substrate of living cells, formation of integral microfields and macrofields, and dynamics of field tension depending on metabolic level. The field influence is expressed on molecular, cellular, and morphological levels. On molecular level, the field action is expressed by vectorization of molecular processes in living cells ("working" against molecules' chaotic movements). Episodic memory (biographical events) as well as semantic memory (individual's store of knowledge) are represented by molecular "traces" caused by afferent to-be-perceived neural stimuli projected upon the brain's autonomous field-determined intracellular molecular continuum. Even initial small changes of field's parameter(s) caused by environment may lead to a lasting field evolution (imitating "trend"), contrary to accidental dot mutations' principle of classic genetics even if supported by Baldwin effect. An infinite number of potential field states cover any possible amount of memorized events and facts.

**Keywords:** Memorization capacity, Evolution, Field concept

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## **MATERIALISM. AN ADAPTIVE ANALYSIS OF CONSUMER BEHAVIOUR.**

*Poster*

The paper proposes a new paradigm of consumer research, namely: the adaptive analysis. First, it argues for the need of an adaptive analysis in cognitive psychology of reasoning and probability judgement. Such an analysis employs: specification of goals for the cognitive system to achieve, analysis of the "ecological" trade-off benefit structure as well as the processing and evolutionary constraints, and the probabilistic nature of stimuli. Examples of the adaptive analysis in cognitive psychology have been provided. Second, it shows that the adaptive analysis is already, though partially, present in the some research on buyer behaviour dealing with adaptive aspects partially, present in the some research on buyer behaviour dealing with adaptive aspects of decision making and consumer expectations. Some practical issues of the research on consumer satisfaction have also been included. Some disadvantages of the adaptive approach are underlined and the question of its empirical verification is being posed. Next part of abstract shows that possession of material goods involves bearing certain costs, mainly of a psychological nature. The analysis of costs has been conducted in terms of the assessment of the sense, efficiency, economic aspects, security and ethics of possession, taking into consideration that personal possessions have to be seen in the context in their quantity (how much wealth) and quality (what sort of goods). The author stresses the problem of technological and social appropriateness of possessions, which could influence the final balance of profits and costs. It also points out reasons underlying difficulties in assessing the individual relationship between benefits and costs of having material possessions.

**Keywords:** Materialism

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## **PANPSYCHISM, THE COMPOSIBILITY OF QUALIA, AND THE UNITY OF MIND**

*Poster*

Several recent attempts to formulate naturalistic accounts of the place of consciousness in the world have favoured panpsychism (see eg Galen Strawson). Usually these take a micropsychist approach, in which atomic elements of consciousness are associated with microphysical entities. One of the major problems facing any micropsychist theory is this: how do atomic elements of consciousness become composed to form a macro-experiential mind possessing unity and privacy? The composition of psychic elements apparently has no counterpart in everyday life, hence we have no ready concept of it. Some critics have argued that this is as hard to explain as the original problem of how a conscious mind could arise from a physical system. It is argued here that qualia lend themselves to a straightforward model of composition without the need for opaque forms of emergence. But it is also argued that identifying the conscious mind with microphysical structures extended in physical space encounters a more damaging problem, and one that defeats any micropsychist versions of panpsychism. It is argued that the unity of the consciousness mind is logically incompatible with its putative spatial extension -- which if real would be open to paradoxes of dissecting conscious brain tissue. The price we would have to pay to avoid those paradoxes is a version of panpsychism based on macroexperiencers, rather than micro-experiencers, as fundamental ingredients of reality.

**Keywords:** panpsychism, idealism, compositability, unity of mind

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## **QUANTUM MORPHOGENETIC FIELD OF PATTERN RECOGNITION**

*Poster*

Pattern recognition is considered as one of the fundamental brain function. In addition to geometrical patterns, the objects to be recognized can be more general physical objects, such as quantum particle or classical particle. The wave function of a moving electron at a point in Minkowski space is identified with that at another point through an electromagnetic field (or group transformation). The same principle applies to the pattern recognition of geometrical patterns. Various features are extracted from the object, analyzed, and finally reconstructed in the brain. The constructed image is matched with the ones stored in memory through suitable transformation groups such as rotation, translation, dilatation or mirror inversion. Many patterns are reduced to standard ones through the group transformations. The images constructed in the brain can be transformed into each other by suitable group transformations. In this paper, using the mathematical structure of quantum morphogenetic system (QMS) in non-Euclidean

space], we introduce a postulate that geometrical patterns are recognized from their invariant features under given group transformations. In this paper we describe a new type of input-output information process. Here, the image  $(\psi)$  corresponds to the quantum wave function and the geometrical pattern  $c$  corresponds to the Minkowski space coordinates, and the "image potential" corresponds to the quantum morphogenetic field induced by prototype images. An "image field" is also induced through the "image potential" from quantum morphogenetic field. The mathematical relation between image potential and the image field can be resembled with the connection coefficient and the curvature tensor in differential geometry. If the difference between two images cannot be cancelled out by suitable coordinate transformations in the image space, the image field is induced in the brain and the two corresponding patterns are interpreted as having different in information contents. The new image field is then absorbed into the quantum morphogenetic field and thus the formation of new image prototype is created. This process is said to resemble the a and assimilation mechanism of the brain.

**Keywords:** Quantum morphogenetic field, mental imagery, invariant characteristic, pattern recognition

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## **ASSOCIATION MAPS AND RELATED EMOTIONAL LOADINGS**

*Poster*

In our research we investigate the semantic space available to consciousness and the emotional loading related to the stimuli words. This research follows the C.G.Jung's theory of association test and attempts to generate data which could test it. According to this notion, the associations are based on the association network and some nodes in this network are so called complexes. The stimuli, which are closely related to the complexes in the network, produce more intense emotional reactions and may cause association failures. We model this theory with an association network containing common words. First we administer Word Association Test, in which pupilar dilatation and electrodermal activity are being measured. Then the subjects rate the stimuli words with Semantic Selection Test, which is used for estimating of semantic and emotional distance between each two words. We test the hypothesis, whether the intensity of physiological activation is related to the distance from specific points in the network. Our first results in agreement with other sources suggest that both highly positive and highly negative stimuli produce intense reactions. Therefore in current research we include more variable stimuli and stimuli words representing all basic emotions (from Paul Eckman's list), which will serve as benchmark points for the network and will facilitate the interpretation. With these improvements we plan to test whether the emotional reactions are caused only by the valence dimension (positive/negative) or by the distances in the association network.

**Keywords:** semantic space, word association test, emotional reaction, semantic map

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# HIGHER-ORDER THOUGHT AND HIGHER-ORDER PERCEPTION: A FALSE OPPOSITION

Poster

On occasion, we human beings engage in reflection on our conscious mental states. However, it is not clear, what kind of psychological capacities allow us to do this. There are two rough main views on this. Ever since the Middle Ages this capability is viewed either as a form of perception or thinking. In the contemporary philosophy of mind, these two views are labelled the higher-order perception (HOP) theory and the higher-order thought (HOT) theory. The former claims that in addition to external senses we have an internal sense by which we observe mental states. The latter, HOT-theory denies this claiming that reflection is thinking about mental states rather than perceiving them. These two alternatives are often held the only ones for a higher-order theory. I will argue that neither of these theories has a decisive advantage over the other. Defenders of both sides have pointed out serious faults in the opposite view. Many concessions made by each side have brought the views closer to each other. I will show that when pressed, the two views begin to resemble each other more and more. E.g., HOP theorists admit the need for some conceptual abilities, and many properties of the inner sense which do not correspond to those of outer senses, starting from the lack of sensory qualities. HOT theory concedes that, unlike ordinary thinking, the objects of HOTs must be present, and in a non-inferential way, which makes the access share properties with a perceptual access. These considerations give reason to suspect the justification for the whole opposition. In case of external worldly intentionality, it has been argued that perhaps there is no principled way to distinguish perception and conception (e.g., Prinz 2002). Echoing this view, I will argue that this is even more so in the case of internal intentional states or metarepresentation. In my presentation, I will argue that the capacity to reflect on one's mental states should not be seen simply as perception nor thinking but something that has properties of both of them. On an alternative view, the privileged access we have to our own mental states and the capacities to retain, organise and process the information received by reflection are based on working memory, global access to information, voluntary attention and psychological concepts (cf. Baars, 1988; Carruthers 2000). This view is at the same time empirically informed and one that does not fall under neither the label of HOP nor HOT theory. However, it avoids their main difficulties, and it is still able to explain the intuitions supporting both of them. References: Baars, B. (1988). A Cognitive Theory of Consciousness. Cambridge University Press. Carruthers, P. (2000). Phenomenal Consciousness: A Naturalistic Theory. Oxford University Press. Prinz, J. (2002). Furnishing the Mind: Concepts and their perceptual basis. MIT Press.

**Keywords:** higher-order thought, higher-order perception

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## CONSCIOUSNESS' TEMPORALITY AND TEMPORALITY'S CONSCIOUSNESS

Time is consciousness' essential key feature. The feeling we have regarding time is based on two

categories: succession and duration [Fraisse, 1984]. Succession involves our capacity of differentiating the events' simultaneity or sequence. But not in an absolute sense: as a matter of fact, it was proved by experiments that the reliability of such opinions is quite relative, when you work with temporal scale of tens of milliseconds [Zeki, 1998]. On the contrary, duration implies the capacity of fixing sequential perceptive events, as if they were simultaneous, of seizing time without fixed duration. According to James [1890], our consciousness of time consists of different velocities, which depend on the number of events or changes, during a specific interval. You need a minimum time to emerge from the neural events correlated to a cognitive event. Our consciousness of the time may be analyzed as a wide-range neural integrative phenomenon, connected to a diffuse synchrony. This connection clarifies the phenomenological nature of the invariants, through a dynamic reconstruction, and explains the synchrony as content of tangible experience [Varela, 1996]. Actually, there is no general agreement on cerebral processes subordinated to our perception of succession and duration. The most accepted hypothesis is that our perception of time articulates itself around specific orders of magnitude [Fraisse, 1984]; therefore you may state that the "moments" of our "specious present" oscillate between 100 milliseconds and five seconds. Some years ago, Crick [1994] advanced the hypothesis that in the foundations of consciousness there is an attentive mechanism that unifies relevant neuronal activities, synchronizing their impulses in 40-Hz vibrations. Such vibrations do not codify any additional information, other than the fact of temporarily uniting part of the information that exists in a coherent perception. Although necessary, such vibrations are not enough to produce a conscious experience. Consciousness demands explanations, based on very complex models [Edelman and Tononi, 1995]. The neuronal activity's phenomena are highlighted in the electroencephalogram and are generated by the multiple neuronal circuits' synchronization, parallel inhibition, and activation. In the neuronal net, you sense a dynamic balance, where each event, of 100 to 200 milliseconds, reflects the steady activation of a distributed and parallel neuronal net, which is translated in a content of consciousness, like an abstract thought or a visual image [Kochi and Lehman, 1998]. There are areas with communication dynamics, where each neuron's vibration plays a core role. The states of consciousness and certain pathologies record different cortical-thalamus rhythms. The duration of such states varies in some clinical populations, so that neuronal harmonies and disharmonies make room to emergent phenomena of consciousness, which are at the base of subjectivity. If this were a wellgrounded theory, it would be possible to avoid the problem of the "central theater" [Baars, 1996], giving to the self the consent to be born to the neuronal organization. In that way, we uphold that our subjectivity follows the physical brain in its multiple evolutions and variations. That is how a neurophenomenology puts us on the trail of the *unitas multiplex* of the conscious experience.

**Keywords:** Temporality; Consciousness; Neurophenomenology; Complexity; Perception of time; Conscious experience

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**ALTERNATIVE POSSIBILITIES FOR METAPHYSICS OF THE MENTAL**  
*Poster*

Literature shows that theories of mind subscribe mainly to physicalistic or dualistic metaphysics of the mental. This paper argues that both physicalism and dualism are unsatisfactory as the metaphysics of the mental. Dualism suffers from a fundamental philosophical flaw; namely, certain conceptualization of the mental that is rather dogmatic. This paper shows that the same conceptualization of the mental also forms a base supposition for physicalism. I further argue that as long as a metaphysics rests on this wrong conceptualization of the mental, which dualism and physicalism both share, it cannot serve as a satisfactory metaphysics for the mental. Finally, the paper proposes other possible ways in which the mental may be envisaged and recommends how based on that a metaphysical theory for the mental may be attempted. Keywords: Metaphysics of the mental, dualism, physicalism

**Keywords:** Metaphysics of the mental, dualism, physicalism

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## **AN EXTERNALIST PROCESS VIEW OF CONSCIOUS EXPERIENCE AS A SOLUTION OF THE HARD PROBLEM.**

In this paper, I argue in favour of a process-based view of the conscious subject. It is an externalist approach that aims at locating the conscious mind in processes taking place between the agent and its environment. According to this view, phenomenal consciousness is no longer a private and mysterious property of neural processes. Although it is obvious that the body of the subject is separate from the body of the object, it is by no means so obvious that the mind is confined by the same boundaries of the body. Indeed, there are many phenomena which extend beyond the boundaries of the body (behaviors, actions, perceptions, ecological processes). The mind could be one of them. In the recent past, other authors presented various versions of vehicle externalism Dretske 1995; Hurley 1998; Clark e Chalmers 1999; Lycan 2001; O'Regan e Noe 2001; Rowlands 2003; Rockwell 2005). The main difference between these approaches and the one presented here is the fact that they are not radical enough in abandoning the assumption of the separation between subject and object. The rationale of this proposal is simple, albeit radical. Traditionally it is assumed that there is a world of things and that there is an experience of such a world of things - the two being different and separate. This view is based on the common belief that the world is made of things which seem to exist autonomously and without any need of being in relation with the rest of their environment. I will start challenging this belief and showing proof of the fact that in order to exist anything needs to interact with something else. Thus I will claim that the existence of things (objects and events) should be re-described as their taking place - thereby adopting a process-based stance. As soon as we drop the belief in a world of things existing autonomously and as soon as we conceive the world as made of processes extended in time and space, experience (and thus consciousness) does not need to be located in a special domain (or to require the emergence of something new) - experience is identical with those processes that make up our behavioural story. Experience is no more constrained to the activity taking place inside the cranium -

experience is an extended collection of processes comprehending all those events that are part of our conscious experience. Most concepts - like those of representation or mental causation - get a twist and develop a new perspective. This will lead me to sketch out a new view of consciousness, which can be summarised by saying that consciousness consists in the occurrence of a unity between the brain and the part of the world that is being attended. I will use the rainbow to provide a first example, and subsequently extend the same rationale to more complex examples such as perception of objects, faces and movements. I will use a process-based approach as an explanation of ordinary perception and other variants, such as illusions, memory, dreams and mental imagery. Clark, A. e D. Chalmers (1999). <<The Extended Mind.>> Analysis 58 (1): 10-23. Dretske, F. (1995). Naturalizing the Mind. Cambridge (Mass), MIT Press. Goodman, N. (1978). Of Mind and Other Matters. Cambridge (Mass), Harvard University Press. Hurley, S. L. (1998). Consciousness in Action. Cambridge (Mass), Harvard University Press. James, W. (1890/1950). The Principles of Psychology. New York, Dover. Lycan, W. G. (2001). <<The Case for Phenomenal Externalism>>. in Philosophical Perspectives, Vol. 15: Metaphysics. J. E. Tomberlin.(a cura di), Atascadero, Ridgeview Publishing. O'Regan, K. e A. Noe (2001). <<A sensorimotor account of visual perception and consciousness.>> Behavioral and Brain Sciences 24 (5). Phelps, E. A. (2001). <<Faces and races in the brain.>> Nature Neuroscience 4: 775-776. Rockwell, T. (2005). Neither ghost nor brain. Cambridge (Mass), MIT Press. Rowlands, M. (2003). Externalism. Putting Mind and World Back Together Again. Chesham, Acumen Publishing Limited. Zeki, S. e A. Bartels (1998). <<The autonomy of the visual systems and the modularity of conscious vision.>> Philosophical Transaction of the Royal Society of London 353: 1911-1914.

**Keywords:** process ontology, externalism, consciousness

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## **AND THE LOGIC WAS GOD**

*Poster*

We propose logic to be considered as a reality, as a part of Nature by assuming, that there can not be anything which is not part of Nature and arguing that - logically - there can not be no logic. We thus define logic as the manifestation of properties of things in motion and interaction. This includes any type of relation and interaction, especially causal relation. Logic is part of everything in Nature and assuming that something can only be part of everything if it is a property of the fundamental energy form we conclude that logic is such a property. The history of life forms is presented to show the actual and future importance of logic: Vegetation and the lower animals represent the first life form. Their life is driven by (physical) needs. Any subjective experience originates in the physical, i.e. the body. Human beings are considered as the next, more advanced, life form. Their orientation is based on the birth of desires. Their main drive is to satisfy desires, which originate in the mind. Desires can change and multiply and thus have a far bigger variety of forms. Interestingly, the desire to gather more objective knowledge with less dogma and more logic became stronger over the last centuries. This orientation let

the human being develop a huge knowledge fund, as well on a micro level (brain/mind) as on a macro level (universe). We think that this is the first step of a transition towards a new logic-driven life form. Its main orientation will be to objectively understand phenomena of Nature and its underlying logic. The transition already started and many of the current human struggles are results of this transition and the non-awareness of it. To use our own mind for objective understanding we first must acquire an intelligent understanding of the working of our mind as a whole. This is necessary to bring to focus our mental faculties to understand objective logic. It is important to understand mental processes and which parts of them to use. Mental processes can be defined to be intelligent when they are able to identify and discover the logical process (of cause and effect) of an object, even beyond perceptual information. The intelligence functions do not only depend on perceptual processes nor verbal capabilities. The intelligent form of logic first developed in the human brain/mind and represented a new phase in evolution with the goal to lead to an understanding of primary forms/logic itself. We think that these primary forms of energy/logic date back to the pre-big-bang period, where we consider logic and energy as potentials and motion present in oscillatory form only. Consciousness is awareness of the mind and ones own mental processes. Once we are aware of and understand logic, the logical consequence will be to rewrite it in terms of establishing a causality of harmony. Consciousness would be the tool of this re-structuring. Contradictions should give way to its contrary, which we call pleasure, the new driving force of logic. Being conscious will lead to being logical without contradiction to acquire happiness.

**Keywords:** logic, history, mental processes, evolution, consciousness

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## HOW THINGS LOOK

What colour does a white wall look in the pinkish light of the late afternoon? - Well before sunset, that is, when the light turns lurid. Does it look a different colour than at noon, when the light is harsh and bluish-white? What shape does a circular table look when you are standing right next to it? - Viewing it from a moderately oblique angle, that is, not as if you were squatting down by it. Does it look a different shape than when you are suspended above its centre, looking directly down? These questions seem simple enough, but philosophers disagree even about how to go about answering them. Some imply that the white wall looks pinkish in pinkish light; others that it looks white. Similarly, some say that the table looks elliptical viewed obliquely, others that it looks circular. In this paper, I attempt to construct a theoretical context within which these disagreements can be resolved. I begin by reformulating the idea of perceptual constancy. Constancy is often formulated as things looking visually the same despite changes of viewing conditions. Here I argue that the phenomenon is best understood as a scene-parsing exercise, in which different features belonging to different kinds of environmental subject are presented separately. I argue that making proper sense of visual phenomenology requires that we attribute to visual states a subject-predicate structure, wherein vision attributes different kinds of features to different kinds of subject. Working through the proper subjects of visual attribution - material objects, illumination, shadows, highlights, vapours, translucent volumes, etc. - shows that all of the parties to the above dispute are on the wrong track regarding visual phenomenology.

**Keywords:** phenomenology, logical form, perceptual constancy

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## **THE FEELING SELF AND THE REFLEXIVE SELF: THE ROLE OF INNER DIALOGUE IN PRAGMATIST CONCEPTIONS OF THE SELF**

The classical pragmatists are famous for rejecting the Cartesian conception of the conscious self. James is also credited with articulating the notion of the 'stream of consciousness,' the continuous flow of thoughts, sensations and emotions, which make up our conscious lives. However, what, if anything, structures or directs the stream? Is it simply a blooming, buzzing, confusion as James once put it? The other classical pragmatists give us ways of thinking about how the stream might be directed by the structuring role of inner speech, especially dialogue. Peirce explains how inner speech is necessary for 'critical self-control' in deliberating about ends. Dewey explains the way in which inner speech is used to perform mental experiments and Mead extends this by showing how inner dialogue (the self- talking to itself as Plato put it in the *Theatetus*) is used to solve problems. The picture that emerges is one of a primitive, or basic, sense of the stream of consciousness, our experience of un-conceptualised reality, which is directed and made the object of thought by the structuring role of inner dialogue.

