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The Enactive Didactics for Enactive Mind: The Evolution of a Learning Model

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Abstract

The term "enactive mind" comes from the Varela work and the concept of "activation" underlines. Approach you enactive involves two concepts: from a side than the perception he consists in an action to his time driven by the perception coming from that action date and from the other but the cognitive structures they emerge from the recurring sensory- motor schemes which allow the action to be perceptively driven. In the specific one, approach him EM places like a frame to frame a series of phenomena considered essential for the comprehension of the concept of adaptation as social as the necessity of considering the relation world complexity as, the importing time constraints present in it, the nature and the modes in which mechanisms of this adaptation allow the formation of the social knowledge. In the EM approach the child "activates the social world" selectively perceiving it in the terms of what which is immediately essential for a social action, while the mental representations (the social knowledge) of this individualized world build themselves based on the repeated experiences ripened by these actions driven by the perception, become then deeply you root in the history of relational actions of the child to be tools for the adaptation to the world in which alive. The enactive vision, although it recalls in the meaning the concept of representation as mode to know, tries to exceed it in favor of the corporeality, that is an incorporate mind (embodied mind). A corollary of this theory is that subjects with autism learn on the people in a deviating way with respect to the typical social development process.

Keywords: enactive mind, awareness social incarnate, empathy, topology of salience, eye-tracking, human motion display, closed field/open field

INTRODUCTION

One of the enigmas anchors unsolved and between the most charming, regarding people with troubles of the autistic ghost are the big discrepancy between their good performances in the tasks of social reasoning and the approach adopted in the situations in which they are to act and interact. That happens when all the elements necessary for solving a problem are verbally given them but I am not able to apply spontaneously their analysis capacities to face the continuous requests placed by the daily social life (Klin et al ., 2000). Some, especially what do not have associated cognitive deficits, (Baron – (Cohen et al ., 1997), am able to solve difficulty level relatively raised tasks, without however showing the same capacities in the social adaptation.

This dichotomy reveals himself problems because, while it is possible to make their abilities improve through the teaching in think and accept some data reworking them, the new acquisitions can have a very limited effectiveness with respect to a real social integration and a real communication with the external world (Hadwin et al., 1997).

Our study concentrated its interest on the possession of those abilities which allow the subjects struck by troubles of the autistic ghost, with Q.I. in the rule, to face new situations bind to the surrounding world. The study's methodologies generally use, they base on explicit, often had verbally tasks, faces to ascertain if the subject has or not such abilities. However, the social context hard has himself this way: the subject must orient the attention on a few mattering aspects developing this way the use of cognitive and social problem solving abilities.

To study adequately the adaptation capacity the reference to an alternative theoretical perspective appears opportune (Klin et al., 2004), that he is based on a different series of socio-cognitive phenomena, like the bent of the people towards priority social stimuli; so as to attribute a meaning to that that see and think; to discriminate between the mattering information from the not important one and be intrinsically justified to solve some fundamental problems once identify. The theoretical perspective which we refer to is that of the enactive mind

(enactive mind/EM tea), which points out both the central role of the motivation to answer to social stimuli, and the evolutionary process through which the social knowledge builds himself. The term "enactive mind" comes from the Varela work (Varela et al., 1992) and the concept of "activation" underlines. Approach you enactive involves two concepts: from a side than the perception he consists in an action to his time driven by the perception coming from that action date and from the other but the cognitive structures they emerge from the recurring sensory- motor schemes which allow the action to be perceptively driven. This approach has origin from the emergent perspective of " science of the incarnate knowledge, which depends on the type of experience deriving to have a body with various capacities sensory-motor and to follow, such sensory-motor individual capacities are eases themselves included in a wide biological, psychological and cultural more context". In the experienced knowledge, the sensory and motor processes, the perception and the action, are basically indissoluble. Actually, in the individuals, the two aspects are not only bound in a contingent way, but also evolved in a parallel way "(Varela et al., 1992) ". The knowledge is entirely built on the experiences derived by accomplished adaptive actions by the organism on the important elements of the environment which surrounds him.

OBJECTIVES AND FUNCTIONS

Teaching enactive vareliana derivation is in fact a teaching context, spontaneous, which offers a very educational intervention related to the training needs. Where the needs in the context of neurodidattica, are also identified on the findings of the relationship between educational stimulation and neural correlates of awareness that the active stimulation, even on the basis of synaptic strength that is capable of triggering a didactic. An education empathy (Rogers C., 2007) is what we aim to give priority to the meaning of our research on EM. The meaning is thus related to the promotion of accountability and forms of critical thinking.

