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Mental Aggressive Operability from Informational Perspective: A Deterrence Manifesto

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Abstract

Introduction: The aggressive mentality is operable at any age and gender, but especially during the adolescence/youth, when the prefrontal cortex responsible for the inhibition of the informational emotional/alarm signals transmitted by amygdala is not yet fully matured.

Aim: Informational Modelling and Methodology of Determination of mental aggressiveness for its detection and deterrence.

Analysis and Modelling: The informational system of the human body is reflected in consciousness by the info-accumulation especially during the childhood period, when are added over the inherited traits the concepts on good/bad type references learned from parents, which can engrave positive or negative emotional paths in consciousness, converted into positive/negative (YES/NO type) judgment criteria of the future adult. Such criteria strongly influence the thinking behaviour, distinguishing each individual from others, according to own personal life experience.

Results and Discussion: The perception and interpretation of the reality is different for each of us, and this can be described by the model of cognitive-sentient exploration of reality (CSER), which explains the perception/interpretation of reality by means of the cognitive centres of consciousness. The manifestation of the mental aggressiveness is a disruptive process, distinct from the natural/normal behaviour and this is germinated by the personal thinking manner: the maintenance of the obsolete judgement criteria are unfavourable for the mental health and the connection to new reliable educational informational sources to educate/teach/reformate the thinking structure of the mind operability is necessary. The stereotype mechanisms of the aggressiveness manifestation are described and suggestively presented by a qualification diagram.

Conclusion: On the basis of the specific analysis and modelling of the aggressive behaviour founded on informational concepts and informational activities of distinct cognitive centres of the mind specifically defined, it was deduced the important role of educable centre Ibelieve, the fundamental role of Iwant as a combination between all other centres, and that of the centres Ilove, Icreated and Icreate in the triggering of the stereotype mechanism of the aggressive actions. A novel powerful methodology to detect the aggressive mental behaviour and the possibility to use it for prevention of aggressive acts was also deduced, which can be used, besides the actual modern resources for the identification of the individual mental health state, independently on age and gender, for the aggressiveness deterrence and violence avoidance.

***Keywords**: Mental Aggressiveness; Cognitive-Sentience Exploration of Reality (CSER); Mind Operability; Prefrontal Cortex; Amygdala/Limbic System; Stereotype Behaviour; Deterrence and Prevention of Violence*

Introduction

The study of the aggressive behaviour is of a major importance in the social psychology, because the aggressiveness affects the social relations in family, groups and society. The natural mental structure of human is habitually engaged to collaborate and maintain normal relations within the social community. The first social nucleus is family, with well established functions concerning the growth and development of the new generation. However, the collaboration is based on communication, i.e. on information interchange between the members of the community, so this could be approached by informational tools. The recent advances in understanding of the mental structure of human allow to approach from the informational perspective the mental aggressiveness in social relations, starting from the parental to the inter-human relations in the society.

Traditionally, the aggressiveness studies in animals refers to two categories: affective (impulsive/"spontaneous") defences aggression, explicitly consisting in fear-induced or maternal defence, inter-male territorial competition, resident-intruder, individual or group irritability, or predatory/planned aggression [1]. Extended to human, these two categories are to be expressed rather as reactive and proactive aggression respectively [2]. The difference between two types of aggression is evident: whereas the first category involves the response to a threat for remove the provocation, the aggressiveness of the second category is planned to obtain a reward and often without associated with an emotional arousal. However, into the first category enter at humans a large variety of aggression types, sometimes rather a combination of both, so this is much more complex than the aggression at animals. The involved zones of the brain are especially the limbic system (LS) and the prefrontal (PF) cortex [3], so the scientific literature focuses attention on the neurological/neuroscience circuitry of the brain, particularly on the activity of amygdala and associated connecting components from LS, responsible especially for the operation with the alarm signals of arousal and with inhibitory/controlling regions in the PF cortex. If from neurodynamics point of view the excitability and the associate connecting circuits could be quite well observed and described [4], especially due to the remarkable improvement of the non-invasive and non-destructive new techniques like frequency magnetic resonance imaging [5], the mechanisms of aggression are still a subject of attention, especially for better understanding and prevention of the individual and collective conflicting situations and violence.

The aggressive behaviour is strongly related with the cognitive capacity of individuals. The recent advances in understanding the brain cognitive activity and the relation with the body [6,7] from the informational perspective [8,9], allowed to understand the cognitive operability of the brain reflected in consciousness [10], on the basis of information concepts introduced by the information science, correlated with physics and neurosciences concepts [11-13], with direct implication in the mind/body equilibrium and health [14].

