

FOR A COGNITIVE ONTOLOGY OF MODES OF EXISTENCE OF PSYCHIC RESOURCES

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« Je touche mon horizon de tous les côtés » (I reach my horizon on all sides).
Théophile Gautier, *Mademoiselle de Maupin* [1834], Paris, Gallimard, 1973, p 84.

What is primitively specific (*oikeion*) to the human living is its own constitution (*sustasin*) and his
consciousness of having it (*suneisdesin*) as it is not likely that nature makes human living a foreigner for
himself. Chrysippe, « Des fins », Diogène Laërce, VII, 85.

Abstract : Natural and Artificial model Theory of subjectivation of entity, hypothesizes that the intelligence of a complex adaptative system comes from the activity of a functional cognitive module that imputes different property classes to the different interacting entities, including subjective and psychic resources properties. Psychological functions or psychic resources are made of biophysic, cultural and social as well as personal constructions, they are represented, selected, recovered, learned, activated or inhibited. We describe basic structures of the modules that assumes, at a high cognitive level, the subjectiving entity adaptation to internal and external variations of its living environments.

1. What we mean by cognitive (psychology) or conceptual (epistemology) ontology is the description of concepts that are needed to account for psychic existence of psyche to model modes of appearance (phenomenology), existential causes, and effects of psychic resources representations. Epistemic, doxological, social, cultural or individual knowledge or symbolic representations of psyche have a psychological existence. These resources are one part of the properties assigned to the entities; they inform appearances, experiences, directions of self existence. A subjectiving entity have the property to represent itself (cognition and meta-cognition of reflexivity) and to represent other subjectiving entities (transitivity and symmetry of theories of mind) or non subjectiving ones. A single model should allow to investigate the conceptual continuity and mutual influences between epistemic and doxological models. In the psycho-

logical meaning of C.S. Peirce's pragmatism, the conceptual ontology engages some modes of relation between individuals and their living worlds because « their meaning of a concept (...) is purely and simply [ou bien plain and simple] the set of sensitive and conceivable effects of this concept. Thought could not be reduced to action; but it is nevertheless inseparable from the action designed and finalized » (Claudine Tiercelin, 2011, p 36). « Modes of existence » are, not only representations of the qualities, quantities, values, usages and design of psychic resources, but also oriented vectors, enriched with self and others experiences. We join psychology, epistemology and ontology in that “ a fact is a familiar theory » (Ignace Meyerson, 1954). A knowledge could not be thought independently of the realities it informs, otherwise it dies for unsuitability. Our hypothesis pursues Ignace Meyerson's hypothesis [Varsovie, 1888 - Paris, 1983], (Meyerson, 1948). Our mentor in comparative historical psychology considers the subject, the person, as a psychic function, as a social human work, built, but still under construction all the way along biological and cultural individual or collective histories. Our models aims to define basic fundamental units of subjectivity imputed to a given entity, including individuals. Contemporary neuroscientific approaches describe functional biological structures (World 1) that produces high level psychological functions which are the emotional conative and cognitive states and processes like conscious states (attention and awareness, dream, sleep, coma), emotional states (happiness, pain etc.), voluntary and intentional states (control, containment), cognitive states (symbolisation, language, reasoning, creativity, etc.), in the three time-step memories, in self and other perceptions (proprioception and exteroception), in communications, etc. The conceptual work of the psychologist is to describe mental states (World 2) as they are experimented by the subjects themselves, without bias or epistemic prejudice relative to their possible causalities. Psychic functions or resources are dimensions, complex factors, vectors or tensors of subjectivation of entities, that can be studied according to the three phenomenality types differentiated by epistemology. Karl Popper, Jurgen Habermas and others, following the logician's G. Frege epistemology, define three types of worlds according to the entities appearance modes: objective states, physical, chemicals and biologicals of World 1, subjective or psychic or mental states of psychological sciences of World 2, and symbolic or linguistic states of historical and social sciences of World 3, and even a “platonocian” World 4 of formal, logical and mathematical sciences (Oliviero, 2006a). The structure and functioning of the resources that form the psychism, constitute a Complex Adaptative System (Gell-Mann, 1995) that evolves in variable environments. Psychism fullfills multiple adaptative functions for the entity that updates it, in variable personal, ecological and socio-historical environments. Our epistemological and disciplinary anchoring of social psychologist considers entity subjectivation models activity, as states and processes belonging to World 2, as it considers this activity as