It is possible to assume that deficits specific of the subjects with autism are to a special building of the result mind of the mode of acquisition of the lowered knowledge in the surrounding world. Understand the environment which surrounds us and orient himself in it, in fact, involves the necessity of considering a multitude of elements which become more or less important based on the situation, the perceptions the motivations, the subject expectations and to the way in which they modify suiting themselves in the time. An adequate and effective adaptation requires that the person have a sense of the relative importance of every element in a date situation, of the preferential choices based on acquired priorities through the experience and the capacity of adjustment to the situation moment for moment.

Traditionally, theories on the socio-cognitive development did reference to the perspective of the computational mind and brain models (Gardner, 1983), which focus themselves on the identification of the problem solving expertise necessary for reaching a good adaptation level in the environment. Elements underlined by the EM model are different in many manners from that of the computational models which often reduce the complexity of the social world to a circumscribed number of problem solving tests easily check; to a pre-established set of pre-defined rules and invariance which can be symbolically represent in the mind of a child. The world comes to be so simplified and transferred in a circumscribed field closed duly, in which all the essential elements to be analyzed can be entirely represented and defined task. On the contrary, approach him EM accepts the open nature of the social adaptation proposing an active mind that one disposes to draw meaning from the environment itself and that one changes in consequence of this interaction. To add, then, that moving the interest from that the subject is able to be done, this perspective concentrates on the adaptive functions which are to the expertise acquisition process basis; then concentrating, on the knowledge, this perspective recovers the important importance attached to the affection and the innate answers in the socialization process; at last, focus of the investigation from what we define moves "disembodied knowledge", single abstract operations captured by the computational knowledge (as for instance the algorithms in a digital computer) to that that we define "incarnate knowledge", with reference to the cognitive tracks left by the action performed by the subject on an environment well definite and to one "differential topology of salience" able to recognize the environment aspects insignificant from those importing with the consequence to activate actions which are to the basis of the social adaptation. This perspective attributes big importance to the knowledge according to which our brain can be endorse like an experience warehouse (LeDoux, 2002), "becomes what we are", or what we repeatedly test: the brain perceives the emotionally mattering stimuli, and the mind hears and does not think only. Separate the emotion from the knowledge, becomes as much as never artful (Corona F., Cozzarelli C., 2010).

In the specific one, approach him EM places like a frame to frame a series of phenomena considered essential for the comprehension of the concept of adaptation as social as the necessity of considering the relation world complexity as, the importing time constraints present in it, the nature and the modes in which mechanisms of this adaptation allow the

formation of the social knowledge. Because the field is represented by people of age and various kind, characterized by individual, ethnic and linguistic differences, in all their complexity and nature, I understood body and face gestures, positions, contexts, physical and social environments, conventions, specific situations and many other factors, the social adaptation would really require much more than the knowledge of a set of rules, that which comes at times as definite as "Knowing That" ("know what"). ("knowing in what way") would rather require a "Knowing How", that is a process of learning based on the store of experiences in a wide number of cases, what leads situation to the capacity to be moved in the environment on the basis of the sense of relative importance of every single element of a date, and that on the situations they come to create moment elements for moment from the launching interaction.

In this study of ours, one affirms that theories of the social deficit in the autism must orient themselves towards the necessity to solve the discrepancy, considered as a key element for the comprehension of path physiology of this trouble, between the performances in explicit and structured tests and those in spontaneous and natural situations. This way, proposing an approach to the development of the social knowledge, one tries to do light on what could be the characteristic evolutionary development way without denying the strong impact in the world both clinical and of research.

In the autism, one of bigger teaching strategy limits at present available, understood the various types of training in the social abilities (Howlin et al., 1999), is the difficulty in promoting the acquisition generalization. The autistic subjects are not able to translate an ability of problem solving learned in an environment to "enclosure field", as for instance, in the rehabilitation strategies based on the teaching through cards, tasks, explicit rules and controlled exercises, in an ability which the individual has at disposal in an environment to "open field", as he happens in a natural situation in which one must relate himself with the others (Winograd and Flores, 1986). This can be the explanation of because subjects with autism, once left to take off it with their means in the reference environment, have difficulty in using the expertise of social knowledge which learns through explicit teachings.