**Keywords:** Self, inner speech/dialogue, stream of consciousness, pragmatism

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## **QUANTUMMARY MEETS COMPUTATIONALISM**

In this talk, I will argue that theories of quantum consciousness and/or quantum phenomenal experience lead to exactly the same problems as in standard computationalism. Let us grant that quantum-level information is indispensable for consciousness. We can then imagine the famous Mary the color scientist on the quantum level: she is a configuration of some micro-physical processes, knows everything physical about colors, and until she is released from the black and white environment, she hasn't experienced red (we can replace color experience with any experience that is supposed to be possible on the quantum level). The proponents of quantumlevel consciousness can either (1) accept that Mary would be surprised when released, but then it's hard to see why they stress the importance of the quantum-level processing; (2) deny that she would be surprised, and choose any of standard physicalism replies to that. Philosophers like David Chalmers seem to embrace both quantum-level information is indispensable for consciousness, and at the same time deny that quantum information is physical. So they might answer that QuantumMary would be surprised if she knew everything physical about colors but not if she knew everything quantum-level about colors. This however is not an end to the puzzle. If we accept that there is anything like quantum computation, we are in trouble with quantum

consciousness. The reasons for accepting quantum computation were spelled out by Richard Feynman (1982) who suggested that for any physical process that seems to process information, we might build a computer that uses it. In other words, anything that physically realizes any information processing is a computer. Such non-standard way of defining computation is assumed in quantum computation theories. However, if this is so, then it follows that QuantumMary actually is a computer as she does process (phenomenal?) information. In other words, there is no difference between purely computational RoboMary (Daniel Dennett's robotic version of Jackson's Mary) and QuantumMary: they both realize consciousness in virtue of their computational properties. So the quantum-level consciousness proponents are faced with a dilemma: (1) discredit quantum computation (or try to justify it without accepting Feynman's definition); (2) accept that their theory is purely computational, after all. The second option could seem more viable, as it allows for some nonstandard computation, but it is usual nowadays to define standard computationalism in terms of ideal, or transparent computationalism (Chrisley: 2000). This however means that quantum-level information is not indispensable for consciousness, as consciousness is only a computational property. So if there is any truth in quantum consciousness theories, then either (1) quantum consciousness is not based on any information processing at all, and Feynman move is not possible; (2) quantum consciousness is based on information processing, and it is some form of computationalism. References Chrisley, Ron, 2000, Transparent Computationalism, in New Computationalism: ConceptusStudien 14, ed. Scheutz, M., Academia Verlag. Dennett, Daniel, 2005, Sweet Dreams, MIT Press. Feynman, Richard, 1982, Simulating Physics with Computers, International Journal of Theoretical Physics, Vol. 11, No. 21.

**Keywords:** quantum computation, quantum consciousness, qualia, computationalism, panpsychism

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## **NEITHER ELIMINATIVISM, NOR DUALISM.**

This talk presents a model of emergence that will be an alternative option to eliminativist and dualist accounts and it will argue that emergent levels present novel emergent properties could not be reduced to the isolated parts of a system. The division represented by the pair of words physical-mental is misleading and misguiding. In place of accepting the pretense opposition of physical and mental states we must put forward an ontology that is able to deal with different emergent levels. A discussion around the idea of decision-making will be a guideline to account for our model of emergent properties and its repercussions specifically in the different levels of information processing in our brains. The more semantically loaded and interpreted character of frontal lobes information processing will be the empirical evidence that will constitute my epistemic credentials. I claim that emergent properties are responsible for determination but not causation (in the strict sense of the word) and that means emergent properties are subtractive conditions rather than triggering mechanisms. They constrain the systems in a way that is not explicable by the parts of the systems taken in isolation but only by the possible arrangements of these parts. This is a substantial difference between the tradition view of emerge and the account is being forwarded here.

**Keywords:** eliminativism, dualism, emergence, decision-making

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## MIND-MATTER MODEL: THE SECOND PERSON

*Poster*

A general social model of human being is launched, focusing on the relation between mind and body. In constructing the human being's mental and bodily architecture, the other human being is incorporated. From the point of view of the 1st person "I", and the 2nd person "You", the model pertains to the physical, mental and social process levels. From a growthdynamic or evolutionary point of view, the physical reality is axiomatic to deduct the mental and social process level. "Interaction" is the key concept modelling all process levels of human functioning. The model is built up in the reference frame of two thinking tools, namely 'finality' as well as 'causality'. The design of the mind-matter model centres on the phenomenon of 'interaction' between object- and between subject systems. Interaction is a simultaneous occurrence between events on physical, mental and social levels. By applying a rule to deduct the mental and social process levels from the physical level, departs from the question of 'how' the processes emerge and how their relationships to each other are established. In the reference frame of finality and causality, the process architecture on all levels provides a general basic social model of the human being. From an integrated point of view of the relation between the 1st and 2nd person, it is tried to unveil the mechanism of mind and matter. Recording of and acting upon environmental events of objects/subjects operates on physical, mental, and social levels. The physical level of stimuli is basic for the mental level. Through stimuli-interaction, mental cognition emerges. Cognition is primary social directed to get feedback by perception extracting information from objects and subjects. The social level of recorded norms in particular, are prerequisite for the formation and development of personality (long-term memory) and the emergence of new values from personality for building up a culture. Attitude (short-term memory) mediates attuning communication and matching of values to create culture. Personality and culture are the end-results of human functioning. Modelling the architecture on physical, mental, and social levels, and the formation of personality and attitude-mediated culture, gives an answer to the question of 'how' these processes and systems emerge. It says nothing concerning the question of 'why' the human being performs his behaviour in that specific way. This issue refers to the household of energy flow in the reference frame of relative 'shortage-surplus'. From an imbalanced state, 'energy transaction' originates within a person, in order to bring about an energy balance in the framework of other objects/subjects. Through the exchange of psychophysical matter/energy of 'cost-benefit', subjective experience of 'pain-pleasure' takes place through 'energy transformation' - an operation of 'fusion-fission' between mind and matter. The hierarchical built up of personality and attitudemediated culture is respectively a contra-evolutionary and evolutionary development. This development of personality towards mentalization on the one hand, and materialization of common culture on the other is not a linear event, but a discontinuous state transition. The human being is aware afterwards of the results of these transformational operations, but he is not able to know what happens within the 'gap', the discontinuous transitional evolution of the mind as well as matter. Therefore,

personality development and natural/cultural evolution raises the ultimate problem concerning the question whether or not a universal force exists as a "unifying-creating force".

**Keywords:** interaction, stimulus-need, norm-value, cognition-perception

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## **SELF-AWARENESS AND THE LEFT INFERIOR FRONTAL GYRUS**

*Poster*

To test the hypothesis of an involvement of inner speech in self-referential activity we reviewed 61 studies measuring brain activity during processing of self-information in the following self-domains: agency, self-recognition, emotions, personality traits, autobiographical memory, preference judgments, and REST. The left inferior frontal gyrus (LIFG-- e.g., Broca's area) has been shown to sustain inner speech use. We calculated the percentage of studies reporting LIFG activity for each self-dimension. Overall, 60% of all studies reviewed identified LIFG (and presumably inner speech) activity during self-awareness tasks. Furthermore, the LIFG was more frequently recruited during conceptual tasks (e.g., emotions, traits) than during perceptual tasks (e.g., agency, self-recognition). This supports the view of a selective involvement of inner speech in self-related processes.

**Keywords:** language; inner speech; left inferior frontal gyrus, self-awareness; self-referential processing; meta-analysis;

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## **PHENOMENAL CONCEPTS AND PHYSICAL INEXPLICABILITY**

*Poster*

This defense of the Phenomenal Concepts Strategy (PCS) from David Chalmers' (2006) dilemma in "Phenomenal Concepts and the Explanatory Gap" grasps the dilemma's first horn. PCS purports to explain the Explanatory Gap (EG) in a way compatible with physicalism by appealing to certain features phenomenal concepts (C) have but nonphenomenal concepts do not. Chalmers' dilemma against PCS: if a creature instantiating all the physical truths (P) of humans but not humans' epistemic situation (E) is conceivable, then either P without C, or C without E, is conceivable. If P & ~C is conceivable, then P cannot explain C. If C & ~E is conceivable, then C cannot explain E. Accepting that P cannot explain C grasps the first horn. Chalmers alleges this move fails because EG is merely replaced with a second-order explanatory gap (EG2) between C and physical explanations. Chalmers anticipates two paths the response that grasps the first horn might then take. One might respond that EG2 can be explained by features of our concepts of concepts with C, and so on. Or, one might counter that as C explains EG, it also explains EG2. Chalmers claims the first reply leads to an explanatory regress, the second to a

circular explanation, and while such explanations may succeed as analyses of EG and EG2, they do not bridge the gaps. The charge of circularity in explaining EG2 by employing C is mistaken. Appealing to C to explain both EG and EG2 is not circular, it is redundant. If able to explain EG, which Chalmers grants it can for the dilemma, PCS already provides, and does not need an additional explanation of EG2. PCS claims that when referred to by a concept with C, whether a property is physical or nonphysical is not apparent, so a concept with C and one without C can co-refer to the same property without it being apparent that they co-refer. EG arises because concepts with C and concepts without afford different types of explanations that are not deducible from one another. Concomitantly, P & ~C is conceivable because one cannot explain C using explanations or conceptions afforded by concepts without C. Before EG2 is invoked, PCS predicts and explains how properties, when referred to by phenomenal concepts, phenomenal concepts themselves, and the phenomenal explanations they afford can be physical but not be physically explicable. The charge that PCS must eventually bottom out in physical explanation is also mistaken. PCS does not need to bridge the gaps and does not have to provide a direct argument for the truth of physicalism. All PCS needs to provide is indirect support by undermining the arguments against physicalism. If PCS defeats the anti-physicalist arguments and explains EG in a way compatible with physicalism, it removes the barriers for other, independent reasons, such as compatibility with scientific theory, to then establish the plausibility of physicalism by inference to the best explanation. PCS itself does not prove, but rather clears the way for nonreductive physicalism.

**Keywords:** phenomenal concepts, phenomenal explanations, physical inexplicability, explanatory gap

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## **THE INCONCEIVABILITY ARGUMENT**

*Poster*

The Conceivability Argument is often run in terms of zombies, beings who instantiate all the physical properties humans do but none of the conscious, experiential properties. Zombies are conceivable, conceivability entails possibility, therefore zombies are possible and experiential properties can not be physical properties. Such is the argument. However, zombies have another half. In "Conceivability, Possibility, and the Mind-Body Problem" (1999), Katalin Balog mentions that belief in the conceivability of zombies commits one to belief in the conceivability of their opposites, beings who instantiate all the experiential properties humans do but none of the physical properties. Let them be called ghosts. Balog suggests that ghosts are inconceivable. If so and taken a step further, a counter to the Conceivability Argument can be made: the Inconceivability Argument. If conceivability entails possibility, then inconceivability entails impossibility. Ghosts are inconceivable, inconceivability entails impossibility, so ghosts are impossible. Ghosts and zombies are both either conceivable or inconceivable, being counterfactual flipsides of each other. The inconceivability of ghosts is stronger than the conceivability of zombies, hence the Inconceivability Argument is stronger than the Conceivability Argument and the latter should be revised to conform to the former. So, ghosts and zombies are inconceivable, and therefore impossible.

**Keywords:** conceivability, inconceivability, zombies, ghosts

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## **INTERPRETIVISM AND QUALIA**

*Poster*

Could an interpretivist about the mental accommodate the what-it-is-likeness of experience, its qualia? My answer will be a qualified "yes", in contrast to the qualified eliminativist tendencies of fellow interpretivists such as Daniel Dennett and Donald Davidson. The tension between interpretivism and any view that acknowledges qualia should be obvious. In my construal, interpretivism is a stance about the possession of mental states with their respective contents. There are stronger and weaker options, but one moderate position would consist in the claim that there can be no adequate account of the possession of mental states without some relevant mention of interpretability. It seems, however, that having experiences with phenomenal features is independent from any interpretation, especially if the latter proceeds from the third-person perspective. In other words, interpretability seems not required for the possession of qualia. What are our options? Provided one is not prepared to renounce the interpretivist view itself, should one deny that there are any qualia at all or should one concede that interpretivism cannot account for all mental properties? In this talk, I'll provide one solution to this tension by sketching the way an interpretivist account can also accommodate phenomenal features. This is to embrace the what-it-is-likeness as phenomenologically primitive, but something that does not have a privileged characterisation in mental terms. On the other hand, this view also holds that having qualitative experiences is undergoing certain subpersonal processes. In my talk, I will clarify how these commitments fit together and explain in what sense can the view that has been amended in such ways still be considered as an interpretivist position. Finally, I will sketch how one can use the resulting conceptual framework, which has a space for phenomenal features of experience, to account for various kinds of mental states, in particular, perceptual states and knowledge of one's own mind.

**Keywords:** interpretivism, qualia, reductionism, content

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## **MINDFULNESS MEDITATION TRAINING FOR FIBROMYALGIA (CHRONIC PAIN CONDITION)**

**Background:** Recent studies on chronic pain and fibromyalgia (FM) have shown that maladaptive cognitive and emotional factors can create and sustain perceptual and response biases in processing somatosensory information, such that these biases could lead to negative outcomes (e.g., exacerbation of musculoskeletal weakness, widespread chronic pain, disability, and negative affect). The objective of this pilot study was to investigate if mindfulness meditative techniques can decrease cognitive and emotional biases (i.e., catastrophizing, anxiety), leading to reductions in the magnitudes of various symptoms reported by FM patients. This study was designed to document changes in self-reported measures of pain and fatigue, mindfulness, and catastrophizing during 8 weeks of intensive Mindfulness Meditation Training (MMT). The modulation of dysfunctional attention and emotion regulation abilities associated with FM by mindfulness training has yet to be clearly demonstrated. We are currently conducting the second phase of the pilot study, using fMRI, to investigate the neural basis of cognitive and affective processes in FM patients with versus without MMT.

**Methods & Procedures:** 22 FM patients were recruited to undertake MMT. The average duration of illness since diagnosis was 9.7 years (ranging from 1 to 15 years, SEM=1.5). The average age was 51 (ranging from 18 to 68). Work status varied across participants (7 full time/7 part time/6 not working/2 no response). Completion of the program was defined as at least a 78% attendance record (7 of 9 classes). 13 FM patients completed the program. Those who completed the course subsequently underwent a semistructured interview about the experience. Outcome data were gathered through online questionnaires, administered through a secure website. Daily symptom measures were repeatedly collected (a total of 42 times on weekdays over the 8 weeks), requiring approximately 10 minutes to complete each day. Weekly measures were repeated 10 times over the 8 weeks, requiring about an additional 15 minutes to complete each weekday. Lastly, monthly measures took approximately 2 hours to complete, three times during the project.

**Results:** Patients' self-reported data revealed the following: Of those who completed the program, 77% showed reductions in worst pain, while 92% indicated decreases in worst fatigue. In addition, 77% reported reductions in depression based on the CES-D scale. Furthermore, 77% demonstrated improvements in mindfulness (as measured by 5- Factor M questionnaire), and those who were high catastrophizers at pre-study reported diminutions in catastrophizing (as measured by the Pain Catastrophizing Scale). The exit interviewing data revealed the following: Many patients reported the following: better sleep, better coping with having FM, feeling calmer, and feeling more aware of what was happening. The majority of them reported that specific meditation techniques learned from the class were highly useful for dealing with what happened to them in real life. The participants provided positive evaluations about the program, the instructor, and the supportive group context.

**Conclusions:** The pilot project provided some preliminary findings to support the potential usefulness of meditation training to help FM patients manage their symptoms. Mindfulness meditation may be seen as a useful method for restructuring the intentionality of the human mind/brain.

**Keywords:** mindfulness meditation, chronic pain, fibromyalgia, mental training, intentionality

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## THE ABILITY HYPOTHESIS

According to the Knowledge Argument, Mary is one of the world's leading vision scientists, an expert on color vision. As a matter of fact, she knows all physical facts that can be known about color vision. However, she has never experienced colors: she has spent her entire life in a black and white room. When she leaves the room and looks at a red rose, she learns something: she did not know what it is like to experience red, but after having looked at the red rose, she does know what it is like to experience red. But, ex hypothesi, she knew every physical fact that is to be known about color vision. What could she learn then upon looking at the rose? The Knowledge Argument is supposed to show that our first personal experiences cannot be captured by physical facts. There must be something irreducibly non-physical about experience. One way to argue against this conclusion is to claim that what Mary did not know before looking at the rose, but knew afterwards, was not propositional knowledge, but an ability: an ability, perhaps, to imagine or recall or recognize certain experiences. This is the Ability Hypothesis. As David Lewis put it, "knowing what an experience is like [...] isn't knowing-that. It's knowing-how" (Lewis 1990, p. 516). Thus, the suggestion is that to know what it is like to have an experience of a certain kind is to have certain abilities. Mary acquired certain abilities. She did not have these abilities in her black and white room, she has them now. There is nothing about her story that should convince us that first personal experiences cannot be captured by physical facts. The Ability Hypothesis is usually treated as a monolithic category. As a matter of fact, different versions of it vary considerably. I differentiate three significantly different versions: (AH1) Knowing what it is like to experience E is having the ability to imagine having experience E. (Nemirow 1990, p. 495). (AH2) Knowing what it is like to experience E is having the ability to imagine having experience E as well as having the ability to recognize having experience E (and perhaps even remember having experience E). (AH3) Knowing what it is like to experience E is having the ability to imagine having experience E correctly, that is, in such a way that would enable one to recognize having experience E. I argue that all of these versions are susceptible to serious objections. But a new, fourth version that appeals not to the ability to imagine or recognize, but to distinguish. This version is not vulnerable to the objections that made the other versions: (AH4) Knowing what it is like to experience E is having the ability to distinguish imagining or having experience E from imagining or having any other experience.

**Keywords:** knowledge argument, ability hypothesis, imagination, recognition

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## **NEURODYNAMICS AND CONSCIOUSNESS**

*Poster*

Embodied and embedded robots with evolved recurrent neural networks for control, are analyzed according to dynamical systems tenets. The approach is often called Neurodynamics, or the dynamical systems approach to cognition. It purports to provide a simple model of cognitive systems. Many current musings on explanations of consciousness that defy cartesian dualism rely on the consciousness

producing abilities of special types of complex neuronal systems and their internal dynamics. Moreover, giving substance to the material hypothesis, the revival of a philosophy remounting as far back as Democritus (and also Varela, Ashby, VonFoerster, Lyon, Brooks, Heidegger), is the unescapable fact that such complex systems are embodied and embedded. We take those two facts and build robotic models of cognitive systems, in which recurrent neural networks enable coupling between robots and world. This coupling is expressed by alterations in the network structures, that are evolved with genetic algorithms in virtual worlds. The networks evolved are also embedded as control structures of real robots, who are subject to endure the tough tests of the real world. Furthermore, the next and more important facet of the work is to set to understand how the neural networks generate behavior. Armed with the formal tools of Neurodynamics, also known as the dynamical systems approach to cognition, it is possible to achieve explanations in the causal level. We report on a wide range of results of robotic experiments where we find dynamical phenomena that are paralleled in the brain, such as oscillations, limit cycles and chaos. These phenomena give rise to robotic behavior that has telling similarities with features of consciousness, such as attention and memories, context dependency and behavioral switches or even decision and action selection. Though the models obviously do not exhaust conscious phenomena, they stand for a concrete attempt in pursuing a level of explanation that is able to provide causation instead of correlation. Neurodynamics is a promising brick to the foundations of a study of consciousness as a result of purely physical processes. Keywords: Embodiment, Evolutionary Robotics, Recurrent Neural Networks, Neurodynamics, Consciousness. References: [1] R.!Brooks. Intelligence without representation. *Artificial Intelligence*, (47):139-159, 1991. [2] G.!M. Edelman. *The Remembered Present*. Basic Books, 1989. [3] M.!H. B.!L. Frank!Pasemann, Ulrich!Steinmetz. Evolving brain structures for robot control. In J.!Mira and A.!Prieto, editors, *Bio-Inspired Applications of Connectionism*, volume 410- 417, 2001. [4] I.!Harvey, E.!D. Paolo, R.!Wood, M.!Quinn, and E.!Tuci. Evolutionary robotics: A new scientific tool for studying cognition. *Artificial Life*, 11(1-2):79-98, 2005. [5] M.!Heidegger. *Being and Time*. SCM Press, London, 1962. [6] F.!Pasemann. Structure and dynamics of recurrent neuromodules. *Theory in Biosciences*, (117):1-17, 1998. [7] F.!Varela, E.!Rorty, and E.!Thompson. *The Embodied Mind*. MIT Press, 1991. [8] H.!von Foerster. *Kybernetik*. Merve Verlag, 1st edition, 1993. [9] S.!Wischmann, M.!Hulse, J.!F. Knabe, and F.!Pasemann. Synchronization of internal neural rhythms in multi-robotic systems. *Adaptive Behavior*, 14(2):117-127, 2006.