symbolic, social-historical construction belonging to World 3, as well as it considers it belonging to the physico-chemical processes of World 1. Modes of existence of psychic resources are not independent from biological processes neither they are from processes and symbolic contents of socio-historical environments. This epistemological and ontological positioning leaves room, to an undetermined extend, for the learning, the resilience, the evolution and structures changes possibilities, that are functions and uses of psychics resources of M2, beyond inherited biological, genetic and epigenetic structures, specific to the *Homo Sapiens Sapiens* species belonging to M1 and to the social and symbolic resources of M3.

2. Entity subjectivation processes are partially constituted with the allocation to an entity, of the existence and the activity of a psychic module, or psyche, organizing different resources. Work in anthropological psychology shows that these allocations of psychic properties are not limitative to human beings, but that they apply to any entity, real or fictitious, inert or living. The model define the respective properties of the three poles necessary to the global field of entity subjectivation description, the subjecting entity pole, the pragmatic context of the subjectivation pole, and the pole of the entity to subjectivate. The “entity subjectivation ” concept describes the high level plurifactorial psychological processes by which subjectiving entities assign attributes or properties to subjectivable entities, constituting or informing them, not only as cognitive objects but also as ontological entities ,with their own properties, populating the different worlds. These properties are complex mental objects, for example cognitive traits that are differentiated on bipolar dimensions of judgment, mental and pragmatic schemes of behavior or of rite (Oliviero, 2005c,d). Our work considers three types of entities, reflexive subjectivation (ego-ego); transitive subjectivation (alter-ego) and symmetric subjectivation comprised of the «ego-alter» interactions. These relations are analysable from a cognitive (implicit, executive or computational knowledges) and a metacognitive (explicit knowledge of implicit knowledge) standpoints. Theories of mind describe an alter for an ego. Subjectivable entities can be themselves subjectiving or non- subjectiving entities which are assigned with mental states. This distinction depends on the considered cultures’ anthropologies (Descola, 2005). From an epistemological point, the three-fold field of entity subjectivation allows to create the potentially most universal models of ontology, for any type of subjectiving entities, natural (animal species, human species) or artificial (IA), related to any type of subjectivable entity, in any type of environment or pragmatic context. The Behavior of an intelligent agent with respect to himself in his different environments, and to the other natural or artificial entities, requires that the agent (self) represents and coordinates, inside a specific module, the set of psychic resources available to him for acting. We describe basic structures and components of the psychic module within the

natural and artificial organisms, the representation of the properties of the entity with which intelligent agents have to build and produce reflexive, symmetric and transitive behaviours. Our Ontology is fully relational (Bitbol, 2010), the final properties of the subjectified entity being computed in dependency with the global subjectivation field three components properties.

3. Our hypothesis is that the assignment of subjectivation properties to an entity has a dynamic effect that structures the behaviours directed towards the entities, the entity inception, updating, evolution and change possibilities. For a natural or artificial entity, the knowledge of the composition, the functioning and the potential transformation of self and others entities psychic resources, offers an outstanding adaptative selective advantage when internal or endogeneous variations (psychogenetic developmental and senescent aspects, sickness, disability, pain and death) and exogenous aspects external to the entity (change of life contexts, geographical changes, socio-historical, cultural, social group, work, family changes, etc.), require adaptative changes for the persistence, the safeguard, or the optimal evolution of the entity's being integrity. Cognitions and representations produced by societies that are related to the human and person's nature, including ones of Word 1 and 3 sciences, are cognitive and behavioural resources not only descriptive and causal explanatory resources but also behavioural direction change resources. The representation of the entities' properties, the compositions and values of the functions assigned to ego or alter's psyches, should be regarded as one of the dispositional resources determining behaviours beside economical and social historical positions. Metacognition is a psychic resource that has been early identified by the stoician logician Chrysippe (see the epigraph below). Metacognition is a potentially fundamental psychic resource that produces the consciousness thanks to the objectivation of the structures and functions of the other available psychic resources, to be used, discovered, devised, built, mobilized or to be reoriented modified according to the possible or wished directions of existence. Subjectivity representations, biophysic, social historical or personal, should be regarded as psychic resources in that they build the complex dimensions of our relations with ourselves, with others and with the world. Statements as « I feel », « I love », « I hate », « I can », « I want », « I know », « I guess », « I remember », « I prie », « I cry », « I hope », « I communicate », « I ignore », etc. should not only be regarded as psychological function that are executed but also as psychic resources built in the individual and group biological, cultural and developmental history. These resources can be studied, known, modified, or even improved for the personal development, in all its possible dimensions of the existence of the individuals.