MATERIALS AND METHODS

Subjects struck by autism showed to be able to solve explicit socio-cognitive problems at a level which cannot turn out consistent with their ability to face the requests for the relation situations in the daily life. The ampleness of this discrepancy is today well well-documented thanks to the most recent investigation techniques, like eye-tracking, which allow us to observe and measure the subjects in what way with top-level functionality autism, in possession of good and potentially expendable cognitive and linguistic expertise, search for the meaning of what which see that is, where they fix the glance, when I am complaints to natural social situation scenes. The presentation of several scenes of film or display sequences evaluate as "more spontaneous", really because they show a high emotional, able content to repeat a real life situation, several among the autistic ones and the spectators with typical development allowed significantly to highlight a behavior: while these last are able to interpret he modifies it of the emotional personality states, the autistic ones observing the essential somatic sections, for instance the eyes and the mouth with age and Q. I. of the same level they concentrate on points not very as informative, as the peripheral face area. "social survival ability" or "road intelligence" of the autistic subjects would seem to be the same as those of the young children. But the fact what in adolescents and grown-ups with autism and Q.I. in the rule the shown reactions are not observed normally as children with typical development does not mean their capacity to work in the world to be comparable to that of the first development phases. It is rather possible that these subjects acquire knowledge on the relation world in a different way. This research paradigm allows to evaluate in what way a person spontaneously looks for the meaning of what which sees during the exposure to social stimuli.

In the EM approach the child "activates the social world" selectively perceiving it in the terms of what which is immediately essential for a social action, while the mental representations (the social knowledge) of this individualized world build themselves based on the repeated experiences ripened by these actions driven by the perception, become then deeply you root in the history of relational actions of the child to be tools for the adaptation to the world in which alive. From the researches made on the eye-tracking images what people struck by the autistic pathology can be inferred not the essential scene elements having oriented direction, in the moment in which they had taken he leaves to a such real situation, their adaptation to the requests for the environment (for instance to take part adequately in the current game protagonists joining the two children) would have been compromised strongly. Approach you EM sees the children's perceptive equipment with typical development as established by a specific set of somato-sensory organs constantly in searches for of important information in the environment on which focus himself: the orientation towards the members of the same kind and the capacity to involve them is sight as one of the functions most important for the survival and this involve the adaptation to the environment or an action on it. The possibility which, in the autism, the

relative clause salience of the social stimulus can be reduced (Dawson et al., 1998) it could be the basis for a succession of evolutionary events in which the child with this pathology fails in activate and carry out a social world important, not therefore succeeding in ripening those relational experiences that I approach him EM suggests are to the socio-cognitive development basis.

In the literature on the development of the child a wide number of social bents is documented innate, some of which they appear significantly compromised in the children with autism. The human voice seems to be one of the precocious and effectives stimuli in the social involvement of the children, a reaction and is not observed in the autism (Werner et al., 2000). It was in fact found out that the missed orientation towards the sounds of the human voice (for instance when the child is exposed to the voice of a near grown-up) is one of the most incisive predictors of a next autism diagnosis in 2 years old of age children.

As regards the visual perception, it was pointed out that the human faces are one of the most powerful stimuli in socially involving the child (Bryant, 1991). For instance, at three months of age children are obviously oriented to fix the glance towards the eye area, the area of the face which reveals more clearly the emotions, and at five months are sensitive to deviations also minimum of the direction of the glance of the interactive partner during the first social interactions and they can associate facial expressions with congruent vocal expressions and two years old children prefer to look at their mother's face with respect to that of a woman unknown. We would be overwhelmed and paralyzed by the complexity if we left from a position for which every element which can be gathered by the glance has the same one salience. Instead we actively recover the aspects of the visual environment essential for some adaptive answer rapids moving the glance in a sequential way in the places where we expect to find elements such. These "expectations" are produced by a cerebral system deputized to salience and one more and more complex (going from the childhood to the adult age) situation context comprehension.

Several studies (Klin et al., 1999) indicate that children with autism not only present face processing level anomalies but also a preferential orientation towards the lifeless objects (Dawson et al., 2002), mattered during the exposure to familiar faces. While the computational models of the social mind are often modular, that is they expect what certain aspects of the social working can be preserved while others can be compromised, approach him EM really attributes big relief to the precocious compromising of the social competence because the typical social knowledge is deep-rooted in the perception and the social experience. These experiences can include the learning of contingencies (for instance the fact that voice sounds take themselves to lip movements, that certain voice tones take themselves to certain configurations as facial, as a smiling or disapproving expression), and the learning these contingencies can be pleasant (the that the situation takes to the approach and to the attempt to restore) or unpleasant (the that moves to avoidance).