**Keywords:** Embodiment, Evolutionary Robotics, Recurrent Neural Networks, Neurodynamics, Consciousness.

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## PUBLICITY, BIOETHICS AND THE SCIENCE OF CONSCIOUSNESS

During the last years a number of cases of severe impairments of consciousness have attracted considerable public attention and raised vigorous bioethical or even political debates, creating a new framework for further philosophical and scientific studies of consciousness. Among the most familiar cases there are that of Mary Ann Quinlan, Nancy Cruzan, Terri Schiavo or Terry Wallis. No doubt, these real, 'flesh and blood' cases or personal fates could reach an unprecedented interest in the nature of

consciousness among non-specialists (e. g. laypeople, bioethicists, philosophers or social scientists). Most people probably faced up to the philosophers' 'hard problem' of phenomenal consciousness for the first time by following with attention the various stages of the Terri Schiavo 'Saga'. One of the central theses of my lecture is that these cases today play a very important role in the development of the science of consciousness. In this sense, my conception is based on an integrated Science Studies approach. Given that the growing public and scientific attention toward conscious phenomena has already produced some advances regarding more subtle and cautious diagnostic criteria of such diseases as persistent or permanent vegetative state (PVS), minimally conscious state (MCS) or locked-in-state syndrome (LIS), it can be promising to briefly summarise the newest developments in this field of research in general. However, the recent confusion about diagnostic criteria of these diseases (both in technical and conceptual senses) can be also regarded as a new impetus for taking the nature of consciousness really seriously in clinical neurology and neurosciences with important philosophical aspects. So, if our goal is to get closer to understanding the philosophical and scientific nature of consciousness and its neural bases, we have to turn our attention to the various chronic diseases of this still mysterious phenomenon. In the history of the science of consciousness philosophers, cognitive scientists and neuroscientists concentrated mainly on imaginary cases (i. e. thought experiments - involving robots, cyborgs, Martians or Zombies), non-human animals or children. According to my conception, the well-known individual case studies of different defects of consciousness and other clinical research can open new and more wordly possibilities to study consciousness effectively in the near-future.

**Keywords:** bioethics

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## DIVERSITY OF CONSCIOUS EXPERIENCES DURING PURE ANESTHESIA

*Poster*

Anesthetized brains are now and again exploited as a research model to investigate the loss of consciousness, and, subsequently, its neural correlates. Such approach has been criticized for the lack of anatomical and functional specificity of the effects that we know anesthetic drugs are inducing in the brain. Even though this problem might be overcome through the advancement of research technologies, another limitation of the current anesthesia model is that a phenomenological approach to the experiences of anesthetized subjects is ignored. It seems that medical definition of consciousness as responsiveness to the environment does not fully match to the neurophilosophical concept of consciousness as the presence of subjective experiences. Apparently, the loss of responsiveness is dissociated from continuation of subjective presence. This has been confirmed in several studies

reporting dreaming during anesthesia, which is a paradoxical but definite sign of subjective contents of consciousness in a state when conscious experiences should be absent. In the present study we aimed to describe the diversity of conscious experiences people might have during general anesthesia. Experimental sessions ( $N = 58$ ) during which subjects were anesthetized by one of the following pure drugs: dexmedetomidine, propofol, sevoflurane or xenon, were conducted. After awakening, reports of subjective experiences were collected in an interview, with specific guidelines given to the subjects in advance (e.g., "tell me everything what was going on in your mind from anesthesia induction to awakening", and "if you had visual experiences, list all the figures, objects and characters you have seen"). One third of anesthesia sessions resulted in reports of conscious experiences which were further analyzed with the Scale for Conscious Experiences during Anesthesia. Subjective experiences during anesthesia ranged from simple bodily sensations to visual and auditory imagery, and from elements of anesthesia awareness to complex dream-like narratives. Results confirm that a presence of subjective experiences is compatible with clinically defined anesthesia as loss of consciousness, and studies aiming to investigate the loss of phenomenal consciousness should additionally control whether it is really lost.

**Keywords:** anesthesia, concepts of consciousness, dreaming

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## **THE SELF AND OUR BRAINS' SUBCORTICAL-CORTICAL MIDLINE SYSTEM. A PROCESS-BASED NEUROPHILOSOPHICAL CONCEPT OF THE SELF**

Recent concepts of self in neuroscience and psychology seem to consider the self an "inner entity" which metaphysically presupposes the assumption of a specific mental, psychological or neural substance or property. Since no such "inner entity" could be found so far, the self has been assumed to be illusory first by both Hume and contemporary philosophers and neuroscientists. Following an alternative line of metaphysics, process metaphysics, I here suggest a different concept of the self, a process-based concept that avoids the assumption of an "inner entity" be it mental, psychological or neural. I characterize the self by subjectivity which empirically is supposed to be traced to a specific process, self-related processing. Based on current empirical imaging data, self-related processing is assumed to be mediated by neuronal activity in a subcortical-cortical midline system. In conclusion, I here present an alternative process-based neurophilosophical concept of the self that opens the door for future empirical investigation and, at the same time, avoids the assumption of our self as illusory.

**Keywords:** self, process, cortical midline structures

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## **CONSCIOUSNESS, HYPERREALITY AND INTERACTIVE ART: CASE STUDY**

*Poster*

The digital revolution has changed the nature of our perceptual processes, and this in turn has changed our conscious experience of the physical world. The contemporary industrialised world, particularly the city, has changed in many ways from the world in which we evolved and in which most of us grew up: `nature' has been reduced to its cultivated representations, and the definition of `objects' has been called into question by the saturation of our lives with aggressive and emissive interactive technology. Although philosophers such as Baudrillard have drawn our attention to this phenomenon of 'hyperreality', there have been very few accounts of these changes within consciousness studies. To shed some light on these issues might bring a much needed redefinition in the way that we refer both to the world - the so-called `real world' - and to human interaction with the world. There is no doubt that true novelty in contemporary art is found in the concept of interactivity: an active, responsive art work is a process rather than an object, and the audience, like a person in the city, is now a participant. In an interactive installation, the application of technology creates new forms of non-verbal communication. The whole body of the installation engages in a dialogue with the human body. The sensory system of the installation matches the participant's senses, and the computerised `nervous system' of the installation matches h/her nervous system. The entire being of the participant is encircled with sounds, images, harmonies/disharmonies, noise/silence, and is electrified by the largely unknown emissive properties of the installation. In this way, the active audience becomes amalgamated with the installation, and the conventional boundaries of the human body (and brain) are called into question. This talk will explore the way in which such an artwork could be used as a vehicle for a phenomenological investigation of these issues. Fugue is a scientifically informed interactive art project based on the functioning of the human immune system. It symbolises the inseparable interconnectedness between all particles and functions of a living body, which is shaped by its inner processes as much as by its interaction with the world. Inspired by the musical form of fugue, the large scale piece operates within the framework of an artificial immune system algorithm, expressed through vision and sound. The complexity of the fugal structure modelled on deep biological functions can bring about a congruence between the rhythm of the piece and the biological rhythms of the participant, opening a channel for a full awareness of the broad spectrum of stimuli and meditative forces emitted by the artwork, and their unfolding in the body of the participant. The talk, which will be supported by audiovisual material from Fugue, will ask how the artwork could be used to reveal the ways in which our perceptions have been seduced and warped by the world we have created, and how this process has ultimately reshaped our consciousness.

**Keywords:** Consciousness/ hyperreality/ interactive art

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**THE COGNITIVE MATRIX: AN HYBRID PERSPECTIVE ON MIND**

Natural language is the most powerful medium human beings adopt in everyday life to express knowledge: specific statements are formulated to encode the results of understanding and to bargain information with other humans. One of the most relevant problems in this context is semantic ambiguity: it is a common experience, for instance, to miss the sense of a word or even of an entire sentence in a discussion; or to intend something different when pointing to the same term adopted by another agent. In this respect, our linguistic practice fails to detect or convey adequate 'concepts' (roughly, the meanings of the words we utilize in expressing knowledge): this is the main reason why 1) knowledge needs to be carefully negotiated and 2) mutual comprehension is anything but a plain enterprise in a community of intelligent agents. But this is almost the end of the story; in the current work, instead, we propose to go back to the starting point and originally reconsider the above-mentioned scenario from both a theoretical and applicative perspective. Representing knowledge is a necessary step for communication; but knowledge can be represented in so far that world phenomena are previously presented to humans, namely structured and perceived as unique experiences of the subject : "knowledge representation is the outcome of the process of under-standing, whose basic element is presentation". For instance, one can hear the sound of a boiling teapot and express a sentence about that; trivially, the linguistic rendering of the experience is something different from the personal hearing event: in the former humans exploit natural language to transmit the conceptual content of experience; in the latter, a concrete sense-driven process supplies perceptual information to the subject. What is not trivial, instead, is the analysis of the relations holding between knowledge representations and perceptual presentations, namely what we refer to in the paper as 'analysis of static and dynamic dimensions of human cognition': our paper aims at investigating this topic, focusing on the fact that if it's worthwhile to consider meaning as an abstract content that can be linguistically communicated, the intrinsic nature and source of meaning is far from being disembodied. Knowledge contents are neither simple products of abstraction nor bare perception-driven units: they genuinely correspond to an interwoven combination of the two. The 'embodiment of meaning' is mainly reflected by the frequent use of metaphors, which shows how the physical features we experience in the environment are used to structure cognition and language. In the paper we will refer to this overall perspective underlying these considerations as the Cognitive Matrix.

**Keywords:** Representation, Presentation, cognition, experimental phenomenology, cognitive semantics

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## **INSERTED THOUGHTS, THE COMPARATOR MODEL AND THE IMMUNITY OF THE 'I'** *Poster*

In this paper, I examine John Campbell's (1999) account of how the possibility of the phenomena of 'inserted thoughts' in schizophrenics requires us to modify our account of the immunity of I-judgements. In particular, I argue against his claim that the comparator model due to Frith (1992) of the underlying cognitive neuroscience provides enabling conditions for immunity as such. My disagreement with Campbell is on two fronts: whilst we agree that the comparator functions as an enabling condition for the immunity of I-judgements, (1) I deny that the immunity phenomena is restricted to judgements (in

this case, I-judgements) and, thus, (2) I deny that the comparator provides enabling conditions for immunity as such. I begin by discussing the phenomena of immunity to error through misidentification generally, turning to discuss the sole object view of bodily awareness (Martin 1995) and how it might provide a model for understanding why some I-judgements are immune. Finally I turn to discuss Campbell's account and argue that the comparator model cannot provide enabling conditions for the immunity phenomena. I want to suggest that I-judgements such as 'I have pain' or 'I am thinking' are immune to error through misidentification because of something distinctive about how we know the referent of the first-person pronoun. In particular, I will argue that our knowledge of the referent of the first-person pronoun is warranted by our awareness of that referent which is distinctive in that it is a form of awareness that presents one and only one object. *Prima facie*, there are two such forms of awareness: introspection and our awareness of our own body. In Campbell's account, the comparator is an enabling condition for immunity which is a feature of some I-judgements. The idea is that the comparator labels one's thoughts as generated by oneself, and when this fails, as in the case of schizophrenics who have 'inserted thoughts', immunity is lost. Whilst I agree that a working comparator mechanism functions as the enabling condition of I-judgements, certain I-thoughts may still be immune relative to 'I'. If a schizophrenic subject Z has the thought 'I think the world will end now', but claims that it is not his thought, but is somehow 'inserted' into his mind, whilst we do not have an Ijudgement - since Z possess no warrant for that judgement - we seem to have an I-thought. Here the 'I' is still immune. But this cannot be the case with every occurrence of 'I' in Z's thoughts. Z thinks: 'You insert an idea into my mind', but 'my mind' still refers to Z's mind. So some I-thoughts are still immune relative to 'I', but not all of them. The breakdown of the comparator mechanism results in Z thinking that he is not the agent of his thought - but the thought appears 'in' him for sure and strikes him as such. If he did not think that the offending thought is 'in' his mind, or inserted 'into' him, then he would have no sense of conflict at all, but would at most be very puzzled. The source of internal strife is precisely due to his realisation that it is in his mind without claiming agency of that thought. If this is correct, then immunity is a more widespread phenomena, restricted not just to judgements, and thus the comparator cannot be an enabling condition for the immunity phenomena.

**Keywords:** immunity to error through misidentification, first person reference, schizophrenia, the comparator model

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## **COGNITIVE DEFICITS OF SCHIZOPHRENIA AND THE SOCIAL DIMENSION OF CONSCIOUSNESS**

The advancement of research on the neurobiology of the schizophrenic brain has revealed a complex of factors, from genetic tendencies affecting the development of brain structure to functional impairment caused by defective molecular signaling. Recently, the attention of psychiatrists and mental health

professionals has been directed to the presence of cognitive deficits in schizophrenia responsible for most of the obstacles to the social insertion of patients. Philips and Silverstein (2003) developed a framework to relate neurobiological findings on schizophrenia with the results of cognitive tasks performed by the patients. The malfunctioning of brain microcircuits depends on the context (and the respective cognitive tasks to be performed) to become apparent. They proposed the concept of cognitive coordination to refer to the modulation exerted on neuronal activity by the context. A neurobiological cause of such deficits was identified as a failure of the brain to achieve fast synchronization of neural oscillations (Spencer et al., 2004) The schizophrenic person has a difficulty to manage the flux of consciousness in social interactions. We address this difficulty with the Flower Arrangement Workshop, a methodology of Psycho-Social Rehabilitation that reduces the vulnerability of the schizophrenic in the social environment. The workshop was offered regularly (18 months) for a group containing 4 schizophrenic subjects, and the results indicate that the methodology is effective for the social dimension of human consciousness. References PHILLIPS, W.A. and SILVERSTEIN, S.M. (2003) Convergence of Biological and Psychological Perspectives on Cognitive Coordination in Schizophrenia. *Behavioral and Brain Sciences* 26 (1): 65-138. SPENCER, K.M., NESTOR, P.G., PERLMUTTER, R., NIZNIKIEWICZ, M.A., KLUMP, M.C., FRUMIN, M., SHENTON, M.E. and MCCARLEY, R.W. (2004) Neural Synchrony Indexes Disordered Perception and Cognition in Schizophrenia. *PNAS* 101, 49: 17288-17293.

**Keywords:** Schizophrenia, Consciousness, Social Interaction, Psycho-Social Rehabilitation, Flower Arrangements.

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**RIM1A (RAB3 INTERACTING MOLECULE 1A) GENE DELETION REDUCES PERFORMANCE IN A DELAYED ALTERNATION AND BARNES MAZE TESTS**  
*Poster*

Mice lacking Rim1, an active zone protein that regulates neurotransmitter release, show deficiencies in certain forms of presynaptic plasticity and learning tests (Schoch et al., 2002; Lonart et al., 2003; Powell et al., 2004). To evaluate the extent to which synaptic deficiencies influence spatial working memory, spatial learning and behavioral flexibility we tested male Rim1 null mutant (RIM1KO) mice in a delayed alternation and Barnes maze tasks. Mice were placed into the starting chamber and after set periods of time (10 sec 120 sec) they were allowed to enter the left or right arm of a circular maze we used to test spatial working memory. Animals were rewarded with food only when they entered a previously unvisited arm. Whereas wild type mice (WT) needed 3.5 0.7 days training for meeting performance criterion (making at least 70% correct choices on two consecutive days) the Rim1KO mice needed 23.3 0.7 days ( $n=59$ ,  $p<0.05$ , for this and all subsequent comparisons). Also, whereas at least 66.7% of the wild type mice met criteria at 40 sec, 60 sec, and 120 sec delay times, even the best performing Rim1KO mice did not meet criterion at delay times longer than 40 sec. The RIM1KO mice displayed a higher rate

of perseverance, defined as consecutive entries into the same arm (Rim1KO: 18.8 1.2%; WT: 6.4 0.6%). In the Barnes maze, where animals learn the location of an escape hole using spatial cues, completion took longer latency times and more errors (~2 times) for the Rim1KO mice than for WT mice, a difference that did not attenuate during the course of training (18 days). The observations that the RIM1KO mice performed poorly in the Barnes maze and that their performance in delayed alternation test became progressively worse at longer delay times indicate a deficiency in hippocampal functions. Supported by a grant from the Commonwealth Health Research Board.

**Keywords:** spatial learning, null mutant, active zone, hippocampus, Barnes maze

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## **CONCEPTUAL STRUCTURE AND LEVELS OF CONSCIOUSNESS**

*Poster*

This paper explores two related questions: what is the relationship (if any) between the structure of concepts and the structure of their referents, and what is the relationship (if any) between the degree of structure of concepts and levels of consciousness. Jerry Fodor has offered a progressively refined theory of concepts in which most lexical concepts are atomic and represent solely by virtue of reliably tracking their referents. Jesse Prinz's proxytypes theory, grounded in concept empiricism, attempts to keep Fodor's informational semantics but not his atomism: concepts are richly structured entities that stand in for their referents in simulations and re-creations, part of whose essential nature are certain similarities of structure they share with their referents. The information semantics is retained, as concepts obtain their identity, in part, by carrying information about aspects of the environment. [Prinz, p. 89] Concepts as available to self-conscious introspection often seem to be minimally structured. This is not to say that they don't have rich structure, only that the structure is not directly introspectible. I know a dog when I see one; with rare exceptions for unusual breeds or instances bordering on wolves, I can reliably identify dogs. But I have little understanding of how dogs are internally composed; what understanding I do have is generalized from human anatomy: after all, we are all mammals. My concept DOG, if it bears any structural similarity to a real dog, is many orders of magnitude less complex. Following this line of thought to one natural conclusion, one might be tempted to forego internal conceptual structure altogether, as Fodor does: (lexical) concepts compose upwards into propositional structures and thoughts (the same thing, to Fodor's Language of Thought hypothesis), as well as into complex concepts, but do not decompose downward. But as Prinz points out, atomism buys elegance at a high price: at the least a difficulty with explaining categorization and acquisition, and potentially a tendency toward radical nativism (which Fodor is now clear to reject). Prinz writes, If concepts are structurally uniform (or uniformly unstructured), a uniform theory of concepts is easier to achieve. [Prinz, p. 94] Prinz's proxytypes theory rejects atomism at the cost of losing that uniformity. Proxytypes are described as heterogeneously structured multimodal entities. Is there a way to have the explanatory benefits of both Fodor's atomism and Prinz's proxytypes? Is there a way to hold onto the structural uniformity? Can we, in other words, have our cake and eat it, too? One approach might be to

restrict an atomist-like account to the level of full self-consciousness and, as one descends through layers of consciousness to the unconscious, give an account that preserves more and more the rich internal structure of proxytypes but one that is underlaid by uniformly structured building blocks. This paper preserves such an account, using the metaphor of an iceberg. On this account, levels of consciousness down to the unconscious can be viewed either as discrete levels or part of a continuum. By showing how an atomist and a non-atomist account can be brought together into a unified account, an unacceptable gap between the conscious and unconscious can be avoided. References [Prinz] Prinz, Jesse. Furnishing the Mind: Concepts and Their Perceptual Basis. MIT Press, 2002.