Following this line of investigation, the aim of this paper is to analyse and modelling the mental aggressiveness from informational perspective, taking into account the specific contribution of the specialized informational operability centres of the brain, as a contribution to a better understanding of the involved mechanisms in the aggressive acts and for the violence deterrence and avoidance by using a new method of determination.

Analysis and modelling: The aggressive operability of the brain/body from informational perspective

Mind operates with information, and the relation between mind and body is informational in essence [15], although since the millenary experience of human the mind and body were viewed and discussed as two distinct entities [16].

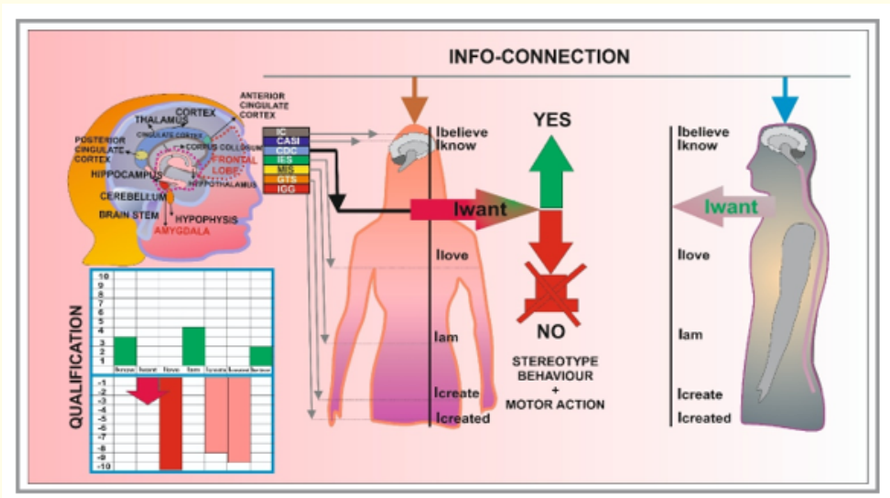

Figure 1: *Schematic representation of the informational system of the human body and of the cognitive projections in the mind under normal (green arrow) and arousal (red arrow) conditions, triggering the aggressiveness "button" (central part); in the bottom left side is shown a corresponding qualification diagram.*

The informational structure of the human body complies specifically with necessary functions of the organism: on one side the main task is dedicated to the metabolic functions, operated from the informational point of view by the Maintenance Informational System (MIS - Figure 1 left side), managing (mainly by the brain stem) the matter-related components obtained from the external sources (foods, air, water); on the other hand, the search of resources and protection tasks determined on the evolutionary scale the development of an informational system, allowing the connection with the external and body internal reality in order to accommodate/adapt momentary to the intervening changes, in agreement with the body needs. Such a system could be defined as an Operative Informational System (OIS), connected with the external reality by the common detection sensors (sight, hearing, smell, touch, taste) and with the body (by signals of pain, hungry, thirst), processing the input information for the comparison with necessities, in order to make a suitable decision. Such an informational operability allowed the intensive accelerated development of human brain on the evolutionary scale [7], distinguishing prominently human from the sub-human species.

The specific functions of such an operative informational system, dedicated to collect external and internal information, to store it and to judge comparatively the data for operative decision does is (and should be) definitely composed by: (i) a Centre of Acquisition and Storing of Information (CASI), managed by the prefrontal cortex (short-term memory - 1 min. duration), hippocampus - long-term memory, cerebellum for learned behaviours and skills, thalamus - a relay for sensory impulses, cerebral cortex interpreting the main sensorial signals (touch, vision, hearing); (ii) a complementary Centre of Decision and Command (CDC) (Figure 1 left side), managed especially by the cerebral hemispheres, frontal and prefrontal lobes which searches/activates (by means of the thought as informational operator), the necessary stand-by information stored in CASI and use it to operate/judge according to earlier experience (informational criteria) for the decision making. This system is (and should be) connected to the motor execution elements of the body, activated by the command components of the brain (managed by cortex and cerebellum), for the execution of the output info-decision. Particularly, as it can be seen from figure 1 (black arrow), CDC is mainly connected with the vocal system of the body, as a most frequently used output operator of OIS, but manages also the body posture (body expressive "language") or the body execution elements (muscles), voluntarily engaging them in motor (compulsive/aggressive) actions.