4. Our empirical aim is to give to psychologists a standardized, differential metrical tool of investigation allowing for an individual (clinical psychology) or a group (social or community

psychology) to determine physical (M1), psychic (M2) or symbolic (M3) properties assigned to the considered entities (ego or altri) in the relevant pragmatic contexts. For the psychologist investigating the World 2, any entity properties, including the ones belonging to World 1, 2 and 3, becomes ipso facto psychic properties. The metacognitive approach that represents the objectivation of entities modes of subjectivation, bring to the professional psychologist and to the persons, the possibility to understand and therefore to modify the composition, the structure, the value, the probability of use, and the functioning of their psychic resources. One part of our human freedom comes from these possibilities, competencies and possibilities to learn to think and to think ourselves, others and any other entity, so as to adapt our behaviours to the domains of activity, social relationships, work, health, environment, etc. Our mental tooling (concepts, categories, representations, reasoning, etc.) has to keep adapting (coping) to the constant variations of the evolutive contexts of existence, the external ones (ecological, societal, economical, historical, etc.) as well as the internal one (developmental psychology, from the embryogenesis to senescence and death, before life and after death representations, etc.). The contribution of psychology takes place in the part of reality it investigates and in the possibilities of change and adaptation it provides to the persons. It is necessary for the psychologist of psychic states and processes of World 2 to think that psyche theories or models assigned to a human entity should, not only describe and explain the nature of mental states, but have also the ability to modify, to transform existence (self, other, ecology, etc.), for example in the case of adaptative, educative, therapeutic or curative, personal developmental, etc. learnings.

5. From a cognitive psychology of larger scope and higher level of description standpoint, the aim of our work is to determine the phenomenon or informations perceived by the subjectiving entity that allow the entity to perceive the presence of a psyche type of a subjectivity. While the neuroscientist is investigating the « Consciousness Code » in biological signatures (Stanislas Dehaene, 2014), the psychologist is aiming to define the signatures of « the consciousness of », in particular self consciousness and consciousness of others, as a psyche, or a subjectivity. The biologist investigates the material trace of psychism in biological activity, the psychologist investigates this trace in the experience that everyone have of himself and others, in the multidimensionality of its modes of appearance in the three ontological and epistemological words, but as they manifest and act in the mental states themselves. This complex question arises anytime and in all conditions of the existence of a human being. The “will to live”, the safeguard or the perseverance in self being, life quality judgements (work, health, relationships, etc.), require the definition, more or less precisely and at different levels of conscious states, what is to be oneself, or non-self, what is to be one’s self and altri’s self and who is this one’s self and

