

## **BODY MEDIATION IN THE COMPLEXITY OF THE HUMAN BEING: RESEARCH PATHS FOR AN INTEGRATED AND INCLUSIVE TEACHING**

### **BODY MEDIATION IN THE COMPLEXITY OF THE HUMAN BEING: RESEARCH PATHS FOR AN INTEGRATED AND INCLUSIVE TEACHING**

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#### **Abstract**

The aim of the present paper is to analyse the body and corporeity potentialities of the human being complexity both in general and in its identity building processes. Our analysis is focused on highlighting the function performed by the body in an integrated multidisciplinary process which views body mediation as one of the many strategies to enhance the individual as a whole and to give, through a semiotics of the body, a chance to hold back the dysfunctionalities present in many vulnerability frameworks. The exploration and rediscovery of the body role represent the paths embraced by pedagogy and special teaching for a long time in order to decode differences not just in terms of personal stories, but also as global behaviours, which consider and outline the body as a subject of knowledge and learning.

Obiettivo del presente lavoro è quello di effettuare un'analisi delle potenzialità del corpo e della corporeità nella complessità della persona in generale e nei processi di costruzione della sua identità. Ciò nel tentativo di mettere in luce la funzione che il corpo svolge in un processo multidisciplinare integrato, che vede nella mediazione corporea una delle tante strategie per valorizzare il soggetto nella sua globalità e per offrire, attraverso una semeiotica del corpo, la possibilità di arginare le disfunzionalità presenti in molti quadri di vulnerabilità. L'esplorazione e la riscoperta del ruolo del corpo rappresentano le traiettorie da tempo intraprese dalla pedagogia e didattica speciale allo scopo di decodificare le differenze in termini non solo di storie personali, ma di funzionamenti globali, che vedono e tratteggiano il corpo come soggetto di conoscenza e di apprendimento.

#### **Keywords**

Body mediation; didactics; inclusion; integrated teaching, neuroscience

Body mediation; Disability; Inclusion; Integrated Teaching; Neuroscience.

#### **1. Introduction**

The present paper aims at a deep analysis of the body and corporeity potentialities of the human being complexity in general but also in the personal and cultural identity building processes, focusing on those whose who are vulnerable and, therefore, adopt particular adaptive behaviours. In accordance with Merleau-Ponty's reflections (1945), we believe that the body generates instances of critical reflection in which the behaviours may change and new effective answers may be given to the difference and, thanks to body mediation, it is possible to find alternative paths to join in a unitary and coherent plot all the multipole representations of ourselves (consciousness), as well as to reset the brain functioning counteracting that sense of helplessness and invisibility related to the deficit and making sure that both adults and children may regain mastery of their own life and body (Kumari-Campbell, 2001).

Choosing such an important topic is not coincidental, since among the themes which surely belong to special pedagogy, that of body exploration and rediscovery is one of the paths embraced for a long time to decode the differences not just of the single human being and his subjective plots but also in terms of global behaviours which view and outline the body as a source of knowledge and learning and usually consider the various manifestations of its vulnerability through a unitary *Gestalt* of its affective, cognitive, social and motor functions (Leisman, Moustafa, & Shafir, 2016). Furthermore, together with important details to develop rehabilitative interventions, it offers the opportunity to an enhanced comprehension aimed at choosing educational strategies and an innovative didactics aimed at supporting such individuals in educational and school contexts (Brooks & Barba, 2009; Lubans et al., 2010).