Human is also a sentient/affective being, probably the most sentient being of the living kingdom. The complexity of the human brain resulted from the evolution, but also from the inter-relational actions both with the natural conditions with which it was necessary to be confronted and with the community and society itself, shows that the emotional component is also determinant in decision making. Therefore, an Info-Emotional System (IES) should be defined (Figure 1 left side), as a constitutive part of OIS. The function of IES is (as is to be expected) mainly operated by LS, composed by amygdala (the "alarm" component) connected with thalamus, hypothalamus, hippocampus, midbrain and the prefrontal lobe (controlling zone), by means of the anterior cingulate cortex (ACC), responsible for informational selection [14]. It is important to note here that the PF cortex - the most recently evolved part of our brain, last to fully mature in the mid-20s, is more complex in humans than in other species [3]. This would suggest that at the young people the control contribution of the PF is still insufficiently active. During the aggressive episodes, IES seems to be the predominant excitatory component of OIS, so its contribution is of a major/definitely importance for decision.

In the most of the studies, the role of ACC is not taken sufficiently into account, although its role is very important for the selection of information between acceptable ("good") or not ("bad") with respect to the experiential survival criteria [7,14]. This informational relay together with the posterior cingulate cortex, with an intermediary position between superior (cortex) and inferior anatomic part of the brain is involved in the connection/(re)distribution of information in extra-sensorial experiences [17,18] and in religious and mystic experiences [19]. This centre can be suggestively defined as Info-Connection (IC) system of the brain and its role is more sharply defined by its projection in consciousness suggestively named Ibelieve (Central and right side of the figure 1), operating according both to the beliefs criteria learned from parents and family during the first years of life and those assumed latter during the life experience and school preparation. Similarly, CASI is projected in mind as memory, including the entire (informational and emotional) life experience, perceived as the cognitive centre suggestively called Iknow, and CDC as a cognitive (voluntary/decisional) centre suggestively called Iwant. The

emotional activity, reflected in consciousness as the cognitive centre Ilove (natural/desired/positive emotional state of human), is a reaction to information: part of it (especially fear) is automatically managed by LS (but voluntarily controlled by CDC), and another part is perceived as satisfaction/dissatisfaction (good/bad - binary YES/NO (Bit)) emotional states induced by the input or recalled information. An important remark to be noted here is that the so defined "emo-states" [20-22] are induced by the repetitive experienced emotional states (like sadness, disappointment or other associated), either by voluntary stimulation or by drug-induced contribution, which determine the formation on the cell surface specific receptors "asking" subsequently the same type of information. Such a mechanism practiced repetitively, becoming a main controller of the self state, could induce irreversible states of depression, with grave consequences for the mental equilibrium and health. Such states become a premise platform which can convert the individual in a candidate of the aggressive actions.

MIS is reflected in mind as the cognitive centre Iam, configuring the personal image on self, the physical and psychical power/vitality/health of the organism (including the mental health, if the individual is awareness of it), which is evidently a consequence of the physical and mental equilibrium, supported especially by the correct operation of MIS, as an automatic/autonomic manager of the digestive (energetic) system. The neuro-connections with the body are represented by arrows in figure 1 left side. The activity of the digestive system assures the energy and material (re)construction elements of the body [23]. The cognitive centres of consciousness defined by Icreate and Icreated represent the projection in mind of the Genetic Transmission System (GTS) (operated by hypophysis - the master gland, which controls the hormonal activity) and of the Info-Genetic Generator (IGG) respectively, responsible of the inherited development properties, managed also especially by hypophysis.

The hormones are long-range communication agents in the body. The testosterones in animals increase the aggressiveness, but in human their role (related with GTS) has been vastly exaggerated [3]: the testosterones do not induce an additional excitation of amygdala, they only increase a neuro-excitation produced by other informational input sources. The visual information for instance is primarily processed by CASI area of cortex (about half of cortex is engaged in info-processing of images, from pixels points to lines and 3D composed image) and then sent to amygdala (IES), only if this is of emotional relevance, before to become an (associative) coherent image. However, under high stress conditions, when hypothalamus signals (IES) induce the production of glucocorticoids hormones by adrenal glands increasing excitability of amygdala and decreasing the functionality of PF lobe, a shortcut way of image transmission directly to amygdala is opened, but the corresponding image is much more inaccurate, leading to confusions. The testosterones are "masculine" hormones produced by testes, but in the women body these are also produced in ovaries, fat and skin, contributing to growth, reproduction, sexual desire and body health. Although in women the testosterone hormones are 10^{th} - 20^{th} times lower than in men, smaller variations in level induce much effect in women than in men [24]. Similarly, small variation of their emotional level induce much more reactive-impulsive attitude in women than in men. Serotonin hormones inhibit the aggressive behaviour.