In the EM approach so, it is thought that the precocious social bents create the bases and the push for the next one emerge of mental representations which, since I am inextricable from the social action (in which "incarnate" are), have an adaptive valence in himself. Children do not build likely models of the social world based on representations "universal" or independent of the context: rather, the models which create or their expectations on the world are consequent to the actions driven by the sense of element salience and performed on an environment that he continuously changes and that it must be faced in an adaptive way, context-dependent and with flexible moment tunings for moment.

Subjects with autism often learn a big symbols and operations number on these symbols which do not assume for them the same meaning which have for the children with typical development. Some examples are, between the other ones: hyperlexia, capacity to decode tongue written not taken by the comprehension of what which is read; the echolalia and echopraxia, literal repetition of sounds and movements; the "idiosyncratic language", neologisms and words used in idiosyncratic way; the execution of activities, behaviors always dependent and social routine expresses from an education, for instance say hello on demand but without looking in the eyes, or stare at a person when is required to look at it in face. In the autism he so discovers dissociation between the knowledge of a symbol and the action on it, for instance know the indication gesture meaning and to spontaneously turn the head following the gesture when somebody shows in a certain direction. However one of the big challenges for these children are to associate a symbol with the adaptive action rooted in the symbol.

The imitation ability is considered, one of the biggest deficits have in the autism (Rogers, 1999). Is interesting the fact that children with autism have from a side big difficulties in the learning through imitation, but from the other one put in act a big number of "echo behaviors", is vocally (for instance literally repeating that one and call the other people) and physically (repeating the same ones gestures performed by others). A theory drawn by the EM approach would support the importance of the execution of the action of the person: while children with typical development see a greeting gesture like a

movement rooted in a communicative or emotional exchange act, children with autism dissociate the movement from the social context, focusing themselves on what which has physical salience and therefore repeating the gesture in a mechanical way.
Studies on the biological movement show how it allows to the man, as like that as to the other kinds, the survival in his habitat which depends on his ability to recognize approach him he of possible enemies, discriminate between movements performed by them and predict their future actions. In the man, this system was associated with the emergent capacity to attribute intents to the other ones (Frith and Frith, 1999). These studies traditionally do use of the paradigm of the display human motion (Johansson, 1973) based on which the man's movement is represented through a series of luminous points which outline the main articulations: this movement is dissociated by the form of the body of the person. The way in which these luminous points are moved evokes a vivid impression of human movements as basic (as walk, run, dance) and a few social actions (approach, fight, hug).

Various neuro-imaging studies indicated that a structure deeply involved in the perception of the biological movement is the superior time furrow (Grezes et al., 2001), an area associated also with fundamental answers for the survival as the evaluation of the facial expressions and/or the direction of the glance. These results are consistent with the vision of a perception-for-action system which not only perceives to act, but is deep-rooted in an affective system of approach/avoidance. In the obtained results in a fMRI study one starts outlining an evolutionary profile of the functional maturity of the brain in the autism in which systems which support the social salience are deviated since the first development phases, follow a way characterized by the attention, research and activation of physical objects and not of people, and a getting negligence of the social experiences (Klin et al., 2002). This study is consistent with the perspective which describes the functional brain development as a "try activity-dependent" in which points out that the childhood represents the maximum plasticity window.

From these studies arises ours bring to promote an enactive didactics which considers the knowledge as the continuous process which models our world by the reciprocal game between outside constraints and the activity produced internally. So, the experienced knowledge, is understood as "incarnate action" and, the creation of a world cannot be seen as the solution of problems by the representations, but like the emergency and with it the sensory and motor processes, the perception and the action are basically indissoluble. In the enactive perspective the learning is considered as building of a common world who each is responsible for.

If one looks to the learning under the point of view of the teaching, he cannot do himself without than distinguishing at least two levels to learn: a first level, objectively formed by the answer process verifiable to the teaching stimulus; an according to level, one formed by the internal system reorganizations in the field of integration between subject and environment, in which the learning works in not deterministic way as transformation operator inside the system.

The first level (established by the answer process objectively verifiable to the teaching stimulus) is articulate about the categories of the predictability, of the linearity and the objectivity; it is inside this level which finds flood justification the logic of the school program.

The second level (established by the internal system reorganizations in the field of integration between subject and environment) is correlated to the unpredictability categories and is inside this level that a different logic emerges, that is strategic. If one places the problem of the aims of the didactic process under the point of view of the program logic, it will be possible to identify them with the capacity of solution of problems (cognitive/relational). Such capacity is measurable and then objectively verifiable by indicators that allow an evaluation. Instead, the purpose of a strategic logic is the "co evolution" of teaching, learning and creation.