Suffice it to think how much the body stimulates the brain activities such as cognition, memory, attention

which are important functions in didactics, since body attention is related to vision and attention in a dimension which could be described as a dual channel between the visual and motor brain (Macedonia et al., 2019). An interconnected action on the above mentioned areas creates a multimodal sensory-motor representations in the brain (Barsalou, 2008), which account for how much cognition and emotions are the result of brain functions in a "system" of highly interdependent and interrelated cells responding respond to stimulation, i.e. to signals coming from the outside world through ears, eyes, skin, nose, tongue and motor acts. Such cells are connected to neuron networks (Hebb, 1949), which represent and store information and create mental images on reality data. As scientific evidence confirms, it would not be risky to support the idea that through a body semiotics of the body it is possible to build a sense of experience (not just from a tout court cognitive but also from a learning point of view) in which the body is immersed. This would arise from the meeting between the neurophysiological and psychological worlds, which, if free from deficits, allow us to grasp each subject's individual learning mental work, not only in the input phases (i.e. sensation, perception, attention), but also in the processing (memory) and output ones. This is valid not only at a perceptual, shape, colour, space and time level, but also regards the ability to abstract and conceptualise since, as mentioned above, it encompasses the prerequisites of the disciplines that teachers should bear in mind and which should be considered for an effective enhancement in the treatment of disfunctionalities. What has been stated above is confirmed by many neuroscientific studies which demonstrated how the processing of objects, spatial information, music, faces, flavours, smells and even the simple thought of these concepts, evokes sensory-motor responses, i.e. body related activities in the brain (Pulvermuller, 1999, 2001; Pulvermuller, 2005). the research carried out by Peppler in the last years follows this course. In 2017, he described how it is the body that directs the counting in the real world. He wrote that "during the counting, the body moves the fingers to support the cognitive task. We explain the basic operations of mathematics (addition, subtraction, division and multiplication) to children by putting together things of the real world, separating them from each other, cutting them off and so on" (p. ). And we do all that through our body. Even literate people, who cannot read or write numbers, can perform operations referring to the task through real-world objects (Macedonia, 2019).

Furthermore, there is a line of research (Nathan & Walkington, 2017) which has developed the theory of the grounded and embodied mathematical cognition (GEMC), which considers the action and the gesture as tools to understand the properties of concepts related to science, technology, engineering and mathematics (STEM).

## **2. The body between the physical and the symbolic world: theoretical paradigms in comparison**

For the above stated reasons, it is good to reiterate that focusing on the body and on its potential study object stems from a varied series of epistemological, interconnected and specular approaches (i.e. medicine, psychology, pedagogy or bio-educational sciences), which best explains how far we are today from that purely naturalistic and medical point of view which considered the body as a thing and we are instead in front of a body which is a being which turns into a means to raise consciousness and build our thought and our behaviour. The latter is related to the sensory-motor anticipation and interaction (Piaget, embodied cognition), the procedural consciousness (reuse of learning mechanisms), the declarative consciousness (promulgation of behaviours through mental stimulation and imagination) and the internalised situated action. But above all, it is the expression of a totality of a subject, understood as the sum of its parts, and consisting of inseparable units such as body, mind and spirit. Therefore, the body is the physical expression of the intertwining taking place between our emotional and psychic experience. In this view, Gamelli (2017) states that emotions are in the body and not only in the brain, a present body that moves, reacts and, at the same time, provokes reactions becoming an emotional means. Therefore, the self, as an autonomous subjectivity experiencing its being alive, is a "Corporeal Self". A present and corporeal subject, situated in time and space, while meeting with the other gives us the opportunity to perceive and tell something about the self, to transform and be transformed, to break down those pre-established schemes that do not allow to overcome the boundary of objectivity.

The mind-body relationship is one of the great themes that philosophy has first autonomously dealt with for centuries, and then has partly handled it to science and, in the best of cases, it continues to develop the topic in parallel with scientific reflection. In fact, as everybody knows, cognitive sciences very often deal with this kind of issues, seeking the support of scientific