Genetic heredity of aggressive behaviour (by means of IGG) is demonstrable [25], but the influence of genes show different effects depending on the environmental conditions [3]. The aggressiveness is considered one of still conserved heritable trait of human, necessary on the evolutionary scale for survival, but within the present social and cultural context in the advanced informational society, constrained by rules and in the same time opened to information, the aggressive behaviour is inappropriate, causing great harm to individuals, family and society, and is associated with neuropsychiatric disorders, such as attention-deficit/hyperactivity disorder, schizophrenia, bipolar and personality disorder [25].

Results and Discussion: Mechanisms and control of aggressive behaviour

The aggressive behaviour is a disruptive process, but the real causes of aggressive episodes comes from the mental mechanisms of the perception/judgment/interpretation of reality. The perception and interpretation of the surroundings is performed by the cognitive-

sentient exploration of reality (CSER), which is the synergetic result of the reality perception by the contribution of all cognitive centres reflected in consciousness by the informational activity of the informational systems of the human body (ISHB). In figure 1 there are schematically shown the cognitive centres of consciousness of a woman (central part) and of a man (right side), each of them connected to the same reality, but this reality interpreted however in different modes by each of them, according to own experience and power/capacity/ability of interpretation.

During the first years of life, the child behaviour is based on the inherited traits from the parents. These years of the childhood are of the major importance for the development of the cognitive perception of the surrounding reality, because this period coincides with the most intensive development of the brain circuitry, most of the inherited neuron connections are lost and other new connections are formed. During this period the children learn the distinction between good and bad, stably configuring their knowledge as beliefs, cultural, traditional, social and religious conceptions and concepts. This info-accumulation is the fundamental informational substrate which defines the centre Icreated of the future adolescent, young and adult. The dramatic events in family, like violent discussions and gests, insults, quarrels, scuffles, blows, injuries, engrave deep emotional negative paths in children, which remain in the memory as unfortunate events with serious consequences: these are subsequently converted in judgment criteria and thinking pathways for the perception and interpretation of reality, arousing fear, mistrust and disregard in the social relations and in own family. Worse, as the children have a high confidence in parents, at least in one of them, convert these types of episodes in borrowed "model/solution" to "solve" the future inter-relational differences in own family, groups or society, converting own frustration in aggressiveness. The imitation of bad habits like alcohol or drug consumption, open the path of confusion, antisocial aggressive and violent behaviour, wasting the body's reserves for a healthy life.

The adolescence period is marked by the development of GTS with the reflected cognitive centre in consciousness Icreate, which activates/amplifies the social relations and the interactive consequences, with interest for the opposite gender. This is a period of practice and also of learning of the life/professional lessons, but the excess of energy is good to be spent in sport and in personal or social activities. This is a continuation of the first years in family, but asking a higher level of personal responsibilities of own actions, including those concerning the future family formation and professional preparation, the insertion in the working life. The informational sources influence the psychic development, so a selective connection under personal or parents/school control should be preferential, in order to avoid the sources which promote the aggression and/or unfair competition.

The formation of the new generation is a task of parents, so the bad examples like threatening language and/or aggressive behaviour should be avoided. Especially the maternal side, at least in the first years, has a significant role to inoculate in children love instead of hatred, right/equilibrated orientation in life, with respect for people and their opinions, independently of their race, gender, religion, culture, right equality between people of different gender. The CSER model shows the deep effect of language on consciousness [16]. Threatening expressions like "I'll kill you" addressed to the children have a double harmful consequence: (i) promote the (lethal) aggressiveness; (ii) diminish by frequent repetition the sensitivity of the grave consequences of such a behaviour in the society [26]. The subtle maternal educational/provocative influence on child, should constitute an attention issue in society by the grave effects induced in the future adults. This influence could include the disparagement of the paternal figure, the promotion of supra-dimensional pretentions, according to some traditional view in the archaic but still largely accepted and practiced traditional cultures, even in our advanced societies [27] and info-manipulation.