The enactive vision assumes the action as way of doing knowledge, in the consciousness that the knowledge involves the action. If these two assimilations can be acceptable, the problem of what tools are to be built is at once placed: structure enactive (elaborated locally on the basis of the needs of the pupils, verified with tests built to hoc) knowledge. Specified once that the concept of formation is referred to the education activity, education and to the effect which these activities determine in the pupil person, in the sense being his in the world, it is legitimate to wonder what is the evolution of the degrees of consciousness of this his being, in the freedom and the autonomy.

RESULTS

The importance of the evolutionary and contextual aspects of the social development was shown and being able to become the socio-cognitive tool expertise for the social action of the autistic subject. The time constraints in the social adaptation require abilities which must be put in act spontaneously and quickly, without need of an explicit translation of what it is necessary to do in every situation date. It is necessary to find the important social information and keep it active in mind so that a continuous social meaning attribution process can take place in what which is seen. All this in the people with typical development happens in a simple way and without

efforts. On the contrary, the hardest challenge in daily of the life of a person with autism is the necessity of modifying its behavior in the common social situations.

Results elaborated by us, translated in the challenge to be modified they to a natural relation situation, suggest that probably some of these subjects do not have access to the social clues and do either notice that I am there while others look for the causal relations of what which see referring to the physical ambit rather than to the social one.

The attribution of a social meaning to a set of visual stimuli is an adaptive reaction which observes himself in the children since the first development phases and a way more and more sophisticated. This spontaneous ability builds himself on the incalculable number of hours spent in interaction contexts with other subjects. To understanding the meaning of the facial expressions recognizing the human movements and the features of the human actions, attributing deliberateness and been mental complexes to the other ones, he derives the act to suit himself the social challenges activating the socio-cognitive expertise with their functional valence. Socio-cognitive is to the light of these considerations which we can affirm that in the autism there is a break in the process that it gives back the expertise inextricable from the social actions.

The enactive vision, although it recalls in the meaning the concept of representation as mode to know, tries to exceed it in favor of the corporeality, that is an incorporate mind (embodied mind). With the circularity of perception and action he realizes a continuous world production by the subject acquaintance, one goes building a reciprocal coupling history. The body and the environment the subject works in are decisive elements: other beyond their organic, that is their structural coupling and the action interaction of the subject, perceptively driven, and from the perception driven by the action is not known. It is a union detail of mind-body which becomes, actually, a knowledge means street.

All the proposal system aims at showing how the enactive didactics can be to the basis of the change of paradigm in the formation sciences or the based on factual knowledge determination. Therefore for autistic people come point out rights to the comprehension of the social interactions and not to hide under their shortages, through the custom-made ways.

CONCLUSIONS

The subjects with autism with Q.I. in the average can learn many things on the world the acquired know ledges and at the same time are not able to translate in adaptive behaviors in daily of the real life. To do light on this enigma is proposed an interpretative frame different from the prevailing one of the computational models of the cognitive social development, the EM perspective which is based on the emergent picture of neurosciences of the "incarnate knowledge". For the approach the knowledge EM is deep-rooted in the experiences which arise from the actions of an organism on the important aspects of the environment which surrounds him. The social knowledge is deep-rooted in the experiences associated with that special mode of action which is the social interaction.

Approach you EM proposes a theory according to which in the autism this process is compromised since his origin, because of the lack of salience which typically characterizes the social stimuli. To their place they replace themselves so a series of physical stimuli, which attract child's selective attention, the experience and the specialization leading it in an evolutionary way in which on the objects is bigger than that on the people. Approach you EM affirms that, without the set of "incarnate" socio-cognitive tools necessary for producing adaptive answers moment for moment in the natural social situations, the social behavior becomes maimed, slow and inefficient. For the subjects with autism it is clearly possible to learn language and other abilities, understood a quite wide amount of information about the people. However these thought tools are learned outside the ambit of the active social involvement and the experiences what are a part and the learned information refers to. The meanings and the definitions are there, but lack the experiences which are foundation.

A corollary of this theory is that subjects with autism learn on the people in a deviating way with respect to the typical social development process. The fact what subjects with autism intellectively able show competence in socio-cognitive tasks is as much interesting as much as the registering their failure in using these abilities in other contexts. The effort our research must do in the study of the possible compensation ways and of the impact which can have on the autonomy development is as important as the difficulty documentation socio-cognitive, the which involves the necessity of going beyond the results which register themselves in the explicit reasoning tests. Both explore more deeply the atypical processes which people with autism use in solving the explicit tasks, and improve the methodological tools at disposal to study the social adaptation in a more natural context will be necessary.

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