evidence. Having overcome the mind-body quarrel of the past, today we aim at a holistic vision of the subject which is linked to a varied series of models offering an account of how we get to consciousness-raising. Such vision led to the anchoring of pedagogy and special didactics to neuroscience, in order to study, through the triadic brain-mind-body relationship, how to produce a change in the subject, how to guide the human being to use all the potential he has, in terms of emotions, sensations, perceptions, memory and how to create learning environments suitable to produce responses thanks to new neuronal networks and circuits activated by a multiplicity of adequately offered stimuli and mediators. Body image, coordination of action and movement represent the parameters of the discovery of one's own corporeity, whose dynamism is linked to anatomical, physiological, psychological and sociological events. In practice, it is the relationship of the brain-mind-body triad which is able to give, through action, sense and meaning to the experience in which the body is immersed. This implies that the whole body "thinks", that each cell or body part "experiences" and feels "emotions", processes its psychophysical information and transmits them to every other part through a very dense network of extreme communicative variety. Finally medicine has discovered that the human body is not a machine! On these theoretical and experimental bases, Candace Pert (2000) describes the human being as a complex "network of information" and declares that the ancient division between mind and body has no longer reason to be: the old concept must be replaced by that of psychosome (bodymind), in which every human psychophysical aspect is considered as a part of a single organic reality (Nelson, Hagler, & Sereno, 2007).

If it is true that the body is an inexhaustible source of knowledge, it is equally true that movement represents the only possible testimony of psychic life. The ancient conception of the motor system has attributed for decades to the motor areas of the cerebral cortex a purely executive role: that is, translating into movements the information processed by our brain by integrating sensory stimuli and mental representations.

In the light of the recent research conducted on the mirror neuron system, the entire motor system has undergone a transformation from a conceptual point of view, moving from a very simplified image to a more complex one according to which finalised movements depend on the knowledge of the body's positioning in space, on the aim of the action, on the selection of a plan to achieve the objective, on memory and, finally, on the programming of each single movement (Gallese & Migone, 2006; Rizzolatti & Craighero, 2005). The mirror neuron system (MNS), which is found in the areas of the posterior part of the inferior frontal gyrus, of the adjacent ventral premotor cortex and of the rostral part of the inferior parietal lobe of the brain, allows us to physiologically explain our ability to form a relationship with others. When we observe such a human being performing an action, the neurons which come into play when we perform that same action are activated in our brain. That is why we can easily understand other people's actions: our brain activates nervous pathways which recall similar actions we carried out in the past.

The implicit representation of our body in space is known as a "body scheme" and it is the result of proprioceptive and exteroceptive afferents. In practice, the brain implicitly builds a relational map of the spatial arrangement of the various segments of our body, so that the execution of an action is consistent with the external environment. It is evident that the body scheme represents the set of motor constraints that the brain takes into account in the organisation of movement. The movements encoded by the mirror neuron system, through observation, will precisely take into account the constraints imposed by the body scheme. Besides being able to understand actions and intentions, the mirror neuron system is also responsible for imitative processes such as the intentional replication of observed actions or the learning of new actions. This new conceptual model no longer raises rigid barriers among the different functions such as perception, action and cognition, but it suggests that only through a motor approach to intentionality a global understanding of these mechanisms is possible. Likewise, we could not explain the behaviour of others in terms of intentions, and imagine the consequences of that, if we had not the motor knowledge which governs the representations involved in both executive and learning actions. Quite simply, the actions carried out by a human being – be it a single or a chain of motor behaviours – is meaningful to us whether we want it or not and regardless of what the person involved has in mind. This is also valid in the opposite situation: willing or not, our actions have

an immediate meaning for those who are observing us. From this mind-body relationship, it is therefore possible to detect the fundamental meaningfulness associated to the imitative process of mirror neurons, especially for those affected from intellectual disabilities, be they genetic or not, since, due to a congenital reduced ability to mentalise, bodily imitation represents for them the main source of expression and learning