**Keywords:** concepts; proxytypes; atomism; informational semantics; structural uniformity

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## MIRROR NEURONS AND CONSCIOUS EXPERIENCE OF MUSIC

The human mirror neuron system appears to contribute not only to the perception and production of goal-directed action, but also to the understanding and production of language, imitative behavior, and musical experience (Molnar-Szakacs and Overy, 2006). Mirror neurons may be activated "when we see or hear a musical performance, as our brain tries to figure out how those sounds are being created, in preparation for being able to mirror or echo them back as part of a signaling system" (Levitin, 2006). This picture is considerably complicated by the need to observe two significant distinctions: 1) that between the perceived action/motion of a performer and the (related but non-identical) action/motion heard in the music; 2) that between motor mimicry such as foot-tapping or facial expression of emotion and the activation of motor neurons proper. The former distinction is further complicated by the fact that a listener typically has conscious experience of a variety of sorts of motion (Bharucha, et al., 2006). The paper discusses, first, how mirror neurons might contribute to musical experience in light of these complications. The emotional side of musical experience is then considered in light of a third distinction--that between emotional arousal as a result of the perception of musical motion and structure (tonal, rhythmic, harmonic) on the one hand and, on the other, emotional response deriving from the personification of music--whether as the expression of the composer or performer, or of oneself as listener, or simply as a humanly generated "signal". Both sorts of affective response are probably supported by mirror neurons, and there is often considerable interplay between the two. Here connections may be drawn (very briefly, on the present occasion) to theories of emotional contagion and empathy (supported by mirror neurons), and of the associated purposes and rewards of musical experience. Selected References: Bharucha, J. J., Curtis, M., and Paroo, K., "Varieties of musical experience", Cognition 100 (2006), 33-72. Levinson, J., Music, Art, and Metaphysics: Essays in Philosophical Aesthetics, Cornell University Press, Ithaca, 1990. Levitin, D. J., This is your brain on music: the science of a human obsession, Dutton, New York, 2006. Menon, V., and Levitin, D. J., "The rewards of music listening: Response and physiological connectivity of the mesolimbic system", NeuroImage 28 (2005), 175-184. Molnar-Szakacs, I., and Overy, K., "Music and mirror neurons: from motion to 'emotion'", Social Cognitive and Affective Neuroscience 1 (2006), 235-241. Rizzolatti, G., and Craighero, L., "The Mirror-Neuron System", Annual Review of Neuroscience 27 (2004), 169-192.

Tolstoy, Leo, What Is Art?, trans. Alymer, M., Oxford University Press, 1958.

**Keywords:** Mirror neurons, music, personification, emotion

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## **THE ENCAPSULATED PROTECTORATE: A NON-REDUCTIVE PHYSICALIST APPROACH TO CONSCIOUSNESS**

The concept of a physical protectorate (Laughlin and Pines, 2000) refers to systems that display special properties like superconductivity (Anderson, 2000), generated by the combination of universal physical laws and principles with specific initial and boundary conditions. Consciousness can be viewed as supported by an encapsulated protectorate, a brain subsystem that is physically open while functionally autonomous relatively to other parts of the brain/body. Such an encapsulation allows a non-reductive physicalist explanation of the phenomenal properties of consciousness: the First-Person Perspective; the possibility of Free Will (in the sense of an autonomous determination of action); the Intentionality of conscious states; the Unity of conscious content and the existence of 'Qualia'. I propose that the consciousness-supporting protectorate could be a calcium ion system encapsulated in the astrocytic syncytium. Astrocytes participate in the control of arterial blood flow (Abbott et al., 2006; Haydon and Carmignoto, 2006), neuronal excitation/inhibition (Fellin et al., 2006), large-scale brain integration by means of calcium waves (Robertson, 2002) and onset of oscillatory synchrony (Fellin et al., 2004). The operation of calcium ion populations trapped in the astrocytic syncytium is similar to a large scale ion-trap computer (Kielpinski et al., 2002). In the brain, calcium ions interact with neuronal electric fields (produced by the movement of other ions) around excitatory synapses, providing the information that constitutes the elementary contents of consciousness. Conversely, the entry of calcium ions in neurons sustains electric fields and contribute to the onset of oscillatory synchrony. Synchronization acts back on the calcium system, defining neuro-astroglial assemblies selected to compose the content of conscious episodes. My analysis leads to the conclusion that consciousness is supported by a physical protectorate composed of an alkaline metallic ionic system operating under specific conditions. Therefore, I agree with Edwards (2006) that consciousness is not a property of a group of cells, and disagree with those who understand that consciousness has an intrinsic biological nature, since biological constraints are necessary only to establish the right kind of initial and boundary conditions for consciousness to emerge from an inorganic medium.

References ABBOTT, N.J., RONNBACK, L. and HANSSON, E. (2006) Astrocyte-Endothelial Interactions at the Blood-Brain Barrier. *Nat. Rev. Neur.* 7: 41-53. ANDERSON, P. (2000) Sources of Quantum Protection in High-Tc Superconductivity. *Science* 288: 480-82. EDWARDS, J. (2006) How Many People Are There in My Head? And in Hers? Exeter: Imprint Academic. FELLIN, T., PASCUAL, O., GOBBO, S., POZZAN, T., HAYDON, P.G. and CARMIGNOTO, G. (2004) Neuronal Synchrony Mediated by Astrocytic Glutamate Through Activation of Extrasynaptic NMDA Receptors. *Neuron* 43(5): 729-43. FELLIN, T., PASCUAL, O. and HAYDON, P.G. (2006) Astrocytes Coordinate Synaptic Networks: Balance of Excitation and Inhibition. *Physiology* 21: 208-215. HAYDON, P.G. and CARMIGNOTO, G. (2006) Astrocyte Control of Synaptic

Transmission and Neurovascular Coupling. *Physiol Rev.* 86(3): 1009-31. KIELPINSKI, D., MONROE, C. and WINELAND, D.J. (2002) Architecture for a LargeScale Ion-Trap Quantum Computer. *Nature* 417: 709-711. LAUGHLIN, R.B and PINES, D. (2000) The Theory of Everything. *PNAS* 97 (1): 28-31.

**Keywords:** Protectorate, Calcium Ions, Astrocytes, Encapsulation, Synchrony.

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**SHORT-TERM POTENTIATION SUPPORTING CONSCIOUSNESS: THE ROLE OF THE GLUTAMATERGIC SYNAPSE PLUS AN EXTRA-SYNAPTIC BOOST FROM ASTROCYTES**

*Poster*

I propose a set of conditions for the identification of a neuronal short-term potentiation (STP) mechanism supporting consciousness. Based on these conditions, my analysis of experimental results indicates a central role for glutamatergic synaptic mechanisms. Additionally, synaptically-generated membrane excitation is extended beyond the 100 ms range by means of Glutamate (Glu) release from astrocytes and binding with extrasynaptic NMDA receptors belonging to the NR2B subtype (Haydon and Carmignoto, 2006). These receptors open to slow inward Calcium Ion ( $\text{Ca}^{++}$ ) currents, which selectively activate the Calmodulin/Calmodulin-Dependent Protein Kinase II (CaM-CaMKII) complex, and then CaMKII phosphorylates membrane ionotropic receptors AMPA, generating an excitatory cycle in the neuronal spine. This excitatory cycle induces the onset of oscillatory synchrony in a neuronal population (Fellin et al., 2004), a phenomenon that has already been well correlated with conscious processing in neurocognitive experiments (Rodriguez et al., 1999). Therefore, a critical factor for consciousness is the quantity of  $\text{Ca}^{++}$  entering the dendritic spine relatively to the quantity of the available CaM (which has 4 binding sites for  $\text{Ca}^{++}$ ). Perturbations of the four-to-one ion/receptor ratio are possibly related to alteration or loss of consciousness in schizophrenia and generalized epilepsy. As the quantity of entering  $\text{Ca}^{++}$  depends on the balance of excitation and inhibition, both too much excitation and too much inhibition cause a loss of consciousness (Blumenfeld and Taylor, 2003). The functionality of the  $\text{Ca}^{++}/\text{CaM/CaMKII}$  complex also depends on the homeostatic control of intracellular calcium by metabotropic receptors and backpropagation of excitation. Since all the critical factors converge to an appropriate activation of post-synaptic CaMKII, the malfunction of this protein can serve as a molecular index of the perturbation or loss of consciousness (see Yamagata et al., 2006).

References: BLUMENFELD, H. and TAYLOR, J. (2003) Why do Seizures Cause Loss of Consciousness? *The Neuroscientist* 9 (5): 301-10. FELLIN, T., PASCUAL, O., GOBBO, S., POZZAN, T., HAYDON, P.G. and CARMIGNOTO, G. (2004) Neuronal Synchrony Mediated by Astrocytic Glutamate Through Activation of Extrasynaptic NMDA Receptors. *Neuron* 43(5): 729-43. Erratum in: *Neuron* 45(1): 177, 2005. HAYDON, P.G. and CARMIGNOTO, G. (2006) Astrocyte Control of Synaptic Transmission and Neurovascular Coupling. *Physiol Rev.* 86(3): 1009-31. RODRIGUEZ, E., GEORGE, N., LACHAUX, J., MARTINERIE, J. RENAULT, B. and VARELA, F.J. (1999) Perception's Shadow: long-distance synchronization of human brain activity. *Nature* 397, p. 430-433. YAMAGATA, Y., IMOTO, K. and OBATA K. (2006) A Mechanism for the Inactivation of  $\text{Ca}(2+)$ /Calmodulin-Dependent Protein Kinase II During Prolonged Seizure Activity and its Consequence After

the Recovery from Seizure Activity in Rats *in vivo*. Neuroscience 140(3): 981-992.

**Keywords:** Short-Term Potentiation, Glutamate, Astrocyte, NMDA Receptor, Synchrony.

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## **HIDDEN MAGNET OF COSMOS AND CONSCIOUSNESS**

*Poster*

Microbes swarming on a sand grain planet or integral complex organisms evolving consciousness at the forefront of cosmic evolution? How is our new cosmology contributing to redefining who we see ourselves to be at the edge of the 21st century, as globalization and capitalism speed forward? How are the evolution of stardust and the universe offering new paradigms of process and identity regarding the role, function and emergence of life in space-time? What cultural and philosophical questions are arising regarding cosmology's contribution to the creation of new vistas of consciousness, cooperation and community at universal scales? Exploring our new cosmological concepts and the emergence of life at astronomical scales may offer much of valuable orientation toward reframing the biological role in evolution. Considering new insight from astrobiology, each diverse species has a definitive role to play in the facilitation and functioning of the biosphere. Creatively we are challenging the frontiers between species, between life and non-living - is it merely a grade of vibratory complexity, a continuous spectrum without clear definition or distinction? Perhaps each species, organism and eco-system is a transistor and a creative response of the Earth to the saturation of spatial fire allowing Earth to resonate more fully, more consciously, to cosmic reality. What then is the significant of the mass extinction of species we are incurring? Is there an ethic implied by natural science and offered by our rapidly expanding cosmic frontier? Cosmology, consciousness and globalization: our new frontiers of truth and reality, our encounter and creative, chaotic response. The dimensions of globalization at our new cosmic frontiers span all fields, from scientific and artistic to socio-cultural, political and spiritual; we are being invited to champion infinity not as an hor'doeuvre but as a main course. Infinite possibilities, potentially infinite worlds, realms and cosmoi....and most certainly we are invited to infinite creativity. We are exploring new ways of re-visioning ourselves, our relationships as organisms, collectives and cultures on our tiny global satellite, our relationships as humanity to the bio-cosm and cosmos. The changing face of our consciousness of reality has encountered the increasing expansive impulse of "dark energy", a hidden cosmic magnet drawing the galloping of galaxies into existence and beyond. "All cosmic forms are affirmed by the transmutation of the fire of space....The fires of space and the fires of spirit together set up this endless chain...Thus does the attraction of the creative power give life to form." ( Inf. 264 Maitreya)How do phenomenology, consciousness and life expression converge? Considering the relation between quantum mechanics, gravity and the fabric of the evolution of consciousness, we forging a new global-cosmic element and substance. How is our visual and intellectual encounter with the span of cosmic identity affecting the human organism, including the brain's spatial and dimensional functions, its cerebral neuronal networking, and expanding dimensionality of creative reasoning and expression, in response to conscious immersion in the experience of cosmic infinities? This evolutionary

neuronal complexification, eventually shared by enough of the human population, may bring about significant beneficial socio-cultural shifts. Our new cosmic horizon on the infinite is so unique and powerful in human history that many new creative dimensions of consciousness are emerging to meet this expanding vista.

**Keywords:** Cosmology, Consciousness, Evolution, Creativity and Life.

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## **WAKING FROM THE THIRD-PERSON DREAM: DENNETT, OVERLAPPING MAGISTERIA, AND A TALE OF TWO MARYS**

Notwithstanding various attempts to close the gap (e.g., neurophenomenology), the debate between first-person and third-person approaches to consciousness is generally framed in blackwhite terms. Either consciousness can be fully and exhaustively explained as an emergent property of complex physical interactions, or there is an essential phenomenal content--a 'what it is like'--to consciousness that can be understood only on its own terms, and to which third-person methodologies give no access. In his recent book *Sweet Dreams*, Daniel Dennett renews his ongoing defense of the first alternative and attack on the second. But Dennett fares better as attack dog than as loyal defender. He is right that first-person accounts of consciousness are subject to self-deception, and that the intuition of a self at the center of experience is philosophically indefensible. But the sophisticated version of reductive materialism he proposes as an alternative simply cannot cope with conscious experience as a brute fact of how we experience the world. As Dennett's critics regularly point out, treating consciousness as explicable in third-person terms starts from an illegitimate foundation, points us at irrelevant data, and aims at the wrong goal; further, it ignores most of what makes us care about consciousness to begin with. A more fruitful approach is available. First-person and third-person methodologies can profitably be viewed as parallel, non-intersecting ways of knowing, subject to different standards, oriented toward different questions, and dependent on different modes of analysis. This approach resembles Stephen Gould's proposal to treat science and religion as different and nonoverlapping 'magisteria', but it differs in one crucial respect: here the fact of overlap (at the level of content rather than method) is precisely the point. To help clarify this distinction, I introduce two versions of Mary, Frank Jackson's color-challenged scientist, whom Dennett discusses at length. One (Mary Poppins) eschews explanation, insists on specificity, and remains ever mutable. The other (Mary Shelly) succeeds in turning consciousness into an object of scientific inquiry. Imagine them meeting after the world has come back to colorful life: They would have little to say to one another. Having tried in this way to clarify the prospects and limitations of both first-person and third-person sciences of consciousness, I draw on Dennett's critique to sketch out a first-person methodology that could make meaningful contributions to our understanding of what consciousness is and--a consideration unique to first-person inquiry--how best to make use of it. Among the shifts in approach that set first-person methodology apart from third-person techniques are the following: stories over explanations, interpretation over perception, ordinary experience over anomalous or laboratory situations, and structure over content.

**Keywords:** first-person, Dennett, magisteria, methodology, explanation

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## COGNITIVE ACUITY

Some analytic philosophers have recently been defending and developing the thesis that there's "something it's like" to consciously think a particular thought, which is qualitatively different from what it's like to be in any other kind of conscious mental state and from what it's like to think any other thought, and which constitutes the thought's intentional content. A common objection to this thesis is that no such phenomenology is introspectively detectable in the objector's case. A common response is that the objector is simply missing the relevant phenomenology. Yet, one might doubt the plausibility of the claim that there is a kind of qualitative experience, of so prevalent a feature of our conscious mental lives, that could be so easily missed. The other sorts of phenomenology we are capable of are detectable on the most casual introspection. Conscious phenomenology, it would seem, can scarcely be ignored, much less elude introspective scrutiny. I offer a speculative account of the nature of cognitive phenomenology and its place in the evolution of conscious experience that would explain its relative elusiveness to introspection. It shouldn't be assumed that all qualitative aspects of conscious experience must be equally vivid and articulated. Just as there are creatures whose visual experiences are impoverished in comparison to ours, so we might be creatures whose cognitive experience is relatively weak, in comparison both to the other sorts of phenomenology we are capable of and to what is psychologically or metaphysically possible. We might well imagine creatures for whom the phenomenology of thought is as hard to miss as the phenomenology of visual experience is for us. Indeed, if comparative psychology leads us to assign widely varying capacities for experience among existing species, why shouldn't we think that further evolution might bring enhancements of existing types of experience, or result in new types of experience unimaginable to us at present? And if we further imagine that a creature with very weak visual experience might nonetheless enjoy other sorts of phenomenology of greater vividness and articulation, it's not hard to believe that visual experience for such a creature might be as elusive as cognitive experience might be for us. So, the speculation is that, for all our vaunted brilliance, we might rate rather low with respect to the clarity and vividness of our conscious thought. Our thinking is really not all that clear. Our brains are very good at generating some kinds of conscious experience and processing the information contained therein. But, perhaps because the cognitive-experiential aspect of mind is a relative newcomer on the phylogenetic scene, our cognitive acuity is relatively poor.

**Keywords:** consciousness, qualia, phenomenology, intentionality

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## WHY NOT QUANTUM: THREE CONCEPTIONS OF CHAOS, NATURE OF THOUGHT AND

## THE PHYSICS OF THE BRAIN

This paper takes as its point of departure Gilles Deleuze and Felix Guattari's insight, advanced in *What is Philosophy?*, that human thought should be understood through its confrontation with chaos, a great enemy of thought, but also its greatest friend and its greatest ally in its struggle against opinion, doxa, always an enemy only. By contrast, such human endeavors as art, science, and philosophy are manifestations of thought as a confrontation with chaos. Deleuze and Guattari proceed to argue that, in order to explain the nature of thought as this confrontation, the workings of the brain itself and, hence, our scientific understanding of the brain should be rethought accordingly. For, they contend, most current neurological theories only approach the brain as a system for processing of opinions by the mind and not, as it should be, as the system responsible for the emergence of the mind that creates thought. The latter and hence also art, science, and philosophy and, thus, what is most essential to thinking could, accordingly, never be explained by such theories. The paper will examine this (largely hypothetical) argument, first, by extending Deleuze and Guattari's conception of chaos to a more complex conceptual architecture, defined by three concepts of chaos--chaos as the incomprehensible, chaos as chance and disorder, and chaos as the virtual. (Deleuze and Guattari only use the idea of chaos as the virtual.) The paper will also discuss the relationships between thought and consciousness from this perspective, by arguing that thought has primarily to do with the unconscious rather than consciousness. Then the paper will address the question of how well some current theories of the brain's functioning are suited to address the workings of thought in this sense, and in particular whether some among the quantumtheoretical approaches to the brain (which are not considered by Deleuze and Guattari) may be helpful in this task. The potential significance of these theories for our understanding of the brain as the system that gives rise to the mind capable of creating and working with thought is especially intriguing because they, specifically quantum field theory, relate our interaction with quantum objects and processes (via measuring instruments and our minds, and specifically consciousness) to all three concepts of chaos just mentioned.

**Keywords:** brain, thought, chaos, quantum theory

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## PSYCHOPHYSICAL IDENTITIES AND THE INTUITION OF THEIR CONTINGENCY

*Poster*

Assume that an identity appears contingent if and only if it appears possibly false to someone who believes that it is actually true. David Papineau argues that if statements of identity involving proper names cannot appear contingent, psychophysical identities cannot appear contingent, either. Take the identity 'Cicero is Tully'. The concepts 'Cicero' and 'Tully' refer directly (not via contingent descriptions) and this, according to Papineau, explains why the identity of Cicero and Tully does not appear contingent. Similarly, argues Papineau, psychophysical identities cannot appear contingent given that both phenomenal and theoretical-physical concepts refer directly. Papineau uses this point further to argue that because psychophysical identities appear to us possibly false, we cannot fully believe (at least

not at an intuitive level) that psychophysical identities are true. I think that the question of the contingency of psychophysical identities remains open. Papineau is right to point out that phenomenal and physical concepts refer directly and that to this extent they resemble the concepts 'Cicero' and 'Tully'. However, Papineau neglects a certain crucial difference between those two pairs of concepts. Unlike 'Cicero' and 'Tully', phenomenal and physical concepts refer essentially, by presenting their referents as they are in themselves, and it is arguable that this makes room for the intuition of contingency in the case of psychophysical identities. Suppose that pain is c-fibers stimulation. Assuming that 'pain' and 'c-fibers stimulation' refer essentially, there will be two essential modes of presentation of pain. So in thinking about other possible worlds we can think of pain under one of those descriptions and not under the other and this intuitively explains why the identity of pain and c-fibers stimulation appears contingent. The idea that phenomenal concepts refer essentially, by conceiving of their referents as they are essentially, has been familiar since Kripke. It is now being challenged by Brian Loar and Papineau himself who argue that if science discovers that phenomenal and physical states are identical, science will thereby disclose the real (physical) essence of phenomenal states. I doubt if Loar's and Papineau's view is coherent. Instead, I think that the discovery of psychophysical identities will justify the view that there are two equally essential modes of presentation of phenomenal states, the physical and the phenomenal. If this is so, then the intuition of contingency with respect to psychophysical identities seems to make sense. This intuition raises a serious difficulty for physicalists. Physicalists are committed to the view that if phenomenal states are identical with physical states, phenomenal states are essentially physical states. But if psychophysical identities appear contingent, phenomenal states do not appear to be essentially physical and hence it becomes utterly unclear on what grounds physicalists can think of phenomenal states as essentially physical. References: Hill, Christopher 1997. Imaginability, conceivability and the mind-body problem, *Philosophical Studies* 87: 61-85. Loar, Brian, 1997. Phenomenal States, in (N. Block, O. Flanagan, G. Guzeldere, eds.) *The Nature of Consciousness*. MIT Press. Loar, Brian 2003. Qualia, Properties, Modality, *Philosophical Issues* 13: 113-129. Papineau, David 2002. *Thinking About Consciousness*, Oxford University Press. Papineau, David 2006. *Phenomenal and Perceptual Concepts*, in (T. Alter & S. Walter, eds.) *Phenomenal Concepts and Phenomenal Knowledge*. Oxford University Press.