who is altri's self. In a next future, any artificial intelligence that have to interact with other entities, including human intelligent entities, will have cognitive module of learning and of representation of activities, for itself and for the different entities that will interact with it. Psyche models aim to account for natural (animal and human species) subjectivities modes of existence as well as they aim to implement in an artificial entity, the configurable functions of a set of psychic or mental resources, in a complete functional model, these functions can either be organic or non-organic. We are following David Chalmers' idea stating that the material structure is independent of the physical informational function (Chalmers, 2010). In an IA, the implementation of the configurable functions or psychic resources, variables and adaptable according to the expected types of interaction with itself and with others entities, according to the pragmatic contexts, to the relevant actions and interactions, is mandatory to stimulate and further organize the interactions between IAs and human or animal species. Societal applications of psychological definitions of psyche and of subjectivity are related to the domains of robotic and computer engineering as well as philosophical, anthropological, legal and biomedical domains. The numerous medical applications of sciences and biotechnologies, forces to define precisely the psychic or subjective life, in opposition to a purely biological one, or, at the contrary, an immaterial one. Our initial work was focused on human models (Model of Man) and on cognitive and social representation of psyche. Our work have recently evolved towards the issues raised by the modelling of natural or artificial processes of entities and human persons subjectivation. The theoretical domains of psychology that it concerns are the theory of cultural social historical representations, metapsychology (architectonics of psyche), cognition, metacognition and theories of mind. The areas of application are anthropology, Artificial Intelligence, ecology, ontology, bioethic and health psychology. Our work have explored the Mind-Body Problem and the Ego-Alter Problem at different levels of organization of the living beings from somatic or germinal cells to living or dead bodies. It deals with the different biological materials involved in daily or therapeutic practices like sexuality, food, non-verbal communication, infectious disease (e.g. VIH), substitutive therapies based on natural or artificial substitutive material cession and reception attitudes and behaviours, regenerative therapy and, today cancer. Our work is related to all steps of incarnate subjectivity going from embryo to cadaver as well as situations of social communication of biological material (auto or allo-transplant), degraded conscious states, coma states, etc. We are constantly evaluations humans life quality, be it our life or close relatives life, the judge, the doctor, and even the priest, require important decisions related to abortion, the ending of biomedical treatment than can be lethal, the commitment in therapeutic protocols having uncertain outcomes, the measure of the degree of pain that can be acceptable or insupportable in the domain of oncology, and finally the demand

of life ending and for some persons the suicide. Less dramatically, we are judging our lives, our modes of existence, our happiness and pain states, our satisfactions and non-satisfactions, our expectations and hopes, by the mean of comparisons between what is, and what must or should be, between what is real and what is possible, realizable and non-realizable, desirable and unacceptable, etc. The social and personal acknowledgement of the multidimensionality of modes of existence of subjectivity, appears to be one of the psychic resources that are the guarantor of the full exercise of our freedom as a subject that could answer d'Ausone's question (Idylles,XV,1) : « *Quod vitae sectabor iter ?* » (Which way to turn in this life ?)

6. Methodology for the computation of entity subjectivation models. The properties assigned to psychic resources arise from measurements realized on several unipolar or bipolar cognitive dimensions, like the dimension of existence or inexistence, consciousness or unconsciousness, availability or unavailability, finitude or infinitude, necessity or contingency, and of their inherent nature, essential or accidental, substantial or relational, fixed or variable and modifiable, historical or structural, natural or cultural, personal or collective, communicable or non-communicable, etc. Semantic predicate theory and ontological properties assigned to the entities are discrete judgments of bipolar dimensions. In an empirical data survey based on a Questionnaire of Entity Subjectivation, we observe salient regularities on the subjectivation dimensions used. We categorize then in ten main factors, vector and tensors of subjectivation, each having several facets that composes the subjectivation referential (Oliviéro, 2001a). Theses sides are identical for reflexive, transitive and symetric subjectivation although more complexe for reflexive subjectivation (Oliviéro, 2006a). The Universal Model of Subjectivation (MUSE) describes the potential positioning of all psychic resources or functions within the multiple describable architectonics. Our model rely on graph theory morphisms beside factorial techniques. In a perspective of dynamic modelling, we seek to represent in the form of vectors or tensors, variation effects of subjectivation models that are used and assigned. A tensor is a vector computed from multifactorial data that are represented with matrices. Subjectivation referential are cartographies of potential and updated psychic resources as they are represented by an agent or a group of intelligent agents in a cognitive way (implicit) or a metacognitive way (explicit). A multigraph represents the structure, the positioning and the architectonic of the psychic resources assigned to subjectivable entity by a subjectiving entity. The graph's apexes model the assigned psychic resources, while the weighted relations between apexes represent the different informational processing realized by the psychic functions on the entities in play.

The estimation (ou measure) of the cognitive complexity of entities subjectivation models rely on the consideration, variable according to the subjectivable persons and entities, of the five

elementary components necessary to describe the models, that is, the quality, the quantity, the structure (architectonic, morphology), the value and the likelihood of use of the considered psychic resources. The « power » or the multidimensional « degree » of subjectivity assigned to an entity results from (ou is obtained with) the multidimensional computation realized by a subjectiving entity on the different psychic properties that are assigned. Our last models uses the polynomial or logistic regression equation forms to compute the differential heights of the factors and sides of the subjectivation assigned to the entities.

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