### **3. Body, school practices and innovative teaching**

The above mentioned arguments help us to understand how, thanks to our body, we could decode neurodiversities, paying attention to learning and its factors (i.e. incidence of attention and of memory and the techniques needed to activate them); the study of individual differences (i.e. why some people learn and others do not, while some are good in some particular subject, etc.) and how to facilitate the cognitive, emotional/affective and socio-relational processes and dimensions in order to set up a supportive learning environment taking into the due consideration both personal and contextual factors. This leads to a rethinking of the customised curriculum design from an inclusive point of view, which aims at strengthening some processes in subject learning, at how actions are defined and how activities are chosen in a holistic and multimodal framework to activate information processing. This process is enabled by the joint practice of the cognitive function of basic attention, that is, of the process that allows the focusing on a mental image while the others are weakened, and by the basic operational memory, which keeps the different images apart for a long time thus activating the executive functions. This can be obtained thanks to the working memory, which turns out to be a mental configuration of abstract and concrete processes, which according to the somatic markers of Damasio (1995) are always an expression of a somatic state.

Without movement or action there is no need for thought (Damasio, 1995).

As several studies point out, thought has evolved from the motor system as a mechanism facilitating the development of programmed (action-controlled) motor skills. This is because psychomotor activity considers the human being as a whole together with his functions, allowing us to evaluate sense-perception, imitation, attention, emotional expression, executive functions, etc. That is, of all the functions that are expressed through motor capacity and coordination (movement in general, postures, gestures, etc.) which have – we stress it once again – strong implications with the cognitive, affective, behavioral and relational level. It is a body that, acting and feeling, can be described as a dynamic image in which tactile, visual and muscular elements converge and merge in a unitary totality. Such elements lead to a particular way of feeling the movement (i.e. Berthoz's sense of movement, 2010), besides helping to make sense of that unity of the being, of that body image or torn identity, which characterises many problems or vulnerabilities of our students at any school level (Murdaca, 2008). Therefore, it follows that the body represents a mediator and an amplifier of individual potentials in life contexts and, in particular, in school contexts. These contexts must be prepared to accommodate the differences through didactic practices in the name of an integrated multisensory perception, based on the motor-perceptual-cognitive processing and designed to support the possible autonomies in order to produce changes in all subjects, without any exception, through educational tools that carefully combine the relationship among motor skills, executive psychic functions and school performance, besides contributing to a well-being which is related to the quality of an independent life.

### **Conclusions**

What has been argued above invites teachers to a serious reflection on the possibility put aside the usual didactic routines to explore the many potential uses of the body and corporeity in general, as foundations of a theoretical-operational framework of an inclusive teaching that considers the body as a resource to decode cognitive and learning dysfunctionalities, integrating recent advances in neuroscience with research in pedagogy and special didactics. Therefore, to consider the body as a mediator in didactics means to bring together in a unitary and coherent plot the