**Keywords:** psychophysical identity, contingency, phenomenal concepts

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**DO WE NEED TO FEEL IN ORDER TO APPREHEND EMOTIONAL STATES IN OTHERS?**  
*Poster*

Philosophical discussions about the nature of emotions and empathy are vast and diverging. What is the relation between emotion to bodily states, to beliefs, desires, perceptions? And what are the relations between the phenomenon of emotion and that of empathy. There is an emotional component to empathy. To empathise is to apprehend emotional states of others. But in what sense does empathy involve emotions when it comes to the person who empathises? Here I will try to answer some of these questions by examining clinical descriptions of people who somehow exhibit an impaired capacity for

empathy. Such descriptions can e.g., be found among people who have been diagnosed with autistic disorder, psychopathy and among those who are described as alexithymic. The descriptions of these complexes of symptoms all involve references to empathy. Autism is a developmental disorder that has become the focus of philosophical attention because of the selective way in which it affects individual's social capacities including empathy. Psychopathy (The DSM-IV diagnostic criteria for antisocial personality disorder is supposed to replace "psychopathy". It should be noted, though, that many researchers do not believe that ASP fully captures psychopathy) can also be considered an empathy disorder (So"derberg 2003). Descriptions of the alexithymic personality type, finally, include poor empathy. It should be noted that impaired empathy also forms part of the diagnostic criteria for autistic disorder as well as psychopathy (the latter in Hare's psychopathy checklist). Even though these three symptom complexes are quite distinct they share some different emotional dysfunctions, apart from the alleged lack of empathy. Such as difficulties recognising emotions of others (autism and alexithymia), lack of creative imagination (all three), and emotional bluntness (psychopathy and alexithymia). I will, using clinical descriptions and diagnostic criteria as examples, discuss possible connections between imaginative activity, the presence of emotions, the ability to express and verbalise emotions and finally how empathy is dependent on these other emotional abilities. References: American Psychiatric Association, 2000. Diagnostic and Statistical Manual of Mental Disorders, Forth Edition, Text Revision, Washington DC: American Psychiatric Association. Hare, R., D., 1991. Manual for the Hare Psychopathy Checklist - Revised. Toronto: Multi-Health Systems. So"derberg, H. 2003. Psychopathy as a disorder of Empathy. European Child & Adolescent Psychiatry 12: 249 - 252.

**Keywords:** empathy, autism, psychopathy, emotion

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## **AMBIGUOUS FIGURES AND REPRESENTATIONALISM**

Ambiguous figures present a challenge to the philosophy of perception. Macpherson (2006) argues that the square/diamond figure threatens representationalism, construed as the theory which holds that the phenomenal content of experience is either identical, or supervenes on, the nonconceptual content of experience (NCC). The brunt of her argument is that representationalism is committed to the thesis that differences in the experience of ambiguous figures, the gestalt switch, should be explained by differences in the NCC of perception of these figures. If one construes phenomenal content as nonconceptual content then one is committed to the thesis that when one undergoes a gestalt switch there must be some change of nonconceptual content, and so the representationalist must be able to account for the difference in nonconceptual content between an experience associated with seeing Mach's figure as a square and the experience associated with seeing Mach's figure as a diamond. However, with respect to the square/regular diamond figure such differences in NCC allegedly do not exist, and thus, representationalism has to abandon its position. Note that for Macpherson to succeed, differences in the experience of ambiguous figures should be the result of differences in phenomenal content and not differences in the conceptualization of the same phenomenal content, because then

representationalism would face no problems. Here, I examine Macpherson's challenge and argue that representationalism can account for the experience of ambiguous figures. In section one, I succinctly present a theory phenomenal content. In the second section, I offer a representationalist account of the ambiguous figures. Finally, I examine Macpherson's arguments and show that they do not undercut representationalism. My main point is that the diamond/square ambiguous figure can be met by representationalism in two ways. First, the phenomenal content of the rotated figure (that could be conceptualized as a "square") is different from the phenomenal content of the figure with the non-normal right angles (conceptualized by "diamond"), in that the two figures have different orientations and the Cartesian framework cuts them differently. Since these attributes are, as I argue, parts of NCC, the original figure and the rotated figure have different NCC, which is all that representationalism demands. Alternatively, the subject may be searching the scene for squares. The phenomenal content that corresponds to a diamond is first retrieved bottom-up from the scene on account of the nature of perceptual processing and the way the figure is oriented in space. When the conceptual framework of the perceiver applies to the phenomenal content, the object is identified as a square. The content of the relevant neural states along the visual system is now conceptual; the subject sees a square even though she is seeing a diamond. There is only one phenomenal content but different conceptualizations of that content. If so, then there is no gestalt switch, since the switch is not a change in phenomenal content but a change in conceptual content. Thus, there is one NCC but two different conceptualizations of it. In either case, representationalism faces no problems.

**Keywords:** Ambiguous figures, Phenomenal content, Nonconceptual content, Representationalism

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**THE NATURE OF CONSCIOUSNESS. THE CONSCIOUSNESS OF NATURE. AN OUTLINE OF A NEW STORY FOR THE 21ST CENTURY.**

*Poster*

By asking questions to Danish academics interested in consciousness I illustrate that there are different metaphysical positions that make a discussion of the nature of consciousness difficult. My questions were: 1. What is consciousness? 2. Where is consciousness? Does it have a place in physical space? 3. Does consciousness exist without content or intention? 4. Can consciousness be naturalized by science? 5. What is the connection between consciousness and the brain? 6. Do animals have consciousness? How long down the chain of evolution? 7. Is the subconscious part of consciousness? 8. Is nature conscious? If not, how can we explain the emergence of consciousness in a nature without consciousness? The answers fall in the classical categories: Materialism (Physicalism/Functionalism), Idealism, Dualism and Panpsychism. The most common assumption among scientists taking part in the debate is that reality is a material substance, from which follows that consciousness is material. But it seems impossible to give a convincing proof. My conclusion is: We have to accept that consciousness is a fundamental part of nature. Nature is conscious. Only by accepting this as a fact can we build a new metaparadigm and thereby naturalize consciousness. Traditional materialism is as 'religious' as idealism. It makes us believe that consciousness is 'created' by the material world or emerging out of a dead

universe. Such a belief is irrational. If we stick to what we know, we have the following situation: There is a material world explained very well by science. And then there is consciousness (and life) that can not be explained by science. But we know that consciousness (and life) exists. We can not separate these two qualities of our reality. The idea of complementarity introduced by Niels Bohr to explain the paradoxical features of light might be useful for an explanation of our reality because of restrictions in the capacity of our language. The mathematical-logical language of science is consistent but unable to embrace all of reality. Materialism (physicalism/functionalism) and idealism can be seen as complementary. We can transcend them both in some kind of evolutionary panpsychism that embrace both consciousness and the material world. It could be a process ontology and it might create a basis for a new story for the 21st Century transcending both traditional religion and traditional science. The new story will be dynamic and include us as conscious co-creators in the evolution of the universe. Evolution today is first of all an evolution of consciousness. The creativity is as consciousness itself an integrated part of nature. Nature is both conservative and creative. Nature is conscious and unfolding but not controlled by a fixed blueprint made by an external designer. Abstract Keywords: metaphysics; ontology; materialism; physicalism; idealism; complementarity; nature; new story; nature of consciousness; consciousness of nature; metaparadigm

**Keywords:** metaphysics, ontology, materialism, physicalism, idealism, complementarity, nature, metaparadigm

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## **LOOKING AT THE BEGINNINGS: ENQUIRIES ABOUT EMERGENCE OF COGNITION IN EVOLUTION**

*Poster*

Trying to understand when and how the cognitive phenomena arise in evolution continues being a hard problem of confronting. Another important issue is referring to find the explanatory framework which integrates the different observations and data in neuroscience investigations. These situations lead us to ask a question in regards to whether there are underlying general principles to the so-called neural code: What might the relationship be that is established between the neuronal responses and the sensory signs or signals that these supposedly represent? In fact, one important task is to find the ways in which we will be able to arrive at those explanations that will enable us to understand how living beings put together perceived sensory information as well as how they represent it. In this brief paper, we address some conceptual questions involved in the relationships between sensorial information perceived by brains and its representational capacities. Specially, we propose that it is possible to defend the physical origin of Information. Therefore, we will study the implications to use the information notion as an ascribed concept and its relationships with using this same notion like denoting something in the reality.

**Keywords:** production of information; constraints and emergence; black hole information paradox; complexity increase; spontaneously assemble; origin of information; basic semantic.

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## **FREUD, JUNG, AND THE HARD PROBLEM OF CONSCIOUSNESS: INTRODUCING THE HUMAN NETWORKING SYSTEM**

The term "hard problem of consciousness" coined by David Chalmers (1995) sparked off a lively discussion of problems new and ancient. Over the last decade, `soft' problem solving has been facilitated by technological advancements, while the `hard' problem has either been remanded to wait its turn (as nothing more than a difficult `soft' problem) or declared an outcast of science, if not altogether dismissed as nonexistent. The author proposes a new computer model of the human brain by filling in the missing piece of the puzzle by algebra: if human brains can be modeled on computers, then let be the networking system of the model. A surprisingly close match is found between this computer model and the psychoanalytic model of Freud and Jung. The concept of a human networking system is then expanded to suggest a possible solution for the "hard" problem. Relevant questions are raised for future research.

**Keywords:** Freud, Jung, Hard Problem of Consciousness, Human Networking System

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## **SENSORIMOTOR KNOWLEDGE IS NOT NECESSARY FOR PERCEPTION.**

*Poster*

Is sensorimotor knowledge necessary for perception? Recently Alva Noe has explained the essence of perceptual experience in terms of enactive approach. He holds that perceptual experience just is a mode of skillful exploration of the world. This is to say perception is a way in which one understands how to excise his body skills to interact with the objects around him. Noe calls such understanding as sensorimotor knowledge. According to enactive approach, perceptual content is constituted by sensory stimulus and the involvement of sensorimotor knowledge. In other words mere sensory stimulus is not sufficient for one possess perception. Sensorimotor knowledge is prior for constituting perception. I will suggest a consideration of imaginary case that can account sensorimotor knowledge is not necessary for auditory experience. We can image that a patient with congenital paralysis and his auditory system is well. He can possess auditory sensation. Suppose that there is a sound of a sonic device such as a ring moving from the left side of that patient to his right side. We can credit that patient is able to hear the same sound that move from his left side to right side. Logically speaking, by the changes of the position of stimulus sources, patient can judge the change of the spatial relationship between the sound and his body. He will be able to take that sound not to be mere sensation, but something external to him. This minimal ability to have different perspectives on the object indicates that one can possess perceptual content without the movement of the body or the understanding about his bodily skills. Whether or not such a being is empirically possible, it certainly seems to be logically possible. I suggest that this imagery case is a counterexample of enactive approach. And the result suggests that one can possess

auditory perception without sensorimotor knowledge about the sense of hearing by mere sensory stimulus. That is to say sensorimotor knowledge is not necessary for perception.

**Keywords:** Sensorimotor knowledge, perception.

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## LEVELS OF INTENTIONALITY

*Poster*

None of the attempts to develop a naturalistic account of intentionality has been universally accepted. Intentionality is directedness towards an object, which may or may not exist. Traditionally, it has been taken to be a feature of mental states, specifically of propositional attitudes. An alternative approach treats intentionality primarily as a feature of goal-directed behaviour, where this may come in different forms of increasing complexity. This paradigm shift opens up the possibility to develop a theory which distinguishes different manifestations of intentionality in a hierarchy of levels, where these levels are distinguished according to various capacities a human being acquires (or manifests) during ontogenetic development (cf. Barresi & Moore 1996). First, arguments will be presented in order to show that the traditional framework is inadequate. Second, an alternative proposal is sketched. In order to adequately describe these forms of intentionality, recent work in neurophysiology and developmental psychology shall be taken into account. The most basic and "biologically primitive" (Searle 1983) forms of intentionality are (non-epistemic) perception and action, i.e. forms of directedness towards existing objects. According to the "dual model" of human visual processing recently developed by Milner & Goodale (1995) and Jacob & Jeannerod (2003), the concept of vision encompasses both conscious visual perception (ventral pathway) as well as the guidance of action (e.g. reaching and grasping), which is based on visuomotor representations (dorsal pathway). It has been emphasized that a characteristic feature of (at least) such intentional behaviour (if not of the whole of cognition) is embodiment (Clark 1997, Gallagher 2005). Accordingly, this plays an important role in the characterization of this basic intentionality. Based on this first level, which human beings share with most non-human primates, various other levels include (probably) essentially human forms of intentionality, such as scenes of joint attention, where a child (at approximately nine months of age) can be engaged in social interaction with a parent towards some object. In further stages, the child is able to use its capacity of imagination, which allows forms of intentionality independent from current perceptual contexts. The child learns first to interpret others as intentional agents pursuing goals, and then as mental agents. At this stage, usually at the age of four, the child has acquired a theory-of-mind, which allows to understand the fact that others may have false beliefs about the world which differ from the child's own beliefs. Such a framework allows us to integrate intentionality in the traditional sense as a special case by showing how the ability to ascribe propositional attitudes is acquired in human ontogeny and how it depends on more primitive forms of intentionality.

**Keywords:** Intentionality, Joint attention, Theory of Mind, Social cognition

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## PARTIAL ZOMBIES, PROSTHESES, AND A PRETTY HARD PROBLEM

The problem considered here is whether certain kinds of partial zombies are possible. The question is answered affirmatively, and this is argued to have consequences for any attempt to formulate a general theory of consciousness, one that allows prediction of consciousness (or otherwise) and of kinds of phenomenal experiences for any kind of sense-equipped, intelligent being, regardless of physical constitution and functional architecture. This is referred to as a "pretty hard problem", since predicting consciousness and qualia maybe easier than explaining them, as required by David Chalmers' "hard problem" (Chalmers 1996). The immediate objection against seeking a general theory, that predictions of qualia in significantly different beings cannot be verified, is addressed as well. The kinds of (partial) zombies considered here fall somewhere between (partial) behavioral and (partial)functional zombies. Behavioral zombies are sometimes treated in philosophy as obviously possible, since for instance a human could be mimicked by an elaborate puppet remotely controlled by a supercomputer or a person's nervous system (Polger 2000). However, in AI circles it is more often thought that human-like subjective experience would very likely be an inevitable consequence of duplicating human-like behavior in a self-operated (as opposed to remote-controlled) agent. Therefore only the possibility of self-operated behavioral zombies is of interest here. This moves us closer to the notion of functional zombies, though we still want to allow for differences in information processing architecture. In addition, we set aside the issue of self-awareness here, since self-awareness is "merely" a kind of access consciousness (Block 1995). (Indeed, various researchers are working on the development of self-aware agents - see, e.g., AAAI-SS 2005, AAAI-SS 2007). Rather, the question of interest here is whether a self-operated agent could be behaviorally like a human but (partially or largely) lack phenomenal consciousness. As examples of such behavioral zombies, we consider a deaf person equipped with glasses containing a micro miniaturized speech and sound recognition system that displays the results to the wearer visually, in a way that is undetectable by onlookers; and (as a more extreme example), a blind person with a vision gadget, disguised as sunglasses, that whispers detailed descriptions of the scene confronting the wearer, allowing the wearer to act and communicate pretty much like a sighted person. Of course these partial zombies still do have phenomenal experiences, but in "collapsed" modalities (perhaps only a linguistic modality). So AI researchers should not assume that a human-like inner life is an inevitable byproduct of self-determined, apparently human-like behavior. We are then left with the "pretty hard" problem; a key question is at what level of functional description we should seek a basis for predicting phenomenal experience. Some suggestions will be offered having to do with the "geometry" of various qualia modalities (similar to the notion of the "logic" of qualia as discussed by Jeffrey Foss, 2000).

References AAAI-SS 2005, 2005 AAAI Spring Symposium on Metacognition in Computation, AAAI Tech. Rep. SS-05-04, Stanford University. AAAI-SS 2007, Logical Formalizations of Commonsense Reasoning, AAAI Spring Symposium, March 26-28, Stanford. N. Block, 1995, "On a confusion about a function of consciousness." Behavioral and Brain Sciences 18(2):227-287. D. Chalmers, 1996, *The Conscious Mind: In Search of a Fundamental Theory*, New York and Oxford: Oxford Univ. Press. J. Foss, 2000, *Science and the Riddle of Consciousness: A Solution*. Kluwer Academic Publishers. T.

Polger, 2000, "Zombies Explained," in D. Ross, A. Brook, & D. Thompson (Eds.), Dennett's Philosophy: A Comprehensive Assessment, MIT Press, 2000. See also "Zombies", <http://host.uniroma3.it/progetti/kant/field/zombies.htm> Block, N. (1995). On a confusion about a function of consciousness. Behavioral and Brain Sciences 18 (2):227-287.

**Keywords:** phenomenal consciousness, zombies, artificial intelligence

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## **QUANTUM PHYSICS WITH DREAM METAPHOR AND META-BRAIN**

The first part contains a review of the dream metaphor and meta-brain model discussed at the 2006 Tucson conference. The meta-brain provides the non-local hidden variables which determine the outcome of the observations. It is shown that the wave function may depend on the observer and is both mental and physical as is all observable matter in this model. Arguments are made for the mutual causality between the mental and physical worlds and hence for their unification. The Schroedinger cat "paradox" is intuitively clear in this model as is the changing of a system by observing it and also the non-commutation of some observables. In the second part we discuss the relationship of the classical appearance of the world (superposition of observable states are not observed), the anthropic principle and the "filling in" of history by observations according to Wheeler's delayed choice paradigm, all in context of the meta-brain model and the nature of the stream of consciousness. We also note the "recursive" nature of the model. The meta-brain produces "dreams" or streams of consciousness which include brains which in turn produce streams of consciousness. (A crude analogy: the quark produces a force field which includes gluons which produce force fields.)

**Keywords:** Quantum, consciousness, superposition

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## **DECODING THE MENTALESE : THE “KEYS” TO THE LANGUAGE OF THOUGHT (AND UNTHOUGHT)**

Since time immemorial, philosophers were searching for a "machine code" of the common language capable of processing information at the pre-verbal, preexpressive level. Jerry Fodor created his Hypothesis of the Language of Thought back in 1975. In this paper I suggest that natural languages are secondary to the semiotic system of (primitive) signs that are hardwired in humans and which serve as tools for understanding, meaning making and creating new complex concepts by virtue of a code. I assert that the combinatorial (Fodorian) semantics finds its unorthodox expression in the Tarot images organized into a semiotic system, in which each picture serves as a "key" to encoded information. Our beliefs, hopes, fears and desires - even when unconscious, that is, as yet unthought of from the

subjective point of view - objectively have a compositional structure that may be laid down in front of our own eyes in the format of tarot pictures that stand for (as signs, by definition, do) mental representations for affects, thoughts, and actions alike. The knowledge of such Language of Signs (see Semetsky 2005, 2006) has enormous ethical implications, especially in our global age of pluralistic values and conflicts, as it confirms that indeed "the people is one [and] the whole Earth was of one language, and of one speech" (Genesis 11). We should take Fodor's project seriously as a step away from the habitual "linguistic turn" and a step forward to developing both epistemology and ontology of the necessary "semiotic turn" in our search for the so-called lost pre-verbal speech and understanding the Mentalese. References Fodor, J. (1975) *The Language of Thought*. Cambridge, Mass: Harvard University Press. Semetsky, I (2005) "From design to self-organization, or a proper structure for a proper function", AXIOMATHES: An International Journal in Ontology and Cognitive Systems, Vol. 15, No. 4, Springer Science, pp. 575-597. Semetsky, I (2006) "The language of signs: Semiosis and the memories of the future", SOPHIA: International Journal for philosophy of religion, metaphysical theology and ethics, Vol 45 No.1 pp. 95-116.