Although aggression and violence are usually considered by tradition to be a male problem, just because of some global statistical result, relatively little is known about women's aggression. However, the women engage frequently in subtle, masked forms of aggressive behaviour [26,27]. According to a recent trans-national study on aggression, there were no gender differences in relational aggression across countries, although the general belief is that the boys are more aggressive than girls [28]. Research consistently reports that wom-

en use indirect aggression to an equivalent or greater extent than men, masking the aggression intent [27,29] by criticism, false rumours, disregards, gossiping, exclusion and bad prejudice, which are much frequently used provocations like men [30].

Iam is perceived in consciousness as body (included the mental) health, Ilove as emotions (including hatred and aggressiveness as a negative side of love), Iwant as a decision (a contributing result of all other communicating centres), Iknow is the memory (including the older traumatic events from childhood, maintained as reference criteria for judgement), Ibelieve is an (educable) automatic selector of information sent to PF lobe for decision by ACC. In figure 1 (upper left side) the LS emo-arousal brain area and the inhibition PF cortex area are marked by dashed red line. The mental aggressiveness is converted into a direct manifestation by psychical and physical attacks triggered by emotional system (including a motor action), following an already stereotype pathway, practiced repetitively, as shown in figure 1, if Iknow and Iwant do not intervene to interrupt this breakdown chain of a normal judgement.

In the bottom left side of figure 1 it is shown a qualification diagram suggestively representing this mechanism. In this diagram the state level of each centre is represented on a scale from 1 to 10 units [31,32]. The decision depends on the contribution of each centre: in this case IES indicates a negative disruptive contribution of 10 units represented by red colour, assisted by the contribution of other centres represented in green colour on the positive scale, according to a normal behaviour, or in brown colour on the negative scale (Icreate and Icreated, marked by the negative older events in the childhood). The momentary decision is marked by the red colour arrow oriented also on the negative scale, as an averaged level value of all contributing centres. This diagram could be used for the behaviour evaluation of the individuals registering repetitive episodes of aggressive behaviour, as a pre-test of the mental health and necessary/adequate medical or educational treatments. The verification of the mental health with this diagram or another suitable resources and techniques should be anyway an obligatory procedure to deterrence/prevention of the aggression behaviour, independently on the individual age and gender.

It is to be noted therefore the high importance of the (educable) centre Iknow, which maintains the obsolete remembrances as reference criteria, although these are not suitable for subsequent experiences of life. The access to new reliable educational informational sources and documental information facilitating the methods for the recovery to a normal operability of the mind, within our nowadays informational era, enriches the personal informational horizon and helps to eliminate the older archaic stereotype thinking system. The practice of sport, movement in nature, physical exercises, engaging the mental co-participation, help the mental recovery to a normal functional level. At the old ages, when the parents become free of the current problems of the children, this is even a necessary/obligatory component of the healthy life. The intervention should be also a duty for the society, which should be non-discriminatory oriented to the avoidance/deterrence of aggressive behaviour independently of gender, preventing also in this way the chronic stereotypical/progressive evolution to neuro-degenerative Alzheimer's and Parkinson disorders. This is necessary for individual health, life quality and wellbeing, but also for the life quality of the members of family and of the society in general.

Conclusion

The aggressive behaviour was analysed and modelled from the perspective of the distinct informational functions of the ISHB, highlighting the pathways of the arousing (LS)/inhibiting (PF cortex) activity in the specific brain areas, explained by the informational operability of the cognitive centres of the mind, specifically defined. It was shown that the aggressive behaviour is a disruptive mental process, based mainly by the amygdala signals sent to prefrontal cortex, but mediated also by an (educable) intermediary centre reflected in consciousness as Ibelieve, with access to the judgement criteria accumulated by individual especially during the childhood and during the lifespan. The mental aggressiveness can be manifested/converted into psychical and/or physical violence by the decisional system, perceived in consciousness as the cognitive centre Iwant, which mobilises the motor executive elements of the body to action through stereotype mechanisms. All other cognitive centres of the mind are contributing components of the decision, the negative experiences in childhood taken as reference models playing an important role, although such references could be already obsolete/unappropriated crite-

ria. The aggressive mechanisms become stereotype repetitive behavioural episodes, triggered by such obsolete mental criteria, if not own personal or medically-assisted interventions are activated in such cases, independently of gender and age. A novel and powerful method to determine the mental aggressiveness was described, which can be used to identify the aggressiveness state of individuals. A general preventive revision of the mental healthy is necessary to be applied periodically especially when the mental aggressiveness is manifested by external violence, for its deterrence and prevention.

Conflict of Interest

No financial interest or conflict of interest exist.

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