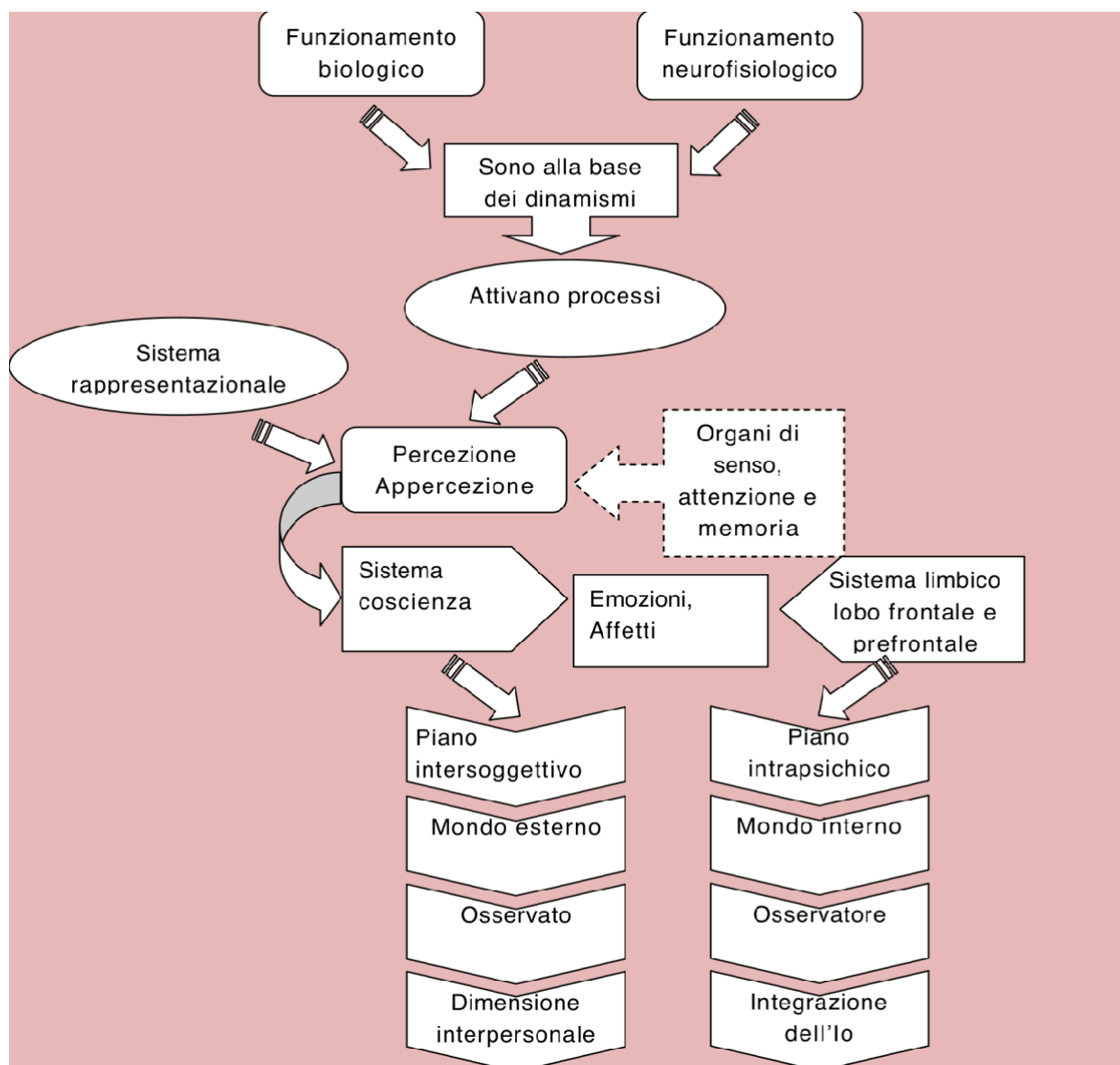
balance between the neurophysical-biological world and the psychological and contextual one, since it is precisely from their interdependence that the development of the possible potential of each subject begins.

Behind every operation and every psychoeducational model there is always a multidisciplinary (i.e. anthropological, phenomenological, neuroscientific) vision, which finds in the body paradigm the knowledge progress on body mediation (Shannon, 2011; Caruana and Borghi, 2013; Antonietti, 2019).

Or, rather, a mind within the body, that is, a rooting of the body in the mind, a body that is a medium to carry out actions through which meanings are built, explaining how the body through the motor system becomes an active part, and how through it the subject expresses and reveals himself. It will be precisely the apperceived sensory perception, experienced thorough and inside the body that make the subject an active part in learning, precisely because the body is characterised as a dynamic image (Rizzolati, 2015) where tactile, visual and muscular elements converge and merge in a unitary totality that leads to a particular way of feeling besides helping to make sense of that unity of being, of that body image or body identity that is too often torn apart in many pathological frameworks of neurodevelopmental disorders because of the immediate shattering of the existence of a body unit.

This is the reason why, when designing a personalised pedagogy, it is fundamental to think of methodological plans aimed at educating the subject to a body scheme with the help of exercises through which, it will learn to know itself, to recognise its own parts, to control its movements, to orient itself in a certain time and space context, and, hence, to proceed to explain a series of actions by elaborating, reworking and analysing, that is assimilating and accommodating a series of useful inputs





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