**Keywords:** Mentalese, LOTH, mental representations, Tarot as a semiotic system

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## **IS THERE AN ETHICS OF ARTIFICIAL CONSCIOUSNESS?**

According to Metzinger, "we should ban all attempts to create (or even risk the creation of) [artificial consciousness]" because otherwise "we might dramatically increase the amount of suffering, misery, and confusion on the planet". To voice ethical concerns over the possibility of artificial consciousness initially sounds absurd. Though perhaps of theoretical interest to philosophers, surely only an uncritical mind under the influence of too much science fiction could take them seriously. Yet the radical-sounding conclusion that artifical consciousness might be created in the laboratory within a few decades follows from a number of fairly conservative and/or widely held assumptions. The aim of this paper is to identify a combination of such assumptions that, if true, would oblige us to consider Metzinger's proscription in the near future. These include conceptual assumptions, assumptions about future theoretical advances, and assumptions of continuing technological progress. The paper begins by considering the recent work of Izhikevich, who has developed a mathematical model of spiking neuron behaviour with favourable computational properties. Based on this model he constructed a simulation of 100 billion randomly inter-connected neurons. Running on a state-of-the-art parallel supercomputer, this program took 50 days to simulate one second of electrical activity within the network. Extrapolating from recent advances in computer technology, Izhikevich speculates that it might be possible to simulate the same number of neurons in real time by 2016. 100 billion is, of course, the number of neurons in human cortex. The same assumptions obviously set an even closer date for simulating in real time the cortex of some less complex animal, a cat say, to which we feel a degree of ethical obligation and whose suffering we would prefer to avoid. But the development of a real-time, brain-scale network of biologically accurate neurons would not be sufficient in itself to invoke Metzinger's concerns. Certain constraints on the organisation and embodiment of such a simulation would have to be met before any

putative ascription of consciousness could be entertained. To build a machine that met these constraints would require further significant technological and theoretical progress, the character of which is spelled out in the paper. Granted such progress, and without going so far as to reject a material basis for mind, a number of arguments can still be advanced for confining the ascription of consciousness to animals, and more particularly for denying it to any computer simulation, whatever its size and fidelity and however it is organised and embodied. But all such arguments rest on premises that have been vigorously contested by one or another respected philosopher. To summarise, the technology required to build and embody a biologically accurate, real-time, brain-scale neural network is within reach. The outstanding theoretical obstacles to understanding the organisation of the brain, though formidable, may, for all we know, soon succumb to a scientific paradigm shift. And the thesis that consciousness in a computer is conceptually possible, though controversial, remains philosophically respectable. In short, the ethical concerns voiced by Metzinger are more urgent than they at first appear.

**Keywords:** machine consciousness, artificial consciousness

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## **THE MYSTERY OF CONSCIOUSNESS - A PSYCHOLOGICAL PERSPECTIVE**

Characterizing consciousness as puzzling or mysterious is commonplace. Often, this is associated with the question as to how consciousness rises out of the brain; this question is labeled "the hard problem of consciousness". Undoubtedly, the hard problem constitutes a mystery. Yet, to my mind, as far as the psychologist is concerned the mystery of consciousness, and the puzzling problems it presents, lie elsewhere. The hard problem concerns the relationship between two levels - the biological level of brain and the psychological level of experience. Obviously, it is a modern variant of the old philosophical body-mind problem. Essentially the same problem is also encountered with respect to the relationship between consciousness and the putative covert level of underlying mental computations. All these questions involve the relationship between the experiential-mental and another level of either reality or theory. As such they are not psychological proper. But is consciousness mysterious only because we cannot fathom how the brain generates it? My answer is a categorical "no". I outline a series of puzzling questions concerning consciousness that pertain not to the relationship between the psychological and another level, but to the psychological level it self. These are significant inasmuch as they defy commonly held conceptualizations, in their presenting interesting empirical facts, and in their defining new paths for the psychological study of consciousness. Genuinely psychological puzzles of consciousness are of several kinds: 1. Fundamental conceptual problems. The key features of consciousness -- sentience, the essence of experiencehood and the intrinsic feel of a subject -- all defy definition. As argued by Merlau-Ponty, consciousness cannot be taken as an object, and any attempt to specify it in fixed terms evades its very essence. 2. Types or levels of consciousness and the relationships between them. Considering empirical phenomenological data of ordinary conscious experiences I highlight patterns that defy ordered hierarchies and what may be conceived as Euclidian-like geometry. Included in these are the dynamic fluctuation between levels of thought, the double-

facedness of mentation, and the phenomenon of self-consciousness. 3. Patterns indicating that features normally taken to be synonymous or to go hand in hand together need not be such. These are especially marked in psychopathology and in altered states of consciousness. An example is the dissociation between the possession of mental material and the experienced generation thereof. 4. Patterns indicating that commonly assumed paradigmatic properties of consciousness are actually contingent, potentially variable, values along parameters. Likewise, there are patterns highlighting otherwise unappreciated parameters. An example is the sense of realness that in non-ordinary states of consciousness may be experienced as either heightened or lowered. 5. Patterns exhibiting extraordinary feats of consciousness. Ones I shall focally discuss are substance induced visions, metamorphosis of identity, and enhanced creativity. 6. The ineffable. Lastly, there are facets of the phenomenology of consciousness that evade both verbal description and logical conceptualization. Examples of these have been noted by mystics throughout the ages. In conclusion it will be pointed out how all these topics lay the ground for a novel framework for a genuinely psychological study of consciousness. The orientation adopted is phenomenological involving both new paradigms of empirical investigation and a new psychological theory.

**Keywords:** mystery of consciousness, phenomenological theory

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## **UNITY OF KNOWLEDGE, COMPLEMENTARITY, AND CONSCIOUSNESS**

*Poster*

We first consider the observational problem in quantum mechanics and the notion of complementarity. Then, following Niels Bohr, we discuss the complementary approach to problems of quantum mechanics, biology, sociology, and psychology in more detail. In biology the general lesson of atomic theory suggests that the only way to reconcile the laws of physics with the concepts suited for a description of the phenomena of life is to examine the essential difference in the conditions of the observation of physical and biological phenomena. In sociology the main obstacle to an unprejudiced attitude towards the relation between various human cultures is, however, the deep-rooted differences of the traditional backgrounds on which the cultural harmony in different human societies is based and which exclude any simple comparison between such cultures. It is above all in this connection that the viewpoint of complementarity offers itself as a means of coping with the situation. In psychology the fact that conscious experience can be remembered and therefore must be supposed to be connected with permanent changes in the constitution of the organism points to a comparison between psychical experiences and physical observations. With respect to relationships between conscious experiences we also encounter features reminiscent of the conditions for the comprehension of atomic phenomena. The rich vocabulary used in the communications of the states of our mind refers indeed to a typical complementary mode of description corresponding to a continual change of the content on which attention is focused. In general philosophical perspective, it is very important that, as regards analysis and synthesis in these fields of knowledge, we are confronted with situations reminding us of the situation in quantum physics. Although, in the present case, we can be concerned only with more or less

fitting analogies, yet we can hardly escape the conviction that in the facts which are revealed to us by the quantum theory and lie outside the domain of our ordinary forms of perception we have acquired a means of elucidating general philosophical problems. This allows us to use the complementary mode of description in the development and clarification of quantum approaches to understanding the mind. Next we try to show how consideration of the kind can help us to explain the enigmatic features of consciousness. Our starting-point is that any observation of atomic phenomena will involve an interaction with the agency of observation not to be neglected. In this context, the necessity of widening of the conceptual framework from the point of view of our moving to the next higher level of objective description is also discussed. During this moving we have a constantly expanding domain of consciousness and life. Therefore, it is important that the problem with which we are confronted here is an analog to the theorem of Go"del in pure mathematics. Finally, we discuss briefly the old truth that we are both spectators and actors in the great drama of existence and the problem of free will.

**Keywords:** observational problem, complementarity, phenomena of life, different human societies, quantum theory, free will

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## **AN EPISTEMOLOGICAL ARGUMENT TO AGAINST THE CONCEIVABILITY OF ZOMBIES**

*Poster*

My main argument against the conceivability of zombies is grounded in the considerations of what the zombies' epistemology might be. First of all, I assert that the zombie scenario necessarily includes three components: (Z-1) there is a possible world, which is the minimal physical duplicate simpliciter of the actual world; (Z-2) the creatures, zombies, are physically and functionally identical to the sentient human beings; (Z-3) the zombies lack any phenomenal consciousness. *Prima facie*, there is no immediate contradiction among these three components. However, I argue that it is not really coherent to put (Z-1), (Z-2), and (Z3) all together. As a result, if the zombie scenario is incoherent, it is not ideally conceivable. Therefore, according to Chalmers's analysis of the inference from conceivability to possibility, the zombie scenario is not a proper candidate to be metaphysically possible. My argument goes as follows: (1) If (Z-1), (Z-2), and (Z-3) are not coherent, the zombie scenario is not ideally conceivable. (2) If (Z-2) is conceivable, it is also conceivable that zombies have concepts and beliefs about their own internal states and the cognitive capacities to do reasoning, judgments, and etc. (3) If (2) and (Z-3) are conceivable, zombies can't be physically and functionally identical to us in all respects simultaneously. 2 (4) If zombies can't be functionally identical to us, it violates (Z-2). (5) If zombies can't be physically identical to us, it violates (Z-2). (6) If (4) or (5) are true, then (Z-1), (Z-2), and (Z-3) all together are not coherent. \_\_\_\_\_ Therefore, the zombie scenario is not ideally conceivable. In effect, the argument is achieved by (2) and (3), but they are not obvious. About (2). According to Chalmers's sharp distinction between psychological and phenomenal concepts, it plausible to conceive that zombies have beliefs, which are constituted by psychological concepts and the cognitive capacities

as ours, to make judgments. Further, to be functionally identical to us, zombies need to have schmenomenal states whose functional roles are identical to our phenomenal states to make judgments About (3). Let's consider the physical identity and functional identity between zombies and us separately. To be functionally identical, zombies have schmenomenal concepts and beliefs. However, if, as Chalmers suggests, phenomenal concepts and beliefs are constituted of phenomenal consciousness, the formation mechanisms of zombies' schmenomenal concepts and beliefs must be different from those accounting for phenomenal concepts and beliefs. To this point, we could ask whether zombies are really physically identical to us. Obviously, we do not have schmenomenal concepts and beliefs, and it is implausible to assert that we do have such mechanisms responsible for them. Further, according to (Z-1), there is no non-physical entity in 3 the scenario; hence the zombies' mechanisms in question must be physical. Therefore, zombies are not physically identical to us in all respects. Finally, if the reasons for (2) and (3) are convincing, my argument is sound. Therefore, the zombie scenario is not coherent and ideally conceivable.

**Keywords:** conceivability, epistemology, zombies

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**AROUSAL AND FRONTAL CORTEX: AN EXPERIMENTAL STUDY ANALYZING  
CONTINGENT NEGATIVE VARIATION (CNV) AND RELATED NEURONAL FIRING IN  
RATS AND MICE**

The present electrophysiological study on rats and mice investigated the role of frontal function in arousal, which is an important aspect of consciousness. Contingent negative variation (CNV) and accompanying neuronal firing were used as the index for arousal, and were measured when the animals received a conditioning paradigm with warning tone stimulation. Foot-shock was used as the unconditioning stimulus that was delivered to the floor grid one second after the warning tone. A tone with different frequency was also presented as the neutral stimulus that was not followed by the foot-shock. Warning and neutral tones were presented in a random order. The animal implanted with the chronic electrodes was placed in the conditioning chamber where it could move freely. EEG was recorded on the frontal, central, occipital and temporal cortices, and at various depths inside them, and was averaged to analyze CNV. Unit firing activity was also recorded in the frontal cortex using a minimanipulator attached to the skull. After several days of training, negative DC shift appeared during the interval between the warning tone and foot-shock. The negativity was less marked in response to the neutral tone. Topographical observation indicated that this CNV potential was localized in the frontal area. Intracortical field potential changes were also marked only in the frontal area. Unit firing recordings revealed that both activation and inhibition of neuronal activity accompanied CNV at the entire depths from the dorsal surface to the ventral part in the frontal cortex. These findings indicate that neuronal activity in a large part of the frontal cortex in rats and mice is modulated after the warning tone stimulation and possibly is involved in generation of CNV. Combination of neuronal activation and inhibition depending on the cell type would have a role in arousal-related potential generation. The frontal cortex may be engaged in arousal function in the way that its field potential becomes more

negative when the animal is aroused in response to warning signal. Arousal can be a key function of the frontal cortex in addition to various frontal activities including attention, memory and execution. The changes in brain potential and neuronal activity of the frontal cortex found in the present study may also be regarded as neuronal correlates of consciousness level modification.

**Keywords:** arousal, frontal cortex, CNV, neuronal firing, rat, mouse, conditioning, foot shock

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## **BEING THERE WITH IRONY**

When ironic utterance is seen as meaning something other than what is said, and when its pervasiveness is recognized, it raises a fundamental challenge for the idea of a theory of meaning, and it provides a powerful tool for examining the relation between consciousness and meaning. I will first defend an account of irony that eschews semantic or pragmatic accounts of 'ironic meaning'. I will then explore the implications of this discussion for the way we characterise the relation between consciousness and meaning.

**Keywords:** irony pragmatics meaning consciousness

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## **A NEW APPROACH TO THE PROBLEM OF CONSCIOUSNESS**

*Poster*

Consciousness issues within the context of modern neuroscience and related problems in contemporary physics are addressed. Current theories of consciousness look towards information theory, information integration theory, complexity theory, neural Darwinism, reentrant neural networks, quantum holism etc. to provide some hints. These theories fall short of the rigors and quantitative measures that are normally required of a scientific theory. The most perplexing philosophical conundrums of the "hard problem" and "qualia" that afflict modern neuroscience can be resolved by a deeper understanding of the physics of the very small (below Planck scale) and very large (at the boundaries of the universe) scales. The modern philosophy of mind proposes that consciousness is a higher-order mental state that monitors the first or base state possibly generated by the brain. This paper builds upon the early approaches to consciousness wherein it was proposed that the state of self-consciousness is not a separate, higher-order consciousness of a conscious experience, but represents a continuum of the lower order states generated by the brain experience. In such a larger context, many of the mysteries of physics and neuroscience can be explained with an integrated model. This paper proposes such an integrated model that provides a direct relationship between the physics concepts of space, time, mass, and energy, and the consciousness concepts of spontaneity and awareness. The observed spontaneity in natural phenomena, which include

human mind, is modeled as the higher order or universal consciousness. The integrated model explains the recent observations of the universe and demonstrates that the higher order consciousness is a universal rather than a biologically induced phenomenon. The neurobiological mind is shown to represent a subset of the complimentary states of the prevailing higher order universal consciousness in the form of the continuum of space-time-mass-energy. The proposed approach integrates spontaneity or consciousness into the existing and widely-accepted theories of science to provide a cohesive model of the universe as one wholesome continuum. The model represents the essential reality of different levels and dimensions of experience, both implicit and explicit, consciousness and matter, to be seen as equivalent and complimentary states of the same mass-energy known as the zero-point energy. The universal consciousness is shown to represent the spontaneous kinetic energy of the extreme kind, which is the ultimate complimentary state wherein everything in the universe is experienced as the zero-point energy field in a fully dilated space and time continuum.

**Keywords:** relativity, cosmology, universe, spontaneity

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## **BRIDGING BLOCK AND BUNDESEN: A FUNCTIONALISTIC ACCOUNT OF CONSCIOUSNESS**

*Poster*

Many scientists have tried to explain consciousness, especially in recent years. Somehow, however, consciousness always seems to elude systematic investigation due to some special nature that it possesses. That special “something” is what philosophers have termed qualia: why, for example, does it feel a certain way to see a red apple? This is what David Chalmers (1995) defines as the “hard problem” in the science of consciousness, contrary to the more “easy problems” of memory and perception. Ned Block (1995) has made a distinction between two types of consciousness – access consciousness and phenomenal consciousness – which is closely linked to Chalmer’s distinction between easy and hard problems. Access consciousness can be compared to short-term memory as described by William James’s (1880), whereas phenomenal consciousness is the experiential quality of a given stimulus – the likeness to use Thomas Nagel’s (1974) term. Within the field of attention research, Claus Bundesen (1990) has proposed a Theory of Visual Attention (TVA) which is a mathematical account of visual attention. TVA proposes a two-part stochastic model where 1) every stimulus is given a weight in terms of belonging to a certain visual category and 2) every stimulus enters a race for a place in a limited-capacity visual short-term memory store. Interestingly, there are many similarities between the descriptions of different TVA parameters, such as K (visual short-term memory capacity) and ? (visual template-matching), and Block’s distinction between access and phenomenal consciousness. In this paper, I propose that Block and Bundesen’s descriptions are very compatible and, in the way that TVA propose that an attentional selection mechanism plays a functional role for the organism, consciousness may be explained in similar, functionalistic terms. Whilst most people would agree that access consciousness plays a vital role in selection (e.g. Baars & Franklin 2003), fewer would seem to view phenomenal consciousness as a selection mechanism, regarding it instead as a mysterious “extra”

dimension to cognition. Some investigations in risk-taking behaviour, however, have shown that optimal solutions can be learned without any explicit access to the rules – only a phenomenal awareness of the right choices that cannot be explained in words (e.g. Bechara et al., 1994, 2000). In a different range of studies, moreover, Gregory Ashby and colleagues (e.g. 2005) have shown that subjects are able to learn tasks without appealing to any explicit or meaningful rule system; instead, they seem to solve the task based on a phenomenal feeling of what is the correct answer. Here, my claim is that if Block gives a sufficient definition of consciousness, and this definition seems to agree with a mathematical model like TVA that describes a selection system for the organism, then we may advance with the functionalistic view that qualia play a vital role in the selection of relevant objects. This still leaves many questions unanswered – like what is the relation between ?, learning, and experience – and still does not fully answer the question of subjectivity, but it may point towards a new and more fruitful path.

**Keywords:** Consciousness, Attention, Memory, TVA, Access, Phenomenal, Selection

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## **LANGUAGE IS IN PRINCIPLE INACCESSIBLE TO CONSCIOUSNESS. BUT WHY?**

It is a commonsense intuition that language without consciousness does not make sense. The use of language both presupposes and implies consciousness. We are unable to imagine what would be the function(s) of language both for the individual and society without the other faculty we also share as a species, namely consciousness. The claim in the opposite direction - that consciousness without language is hard to imagine or even is impossible - is also one that finds support among the professionals in the cognitive sciences and consciousness studies, especially if we speak about the so called secondary consciousness. The point of view that deviates in the most clearcut way from the commonsense intuitions is the one that finds feasible to maintain that 'language is in principle inaccessible to consciousness'. What makes the latter claim challenging is not so much the mere fact of its deviation from the commonsense belief. This view has the potential to become the most challenging one if it offers an explicitly formulated hypothesis why language MUST not be accessible to consciousness in a cognitive architecture that both presupposes and implies consciousness? In linguistics the champion in maintaining the counterintuitive view about the relationship between language and consciousness is Noam Chomsky (1990). He was criticized for his stance more on the basis of the commonsense logic, e.g., that it does not make sense to dissociate consciousness from language, rather than by getting down to his arguments for finding feasible to make such a claim. And he himself never wrote in a systematic way a justification why that must be the case (from what we know about language as a cognitive faculty). In approaching the 'why' question, the first step would be to explicitly formulate what is language as a faculty and how it differs, if indeed this is the case, from the other mental faculties, e.g. abstract thinking, perception, motor control of behavior, emotion, spatial cognition, etc. The second step would be to consider the question is consciousness a single phenomenon or a set of phenomena that do not necessarily share a set of distinctive features. If consciousness is not a single phenomenon but rather a disjoint set of phenomena, it remains to be shown to which of them it is possible to relate

language and in what way(s). Only during the third step we would be entitled to start to compare the characteristics of language and consciousness and find out what is the nature of the relationship(s) between them on the basis of the analysis and description of their structure and functions.

**Keywords:** language, consciousness

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## **RUSSELL: PANPSYCHIST, IDEALIST, OR NEITHER?**

We are currently witnessing a surge of serious discussions of panpsychism in the mainline analytic literature. In making the case for panpsychism, a number of authors rely on a view that Bertrand Russell made prominent. It is the thesis of the inscrutability of matter, the thesis that, contrary to common opinion, we know next to nothing about the nature of matter. All the information provided by physics concerns structural or relational features of matter. Physics tells us nothing about the intrinsic nature of matter. This, the panpsychist argues, opens up the possibility that matter is, in some sense, intrinsically mental. Given a number of other assumptions about reduction, emergence, and simplicity the panpsychist argument arrives at the conclusion that all things--even the ultimate particulars that compose everything else--have a mind. This is usually taken to mean that all things are sentient or have experiences of some sort. This view strikes many as absurd. And many seem to think that Russell himself embraced this conclusion. While a superficial reading Russell's texts may seem to confirm the panpsychist suspicion, I shall argue that Russell's way of "filling matter with experience" does not yield panpsychism. According to his view, we may conjecture that there is experience "in" every ultimate. But these ultimates sense or experience nothing, they are not experiencers, they have no mind. The experience that is "in" the ultimates is, instead, the raw material from which they are constructed. This suggests an idealist rather than a panpsychist picture: experience is seen as the ultimate or basic reality. This view also strikes many as absurd. So I shall end by arguing that Russell is neither a panpsychist, nor an idealist, but a neutral monist. Experience, according to Russell, is best understood as neither mental nor physical but as neutral between the two. Both mental and physical entities are then seen as constructions from these neutral elements. Those who judge panpsychism and idealism to be absurd will, I fear, be only too happy to extend the same courtesy to neutral monism. But even so there is some progress here: if one is going to think that Russell's metaphysics is absurd, it is best to think so based on a correct understanding of what his actual views were.

**Keywords:** panpsychism, idealism, Bertrand Russell, Galen Strawson, metaphysics, mind

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## **PHYLOGENETIC AMNESIA - A CONCOMITANT PHENOMENON OF THE EVOLUTION OF SELF-CONSCIOUSNESS?**

## *Poster*

Considering the transition from prehuman to human existence the german philosopher Hans Blumenberg designated fire usage as the central "differentia specifica" (1981). According to him the factors which determined the evolution of our species became unrecognizable and lost their function (p. 182). Resuming Blumenbergs thought this paper hypothesizes that fire usage was an adaption to the recurrent environmental condition "fire": An adaption which evolved as an increasing interplay between a necessary control of affects (a), a multitude of gradually collaborating cognitive abilities (b) and the development of sufficient communication/ interaction (c). The related evolution of the (pre)human brain may have led from functional to quantitative alterations of certain parts, especially of the prefrontal cortex, the central process of which may have been caused by the mesostriatal and mesolimbocortical dopaminergic system. In this way the dilemma of an interference between the evolving "neocortical" and the archaic "subneocortical locus of control" (c.f. Panksepp, 2005) may have been solved. Such a brain evolution could have introduced a permanent system perturbation (c.f. Rudrauf, & Damasio, 2005) - experienced by human individuals as self-consciousness. However, the competences mentioned above (achieved in the context of fire usage) may, presumably, have been transferred to many other fields of life. Indeed, this hypothesis broadens core ideas of Deacon's (1997), Donald's (2001) as well as Pinker 's (2002) and other authors accounts of the evolution of consciousness by outlining in detail the necessary individual and social developments during the early stages of the Genus homo. Alas, because of its procedural beginning an amnesia sensu Blumenberg seems to work on the human past. It may be clarified by a careful consideration of the stages of prehistoric fire usage and its influence on cortical characteristics attempted in this paper.

**Keywords:** fire usage, evolutionary psychology, self-consciousness, culture

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## **QUALITIES AND SUBJECTIVITY: WHAT IS CONSCIOUSNESS LIKE?**

*Poster*

It is tempting to think that phenomenal consciousness is a feature of the world the nature of which we know quite well. Phenomenal consciousness is, after all, just a matter of what it's like to be in certain mental states. And how could we fail to know quite well the nature of this phenomenon? Nevertheless, there is a quite a lot of disagreement, among philosophers and scientist, about what phenomenal consciousness is like; even what its distinctly "first-personal" features are like. In my talk, I shall address one such issue, namely whether phenomenal consciousness should be understood as "qualitative", or "subjective", or both. If one reflects on a typical conscious experience, it is common to find that it somehow involves a kind of "qualitative" aspect as well as a kind of "subjective" (or "for-meness") aspect. The qualitative aspect varies between different conscious experiences. For example, an experience of red and a sensation of pain involve different qualitative aspects. The subjective aspect, on the other hand, is naturally taken to be the same in different conscious experiences: an experience of red and a sensation of pain seem to involve exactly the same kind of subjectivity, or "for-me-ness". One

prominent instance of this kind of observation is Ned Block's (1995) distinction between "phenomenal consciousness" and "access-consciousness". A similar distinction is discussed by Levine (2001, chapt. 6) in terms of "qualia" and "subjectivity". Examples can be multiplied. Now, to say that a typical conscious experience somehow involves both a "qualitative" and a "subjective" aspect is compatible with different views about what, among these aspects, essentially belongs to phenomenal consciousness. I shall assume that phenomenal consciousness should be understood as a property -- or class of properties -- of some mental processes. Call this kind of property a "P-property". I shall also assume that every P-property is, at least, either (in some sense) qualitative or (in some sense) subjective. Assuming this much, there are seven logically possible views regarding what P-properties are like (with respect to qualitativeness and subjectivity): (1) All P-properties are purely qualitative. (2) All P-properties are purely subjective. (3) All P-properties are both qualitative and subjective. (4) P-properties come in exactly two kinds: some are purely qualitative, some are both qualitative and subjective. (5) P-properties come in exactly two kinds: some are purely subjective, some are both qualitative and subjective. (6) P-properties come in exactly two kinds: some are purely qualitative, some are purely subjective. (7) P-properties come in exactly three kinds: some are purely qualitative, some are purely subjective and some are both qualitative and subjective. In my talk, I shall identify where in this logical landscape some prominent views about consciousness are located. (For example, I take Block's (1995) view to be an instance of (1), and Levine's (2001) view to be instance of (3).) I shall also make some (inconclusive) advertisement for position (2), which is largely ignored in the literature, but which I believe is quite attractive.

**Keywords:** qualia, subjectivity, colour

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## INFORMATION AND CONSCIOUSNESS

*Poster*

According to many philosophers, a person is conscious of a property (an object or a state of affairs), if information about the property (the object or the state of affairs) is accessible to the person. For example, I am conscious of an annoying fly if I have access to the information that there is the fly. The consciousness that there is the fly can influence my action (I will perhaps take a slipper and kill the insect). If this view on consciousness is correct, than it seems that the nature of consciousness will be explained when the problem of the informational access will be solved. However, it turns out that there is a more fundamental problem begging for a solution. This is the problem of information itself. At first glance, it seems that the commonsensical belief that consciousness has something to do with getting information about the surroundings and about oneself is scientifically justified. Biologists write a lot about getting, processing, storing and sending information. I will present two representative examples of how the concept of information is used in life sciences which will show that information, naturalistically conceived is identified with biological signals. Within life sciences, the information cannot be identified with any semantic property. Such a property is attributed to a biological signal (be it a change of membrane potential or neurotransmitter release) derivatively by those scientist who want to make the results of their research more accessible. If any kind of mental information is identical to biological

signals, than for most of the time we are unconscious of this information. However, if there is a kind of mental information which is not reducible to biological signals, than it is basically impossible to understand how this kind of information could influence neural processes and behavior. There is no gap in biological processes that could be filled by information which exists independently. It all shows, that as a matter of fact, consciousness has nothing to do with getting information about anything.

**Keywords:** consciousness, information, emergentism, materialism

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## THE OUROBOROS MODEL

A proposal for a dynamic and self-organizing cognitive architecture is presented which implements one fundamental recursive algorithm in the form of an extended action / perception cycle. In the Ouroboros Model all concepts are stored in schemata, i.e. some type of frame structures, where features are linked together to form concepts. Any activation of a part triggers biases and expectations. In an iterative recursive loop a monitor is checking at discrete points in time how well these expectations fit with the activations subsequently actually occurring. Expectations can be violated, met or even exceeded, giving rise to negative or positive feed-back (emotions), respectively. This type of self-monitoring, a version of "quality assurance" named "consumption analysis", can be brought to bear with input from the outside, e.g. sensations from vision or haptic features, and also apply to activity / sensations relating to a self when the actor directs attention to herself. Whereas in previous contributions emphasis has been put on how this approach could accommodate different accounts of emotions, the focus will now be on how the proposed fundamental algorithm, constrained by its embodiment in brains, could explain the necessity to sleep and dream. During all activity the process of assignment between elementary features and compound concepts inevitably produces "leftovers", which accumulate with time. Sleep then is conceptualized as a specific and multifaceted housekeeping function for maintaining appropriate signal / noise conditions in the brain. Many at first sight rather diverse observed characteristics and proposed functions of sleeping and dreaming can be seen as consequences of efficient data processing according to the Ouroboros Model: extra and especially novel activities necessitate an increased need for sleep as the involved schemata are overflowing more, in particular when they are still developing for the same reason babies and children need more sleep than adults disturbing, threatening and unresolved issues would predominantly surface as dream content as their processing could not be concluded yet episodes which stir emotions, because expectations - e.g. norms - are violated, will preferably provide material for dreaming erasing erroneous associations and traces of expectations or of perceptions unaccounted for enhances correct and well established connections; the ensuing increase in signal / noise would make memory entries, checked for consistency by the consumption analysis, stand out and thus easier to retrieve and reactivate the variations in neuromodulator levels during sleep phases reported in the literature appear to be well in line with their proposed role in "cleaning up" the paradoxical activity of brain cells and areas during sleep seem to fit with the functions which they are assumed to perform during awake behavior

**Keywords:** algorithmic approach, cognitive architecture, emotion, sleep, integrative models, nonlinear dynamics

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## **VERIDICAL PERCEPTION AND HALLUCINATION**

In contrast to the sense data, adverbial and intentional theorists of perception, the proponents of the disjunctive theory of perception claim that veridical perceptions form a type of mental state which is different from that of the subjectively undistinguishable hallucinations corresponding to them. This is because the disjunctive theorist holds that a currently observed mind-independent object is a constitutive element of our visual experience, therefore one cannot be in the same type of mental state while the corresponding hallucination occurs, because while hallucinating, one does not perceive anything at all. The first part of my lecture will briefly deal with the issue of how the sense data, adverbial and intentional theorists of perception usually analyze the relation between veridical perceptions and the corresponding hallucinations. The second part of my lecture will make an attempt to explain how the disjunctive theory accounts for the relation of veridical perception to hallucination. I will try to show why the account provided by the disjunctive analysis is more plausible and promising than the rival theories.

**Keywords:** perception, hallucinations

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## **THE THEORETICAL AND PRACTICAL CONSEQUENCES OF UNCONSCIOUS EMOTIONAL INFORMATION PROCESSING IN THE HUMAN BRAIN**

*Poster*

The nature of unconscious human emotional information processing remains a great mystery. On the one hand, classical models view human conscious emotional information processing as computation among the brain's neurons but fail to address its enigmatic features. On the other hand, quantum processes (superposition of states, nonlocality, and entanglement) also remain mysterious, yet are being harnessed in revolutionary information technologies like quantum teleportation, quantum computation and quantum cryptography (Zeilinger, 2005). In this presentation, behavioral- and neuroimaging studies will be discussed that suggest a special role for unconscious emotional information processing in human

interaction with other objects. Since this is a new research field; we are only beginning to understand quantum information processing in the human brain (e.g. Hameroff, 1998, 2006; Koch & Hepp, 2006; Van den Noort & Bosch, 2006). This research field is important since it could have major theoretical consequences in the way we understand quantum physics and information processing in the brain (Van den Noort, Hugdahl, & Bosch, 2005). Moreover, it could lead to new information technologies and applications. For instance, it might give new insights on human consumer behavior (e.g. Dijksterhuis, 2004; Dijksterhuis, Bos, Nordgren, & Van Baaren, 2006), and lead to new commercial strategies for multinationals. References: Dijksterhuis, A. (2004). Think different: The merits of unconscious thought in preference development and decision making. *Journal of Personality Social Psychology*, 87, 586- 598. Dijksterhuis, A., Bos, M. W., Nordgren, L. F., & Van Baaren, R. B. (2006). On Making the Right Choice: The Deliberation-Without-Attention Effect. *Science*, 311, 1005-1007. Hameroff, S. R. (1998). Quantum computation in brain microtubules? The Penrose-Hameroff `Orch ORS<sup>A</sup> model of consciousness. *Philosophical Transactions Royal Society London A*, 356, 1869-1896. Hameroff, S. R. (2006). The Entwined Mysteries of Anesthesia and Consciousness: Is There a Common Underlying Mechanism? *Anesthesiology*, 105, 400-412. Koch, C., & Hepp, K. (2006). Quantum mechanics in the brain. *Nature*, 440, 611. Van den Noort, M. W. M. L., & Bosch, M. P. C. (2006). Brain Cell Chatter. *Scientific American Mind*, 17(5), 4-5. Van den Noort, M. W. M. L., Hugdahl, K., & Bosch, M. P. C. (2005). Human Machine Interaction: The Special Role for Human Unconscious Emotional Information Processing. *Lecture Notes in Computer Science*, 3784, 598-605. Zeilinger, A. (2005). The message of the quantum. *Nature*, 438, 743.

**Keywords:** Consciousness; Quantum Physics; Unconscious Information Processing; Emotions; Consumer Behavior

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## **CONSCIOUS COMPARISONS AND SUBLIMINAL ADAPTATION IN EMOTIONAL FACE PROCESSING**

Conscious category- and identity judgments in face processing are thought to be supported by information carried in the ventral stream of visual cortex. However, automatic or implicit processes also play a role in the processing of face stimuli, particularly their emotional content. Subcortical areas, including the amygdala, show strong habituation in exposure to emotional faces, even when stimulus presentation is below or near conscious threshold. In our first experiment, we examined the effect of subliminal, masked stimuli on the subsequent processing of consciously perceived stimuli, within the paradigm of the face adaptation aftereffect. The aftereffect we investigated was obtained when subjects categorized faces that were ambiguous along the dimension of emotion. Any effect of the backward masked stimuli might reflect the contribution of automatic processes below the threshold for

consciousness. We found such aftereffects to be obtained with a backwardly masked prime of 22 ms, smaller than those induced by a 500 ms prime but comparable to those induced by prior exposure. Our results showed that aftereffects do not depend wholly on conscious processing. The subliminal aftereffects may in part be contributed by adaptation of subcortical pathways, e.g. amygdala. In a second experiment, we explored whether the aftereffects may be mediated only by cortical processing. The relative contributions of cortical regions and subcortical structures, both known to be involved in emotional face processing, may depend on the spatial frequency content of the stimuli. It is hypothesized that the amygdala and connected subcortical systems preferentially process low spatial frequency (LSF) information, while the cortical regions, such as the fusiform face area, preferentially focus on high spatial frequency (HSF) information. We compared aftereffects from the same adaptor in LSF and HSF channels and in unfiltered faces, and found the adaptation to be smaller in the LSF channel, and uncorrelated within subjects. This evidence suggests that adaptation occurs in multiple neural populations, at least one of which may be within a LSF-sensitive subcortical-pathway.

**Keywords:** adaptation, priming, face processing, emotional processing.

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## **QUANTUM BRAIN OR CLASSIC BRAIN, A REVIEWS**

*Poster*

Physics approaches nature from two point of views, classic and quantic. Conversion from world's classic to a quantic conception has developed expectative and questions about world's reality. Science advancement has played an important role in brain's interpretation from classic and quantic side. This has enriched a growing debate over information science, computation and cognivite sciences consequences. This work reviews possible approaches from classic and quantic physics to description and modeling of the brain, especially from Rodolfo Llinas, Roger Penrose y Henry Stapp points views, allowing to establish enough criteria about how the world and classic and quantic physics are seen.

**Keywords:** classic,quantic, modeling and brain

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## **REPRESENTATIONALISM RECONSIDERED**

*Poster*

The anglo-saxon phenomenological approaches to the problems of consciousness seem to end up dealing

with questions of representationalism. Representationalism involves some type of 'higher orderness'. The main issue about representationalism is to give an account of this feature (van Gulick's HOGS, for example), i.e. to provide an explanation of it by which one may avoid the logical traps of dualism (see for instance the problem of an infinite regress). Possible solutions to the metaphysical questions raised by dualism recently make it more and more fashionable. However, these approaches to consciousness' 'what is it likeness' suffer from deficiencies coming from the term 're-presentation' (see for instance Uriah Kriegel's attempt to revive some of Hegel's ideas about phenomenology of mind - 'representation of' and 'representation to'). Kriegel in one of his papers (*Consciousness: Phenomenal Consciousness...*) dedicates a large space to deal with Ned Block's distinction between phenomenal and access consciousness. The distinction is based of course on functional difference between the two 'entities'. The first one is something to which the explanatory gap apples, meaning that it represents a subjective feature that is simply not accessible, or maybe it is, but the subjective residua makes it almost unusable for any further reasoning, or conclusions about the very nature of phenomenal consciousness. In short: subjectivity is a specific component of P-consciousness, a component that is totally irreducible. On the contrary, access consciousness "is poised for free use in reasoning and for direct 'rational' control of action and speech" (Block 1995: 382). The consequence of this conceptual difference is in fact a quite harsh criticism against cognitive sciences. What is studied by cognitive sciences bears no consequence whatsoever on understanding what P-consciousness is. The phenomena in question is either belonging to access consciousness or, because of the irreducibility of subjectivity, remains closed in itself. In order to accept this consequence we are simply pushed to accept that - as Kriegel points out - that the distinction is not only conceptual, but A- and P-consciousness really represent two different properties of consciousness. Kriegel's argument against the property distinction lists cases of subliminal and habituated perception, and also the fact that accessibility has a dispositional character, meaning that access consciousness should not necessarily be accessed (for reasoning or action purposes), but it certainly has to be disposed to being accessed. Cases of subliminal, or habituated perception also present this sort of dispositional character, proving how insufficient is Block's distinction. Now, if we accept this proof we are left with a mere conceptual distinction between A- and P-consciousness, which may be functional in certain cases, but of course it does not present some 'real' difference between two properties of the otherwise uniform consciousness. The other consequence of this idea is that subjectivity IS a core component of consciousness, and because it is not an irreducible entity, it also belongs to the sphere called Aconsciousness. But how can this statement be made plausible? Reasoning and action (according to the logical scheme used in the process) presupposes a categorical base: "... dispositional properties do require categorical bases, that is, non-dispositional properties whose instantiation explains why the dispositional ones are instantiated . (...) When a mental state is access-conscious, it must also have a categorical property in virtue of which it is access conscious." (Ibid.) Let us turn back for a moment to the subjective feature of our experiences. Subjectivity is indeed a core component of conscious experiences, meaning that experiences have not only a 'to-me'character to them, but also something that is best described by some sort of 'for-me-ishness' (the distinctive feature of what is it likeness is exactly this component). As Kriegel puts it: "Happily trivially, for-me-ness is a component of what-it-is-like-for-me-ness." One of the consequences of this conclusion is that the job of cognitive scientists has been saved, just like the honor of this job. Well, but not only. Subjectivity appears as being a 'categorical base', a nondispositional property, or at best a set of non-dispositional properties. On the basis of a previously already mentioned paper we can add that subjectivity may be in

fact equaled to intransitive self-consciousness. In spite of the fact that 'categorical' doesn't or doesn't necessarily mean 'conceptual', and in this sense it is further from being charged with transcendentalism, the whole structure bears significant traces of a transcendentalist approach. Subjectivity as a non-dispositional property, a categorical base, in other words the intransitive self-consciousness still reminds us too much of a transcendental ego. However, one should admit that the very idea of Kriegel's argumentation is to work out a self-representational model of consciousness, which means that representations always have to them a 'for-me-ness', and so they represent the subjective feature of consciousness in such a way, that this feature becomes open to cognitive scientific approaches. Speaking in methodological terms, reports of this sort of access will involve something that is called 'contrasting phenomenology', meaning a comparative method, by which we may grasp the subjective feature as a difference between reported and so accessed forms of experiences. This method presupposes a feature-like concept of subjectivity, which then can be grasped and isolated from other features appearing and building up the complex of experiences. Following this line of thoughts we may end up having repeated a lightly different form of dualism. In other words, there is a distinction left unnoticed in Kriegel's argumentation: the methodologically necessary difference between what is represented and the entity representing, although we have to admit that in reportable, i.e. conscious experiences subjectivity is actively present as a categorical base (subjectivity appears as a 'for-me-ness' in every conscious experience). What I propose as a solution for the problem still present in an otherwise plausible and apparently elegant solution to the problem of subjectivity, may seem at first a minor conceptual difference: to skip the 're' in 're-presentation'.

**Keywords:** representation, representationalism, presentationalism, consciousness, subjectivity, higher orderness, same orderness

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## THE CRUCIAL ROLE OF THE PRESENT FOR UNDERSTANDING CONSCIOUSNESS

The phenomena of consciousness and of experiencing a present are most closely interrelated. It is impossible to conceive a form of consciousness that would not imply experiencing a present, and vice versa. But the phenomenon of the present is highly marginalized in modern science. The classical, linear-sequential concept of time on which most of modern science is based reduces the present to a definitional point that separates past and future. Even when in psychology the experience of the present is addressed, it is usually seen as a counterfactual temporal integration platform, i.e., the subjective experience of an expanded present is interpreted as an inaccuracy. This view is strongly supported by the fact that in physics there seems to be no place for the present whatsoever. It is shown that this elimination of the present works well for classical and relativistic physics, but it is too restrictive for quantum physics. In general, the virtualization<sup>T</sup> of the present as a temporal mode in its own right has detrimental consequences for understanding all those phenomena that are essentially self-referential and thus autogenetic. Genuine indeterminacy, in-evitable in quantum physics, implies that something

genuinely novel takes place. As the appearance of something genuinely novel cannot take place in the past nor in the future, it does require a significantly stronger notion of the present, i.e., one in which something can take place. It is shown how a richer categorical framework can be developed that allows to deal with genuinely self-referential and autogenetic phenomena. It is also shown that from this new framework the classical, linear-sequential notion of time can be derived as a special case. This is not to say, that the phenomenon of consciousness is a direct consequence of quantum physical processes in the brain. This would be a conceptual short cut. Instead, it is argued that both consciousness and the state reduction in quantum physics are irreducibly self-referential and thus autogenetic phenomena that can only be addressed adequately in a richer categorical framework which includes a crucial role for the present. T-Online eMail The Crucial Role of the Present 1

**Keywords:** Consciousness, present, quantum theory, autogenetic processes

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## **BEYOND PSYCHO-PHYSICAL DUALISM: A CASE FOR INTEGRAL PSYCHOPHYSICS**

Study of consciousness is facing the so-called psycho-physical problem, concerning the relationship between the 'material' and the 'mental.' But the problem seems to be ill-posed: (1) from a monist point of view, postulating the ontological primacy of one of the alleged 'domains,' the 'relation' in question reduces itself to a mechanism producing an illusory appearance of the other domain; (2) in a dualist perspective, putting two independent domains of reality on the same footing, there is no place for a relation binding the phenomena in the two realms, unless hosted by one of the domains (which would thus obtain the primacy status), or by a primordial 'third' domain. The latter option--the material and the mental as two aspects of a tertium quid--, which can be traced back to G.Th. Fechner's speculative philosophy, has recently received increasing attention and sympathy, but no really working theory elaborated on this basis is known as yet. We advocate a different perspective, based on a radical extrapolation of Fechner's idea of psychophysics. Fechner believed in psycho-physical laws revealing the fundamental unity of the material and the mental, as postulated by his dual aspect world-view. E. Mach rejected the notion of an unobservable tertium quid, but retained Fechner's emphasis on functional relations between and within phenomenal domains, and conceptualised the 'material' and the 'mental' as two relational structures connecting the same psycho-physically neutral 'elements' (similar to W. James' 'pure experience'). Unfortunately, Mach's obscure manner of expression, substituting psychologically conceived 'sensations' for the essentially neutral 'elements' and his critical distance from the mainstream of modern physics made him a weird genius, whose project of truly 'phenomenological physics' remained a discontinued torso. While contemporary psychophysics has become an auxiliary discipline serving experimental psychology or neuroscience, the original themes put forth by Fechner and Mach are still available to further development. Here we make a case for 'integral psychophysics,' defined as mathematical study and modeling of structures and dimensions of pure experience, among which the 'physical' and the 'mental' relational nexus would be special cases (Mach's conjecture). There are some parallels between the programme of integral psychophysics and studies on foundations of natural

science: algebraic models of measurement and of 'meaningful' forms of laws of Nature, studies of axiomatic foundations of physics and its empirical grounding, 'protophysics'. Integral psychophysics thus should not be part of physics or psychology, but rather a propaedeutic discipline to them (envisaged already by F. Gonseth as a 'first chapter of science'). The aim of integral psychophysics is not to solve the psycho-physical problem, but rather to eliminate the problem as non-productive for the positive knowledge of the experienced world. Clearly, the so-called 'explanatory gap' is avoided as well, since there is no place for causal explanation (via material causation or otherwise) in the phenomenological concept of knowledge consisting solely of functional relations.

**Keywords:** Psychophysics, Dual-aspect theory, Neutral monism, Phenomenological physics

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## **MOLECULAR MECHANISMS OF CONSCIOUSNESS(WAKEFULNESS): GABA-A AND ANAESTHETICS**

Exploring the potential molecular mechanisms of consciousness is a somewhat ignored pursuit. Nevertheless, reductionism does have a significant contributory role to play in the comprehensive attack on the mechanistic understanding of consciousness. Accordingly, we sought to develop an atomic-level model of the gamma-aminobutyric acid type-A (GABA-A) transmembrane channel protein and to exploit this model to understand how general anaesthetic agents, such as propofol and etomidate, exert their mode of action. Investigating the molecular basis of consciousness-interrupting molecules is challenging due to the wide structural diversity amongst known general anaesthetic molecules and due to the unresolved structure of their principal target - the GABA-A channel. The GABA-A receptor is a member of the Cys-loop ligand gated ion channel superfamily and thus consists of pentameric subunits arranged around a central ion-conducting pore. Since there is no experimental structure for the GABA-A channel, we devised an *in silico* model of this protein using a comparative modelling strategy. The electron microspray structure of the homologous nAChR protein from *Torpedo Marmorata* was used as a template for the transmembrane segments, while the crystal structure of the homologous AChBP protein from *Lymnaea stagnalis* was used as a template for the extracellular segments. A multiple sequence alignment was performed and the target sequences were then mapped onto the corresponding template 3D structures; this refinement procedure permitted the creation of an initial open-pore model of the GABA-A channel protein. The transmembrane helices were then rotated to produce a model consistent with existing transmembrane hydrophobicity data. The extracellular loops were then refined using a quasi *ab initio* loop modelling algorithm. Finally the overall model was geometry optimized using energy minimization calculations at a molecular mechanics level of theory. The resulting *in silico* model of the GABA-A protein was then subjected to extensive computer-aided surface analyses to identify putative binding pockets. Two distinct binding cavities were identified within the beta-2 subunit of the transmembrane domain. The first, located near the centre of the alpha-helical bundle, contains Asn265 (TM2), which is essential for functional modulation of the protein by etomidate. The second,

located near the membrane-extracellular interface, is capped by Met286 (TM3), a residue involved in the propofol binding site. Potential interactions of etomidate and propofol with other side-chains were also identified. In conclusion, the GABA-A protein is a crucial macromolecule in understanding the molecular basis of the "wakefulness" component of human consciousness. Etomidate and propofol are small molecule probes that enable an enhanced functional understanding of GABAA protein action. Using diverse molecular modelling strategies we have devised models to explore the actions of the GABA-A protein, etomidate and propofol. Such models are of utility in the ongoing exploration of the molecular mechanisms of consciousness.

**Keywords:** Molecular mechanism, GABA-A, anaesthesia, propofol, etomidate

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## **METHODS AND STRATEGIES FOR STUDYING THE EVOLUTIONARY FUNCTION OF CONSCIOUSNESS**

Many hypotheses for an evolutionary function of consciousness have been made, often for specific types or aspects of consciousness. Understanding why consciousness has arisen during evolution will be helped, in part, by an assessment of these various hypotheses. A significant portion of them seems to be based exclusively on the inspection of one's own consciousness, which can be problematic for finding the evolutionary function of consciousness because "Nature does not tell us what our organs are for" (Barlow, 1980, p. 82), and they frequently lack support. This paper therefore reviews the methods and strategies that have been used for the generation and development of hypotheses for an evolutionary function of consciousness, and in particular for supporting them. The aims of the paper are both to reveal the methods and strategies available for investigating the evolutionary function of consciousness and to provide a basis for evaluating and discarding, developing or integrating existing hypotheses where appropriate. The methods and strategies for studying the evolutionary function of consciousness can be usefully grouped into four approaches according to their aims, which are (1) showing that consciousness has a function and (2) identifying its current function, along with the evolutionary equivalents of (3) showing that consciousness is an adaptation and (4) identifying its evolutionary function. The first approach, which is concerned with arguing against epiphenomenalism and for the causal efficacy and usefulness of consciousness, will not be dealt with here. Instead, different methods and strategies which have been employed in studying the current function of consciousness will be presented. These include lay and specialist reasoning based on introspection, Baars's contrastive analysis with several areas of application and Flanagan's natural method. Turning to evolutionary considerations it can be argued that consciousness is an adaptation, independent of the possible function it may have. 2 Apart from the basic reasoning that underlies this claim, examples of comparative and complexity arguments that have been used to support it will be given. Finally, several methods and strategies for investigating the evolutionary function of consciousness will be discussed. Among them are just-so stories, reverse engineering, clues from the evolution of the brain and its structures, and analogies to ontogenetic development. In addition, I will suggest methods from evolutionary psychology which have not yet been applied to the study of the

function of consciousness but which could potentially yield valuable insights and evidence in this area. Combining the results of the multiple methods and strategies in the aforementioned four major approaches to finding the evolutionary function of consciousness could bring us a significant step further toward an evolutionary explanation of consciousness.

**Keywords:** consciousness, evolution, adaptation, function, method, theory evaluation

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## **FRACTALITY PROVEN ELECTRIC MECHANISM OF CONSCIOUSNESS IN EEG**

*Poster*

We articulate two potential revolutions in neurofeedback: 1. COHERENCE measure for EEG based on new CEPSTRUM (double FFT), 2. Golden Ratio vs Octaves in EEG optimized "BlissTuner" Neurofeedback. We review -4 precedents in the literature: Golden Ratio in EEG correlated to Peak Experience / Peak Perception / Peak Performance. We developed BlissTuner tool to offer golden ratio EEG training. Examples / Animations presented. We developed Fractal Synth software - to prove why golden ratio (charge) wave forms produce maximum constructive interference. This supports hypothesis that fractal and non-destructive charge compression is a primary mechanism of consciousness. Related evidence presented : fractal non-destructive charge compression as electric cause of gravity, and mass creation. Bill Tiller ("Conscious Acts of Creation") proved attention compresses charge. We simply prove how: Fractal and Non-Destructive Compression - optimized by Golden Ratio in EEG. Self organization out of waves for charge- requires constructive compression. Einstein postulated the infinite non-destructive compression (of charge) was the electrical solution to gravity and the unified field. By adding what he did not know: a) that the only infinite (charge) compression is fractal , and b) that Golden Ratio is the solution to fractality (constructive compression). Software proof- Fractal Synth. see references: [www.soulinvitation.com/braincoherence](http://www.soulinvitation.com/braincoherence)[www.soulinvitation.com/fractalfield](http://www.soulinvitation.com/fractalfield) [www.soulinvitation.com/matrix](http://www.soulinvitation.com/matrix)[www.soulinvitation.com/fractalvacuum](http://www.soulinvitation.com/fractalvacuum)

**Keywords:** Fractality, Implosion, Consciousness, EEG, Brainwaves, Golden Mean

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## **ON THE NECESSITY OF BODILY AWARENESS FOR BODILY ACTION**

Bodily awareness appears to play a phenomenologically and conceptually central role in our ordinary experience of bodily action. However, it is unclear in what sense bodily awareness is central to bodily action. In this paper, I consider an influential line of thought - due to Brian O'Shaughnessy - that bodily awareness is necessary for bodily agency. I will argue that whilst O'Shaughnessy is correct in thinking that there is an intimate connection between bodily awareness and bodily action, recent work in

cognitive neuroscience points to a less direct connection than the one he envisages. O'Shaughnessy argues that control of bodily actions is impossible in the absence of bodily awareness because it provides an ineliminable source of feedback. He challenges the objector to explain how bodily action as we know it is possible in its absence: How could one reach out and grab something if one did not have proprioception and kinaesthetic sensations to tell one about the position of one's arm and the way it is moving? Without the feedback that we receive from bodily awareness, how might we correct for mistakes in the direction of movement? The problem is worse still for cases of more complex intentional movements - how can one walk without bodily awareness? It appears then that without bodily awareness we would have no ability to control our actions. Whilst I agree with O'Shaughnessy that there is an intimate connection between feeling our limbs 'from the inside' and our power to act directly with them, I am sceptical that the role he ascribes to bodily awareness in control of bodily action is the correct way to understand this intimate connection. I discuss three kinds of empirical counterexamples to his claims. (One) Studies of deafferentated patients. Recent studies of deafferentated patients appear to show that we may learn how to compensate for loss of bodily awareness to some extent by trying to maximise our use of other cues from outer perception and lessons from past experience. (Two) Brainwave technology. It is now possible to perform physical actions using brainwaves. This technology has, e.g., been exploited to create brainwave controlled joysticks. Whilst 'brainwave actions' are not bodily actions, and are extra-bodily, they are physical actions. These cases put pressure on the idea that basic physical action requires one to feel the target object 'from the inside'. (Three) Online control. Finally, even if we restrict ourselves to central cases of ordinary bodily action, such as mundane arm raisings and the like, it appears that (a) most instances of these are accomplished automatically and without constant bodily awareness and (b) even when movement involves bodily awareness, the online control involved in fine-tuning actions is mostly non-conscious. This, unsurprisingly, is due to the workings of various sub-personal mechanisms which monitor the state of our body and underwrite our ability to act. The upshot of these points is that O'Shaughnessy's claim that continuous conscious bodily awareness is necessary for bodily action cannot be unrestrictedly correct.

**Keywords:** bodily awareness, agency

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## **A NEW APPROACH TO CONSCIOUSNESS STUDIES**

*Poster*

Frequently it is suggested that mental effects related to the brain and qualia depend directly on quantum effects. This obviously relates to other ideas such as qualia and various theories such as computationalism. There are real problems in terms of things like orders of magnitude, with conventional attempts like those of Stapp and Penrose. It would probably be easier if many-worlds interpretation could readily describe quantum brain or consciousness effects directly but at this time there would be deep fungibility problems with some expositions of this idea. My approach uses category theory and a McTaggart A series as well as the conventional B series effectively used by Deutsch, Bohm and Penrose. This sounds philosophically and physically more realistic but at the present state of the art

it may be required that the A series is a proper class. My theory will relatively easily link with any physically meaningful and duplicable NDE results which may be provided by NDE experiments like those of Fenwick and Grayson and has many other advantages. Dream precognition results and ESP are very much denied by sceptics and on the whole by physicists. At this time I see no evidence whatsoever of ESP personally, but dream precognition ideas raise a few thoughts even if largely seemingly disproved as such, probably correctly by such as Blackmore. On dreams I certainly have not obtained precognition as normally defined but noted apparent peculiar effects not dissimilar in superficial appearance. In psychology it is necessary to remember that many conclusions have been drawn and are repeatable from work like that of Strogatz. I favour dynamical systems psychology somewhat along the lines of Lange, but requiring an A series approach. By adding some ideas due to Stickgold and Hobson, I have already obtained preliminary surprising results. Presently I am proceeding to look at a structure somewhat along the lines of the Sprott work on psychology. I believe that through ignoring the McTaggart A series or trying to subsume the A series to within the B series, important opportunities are being lost and that early calls on quantum theory may be being made, when complex system theory could be more directly appropriate.

**Keywords:** qualia, brain, consciousness, McTaggart

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## **DEVELOPING A FRAMEWORK FOR COMMUNICATING EXPERIENCE**

*Poster*

Communicating inner experiences represents a tremendous challenge in education. External "physical" characteristics are relatively easier to communicate as objects can be reduced to more primitive components to which labels (syntax) and meaning (semantics) are attached and shared. The repeatability nature of physical-world phenomenon makes it easier to share experiences and create the "common semantic base" (dictionary) necessary for communication. Modern science is constructed upon languages such as mathematics and logic that provide formal mechanisms for describing relationships and models between components. Personal "inner" experiences such as those encountered along the path towards inner discovery, however, are much more difficult to communicate without a common semantic reference. Without a common semantic reference, words become simply labels. Each person's "path" or life experience is unique and uniquely interpreted. Each moment in time is a new and unique experience. Lacking a common semantic reference presents a challenge for those interested in developing processes that facilitate personal evolution and growth. Although perception of the physical world through the senses (e.g., see, hear, smell, touch, taste) provide a rich palette for creating experiences that can be referenced and shared, the meaning of these experiences is subject to the interpretation. Art, media (including poetry and literature), ritual, and religion provide references which attempt to communicate inner experiences through metaphor. However, these often rely upon perceptual and subjective interpretations based upon the previous experiences of the viewer/reader/experiencer. The "map" is often confused for the "territory" and subtleties in meaning are not fully appreciated. This paper presents our

work towards developing a framework for communicating experience. The purpose of this framework is to facilitate personal evolution and lifelong learning, a process of cultivating greater understanding including intellectual understanding (mind), emotional understanding (empathy), and direct awareness (being).

**Keywords:** experience, language, framework, emotions

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**MADE OF PLASTIC AND ELASTIC: ON THE PLASTICITY OF HUMAN EMBODIMENT**

*Poster*

Cognitive science has traditionally treated the mind and its contents as disembodied. Until fairly recently, we have treated the mind as something that can be examined independently of the body. In response to this perspective there has evolved a newer, embodied form of cognitive science predicated on the underlying assumption that we all share something bodily - that there is some sort of standard body that guarantees our new theories of meaning and experience are universalizable across human beings. Embodied cognitive science seems to have replaced Chomsky's universal grammar with a universal body. However, this paper will demonstrate that there is no such standard body. Instead, what our bodies share is plasticity over a large range of abilities, both motor and sensory. I examine evidence from both phenomenological accounts of felt bodily experience and neuroscientific studies of brain and bodily plasticity. Rather than a standard, universal body, we see that bodies are non-trivially different, and yet each is experienced as a regular, whole body. There are enormous implications for this work, especially within ethics and epistemology. I will examine some of the epistemological implications through the work of Lakoff and Johnson on embodied concepts. They argue explicitly that we have a shared universal body, and that this enables such processes as conceptualization and rationality itself. But, if we do not share one sort of body, then rationality is no longer one classical category, with a set of necessary and sufficient conditions for inclusion, but is more appropriately (and radically) described by a radial category. Hence, when we allow for all of the implications of embodiment and recognize that there is no such thing as a universal body, embodied cognitive semantics brings previously unacknowledged and radical concepts of rationality and conceptualization, which, though messy, seem accurate.

**Keywords:** cognitive semantics, conceptualization, rationality, embodiment

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**MOTION-EMOTION METAPHORS IN ENGLISH, SWEDISH, BULGARIAN AND THAI:  
EVIDENCE FOR CONSCIOUSNESS-LANGUAGE INTERACTION**

Wittgenstein's so-called "private language argument" states that the meaning of linguistic expressions can not be determined by their linking to "private experiences" since linguistic meaning is normative, in the sense of conforming to public criteria of correctness and (radically) private experiences lack such criteria. This seems to imply that the meaning of expressions such as pain and joy can not be exhaustively determined by the corresponding states or processes of consciousness, but must at least be co-determined by intersubjectively observable behaviours and contexts in which these expressions are appropriately used. Notice that this formulation of the argument does not deny the relevance of subjective experience, which may still be a necessary condition for the meaning of "mental predicates"; it simply states that such experience is not sufficient. Indeed, one can argue that consciousness serves as a ground for language, without denying that language adds a new dimension to it in providing a public representational system for communication and thought. I will present a cross-linguistic and cross-cultural study of the meaning and use of expressions (above all verbs) such as move which can refer both to different kinds of motion situations and to emotion processes and states in four languages: English, Swedish and Bulgarian, and Thai, with the goal of evaluating the following alternative positions: 1. Universalism. If the motion-emotion metaphors in the four languages largely overlap, that would lend support to theories which propose to ground linguistic meaning in pan-human bodily experiences (and neural "pre-wiring"). This is the case in Lakoff and Johnson's Conceptual Metaphor Theory, according to which the meanings of non-concrete expressions are based on (largely) universal "primary metaphors". 2. Strong language-dependence. If, on the other hand, the metaphors vary extensively between the languages this would give credibility to the position that the meanings of emotion expressions are derived primarily by their role in the linguistic-conceptual schemes provided by the languages themselves. 3. Consciousness-language interaction. Emotional experiences are "private" and subjective (an aspect of affective consciousness) but when speakers experienced the need to talk about them, they (more or less) consciously analogized between these and intersubjectively observable phenomena such as motion situations, on the basis of shared gestalt-like structure, e.g. describing disappointment as "my heart dropped". With time, these became conventional metaphors, shaped by cultural beliefs and the structure of the language itself. The prediction from such an interactionist position is therefore that there will be a degree of overlap in the meaning of conventional (e)motion expressions but that this will be higher for more closely related languages and cultures (e.g. English and Swedish) than for more distant ones, such as Thai. The results of the study conform best with this final position.

**Keywords:** motion, emotion, metaphors, universals, language, culture, variation

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