

## Chaos and order in the human brain

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### Abstract

The human brain combines highly deterministic and causal activity with unpredictable but sometimes regular processes. Chaotic responding dominates during time periods without focused mental activity such as rest, fantasizing dreaming, while the organization of movements and focused attention requires predictable and organized brain circuits. Slow brain potentials reflect the organized and deterministic structure of behavioral acts while the spontaneous EEG changes in an ever-returning but unpredictable manner. Examples of experiments and therapeutic applications for slow electrical brain activity and behavior and chaotic activities illustrate a *general theory* of excitability and threshold regulation in the human brain and the respective behavioral consequences. The model relies heavily on a Hebbian view of the interpretation of EEG and behavior.

1. The development of cell assemblies depends on *plastic* ("Hebbian") *excitatory* cell systems with a rapid rise time for their construction. The system ideally suited for this purpose are the apical pyramidal dendritic trees of the upper neocortical layer.
2. A cell assembly includes sometimes widespread cortical neurons including sensory, cognitive (meaning) and motor functions. Any restrictive separation into highly specialized "modules" as it is fashionable in present day neuropsychology, is obsolete; vis-a-vis the fact that every sufficiently large pool of neurons of the cortex is connected to every other neuronal pool, forming the anatomical basis of our *illusion of a unified consciousness*. The meaning and qualitative nature of an event, an idea, an emotion, or a percept is reflected in the local topography, the topographical "Gestalt" of an assembly not in the properties of its parts, the cells or its transmitters.
3. This specificity of an assembly is best reflected in the spatial distribution and frequency of fast changing electrical and magnetic activities, such as the EEG and ERP, and MEG (magnetoencephalogram) components. It has to be fast because assemblies must have the ability to *ignite explosively* as a whole: a whisper can turn on a full blown paranoid delusion within the fraction of a second, including all, or nearly all, sensory, motor and meaning-aspects of that delusion.
4. Cell assemblies, and therefore the EEG and ERP, should have properties of *deterministic chaos*: They cannot be totally random, as it would be impossible to create new ideas and percepts if assemblies did not generate novel activity patterns within the fraction of a thought. Rapid state changes and bifurcations are characteristics of cell assemblies, which are sensitive to very weak initial conditions that lead instantly to widespread changes in the whole system. These two elements also characterize chaotic systems.

## **The development of linguistic reference to the pretend element of children's symbolic games**

**D. Kati**

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### **Abstract**

Data are presented from the speech of a preschool child, showing linguistic reference to the meaning of pretend, taking place in Greek as in other languages, through the use of grammatical means, while the same is observed rarely and only through lexical means in adult language. Pretend structures first appear at the age of 2;9 with the subjunctive particle *na* and past tense, replaced by analogous structures with the future particle "*θα*" at the age of 3;2. The time of these developments is explained as a consequence of cognitive and linguistic maturity, but also of a communicative need for the explicit marking of pretend which is created as symbolic games become more complex, abstract and social. It is, in addition, argued that the specific choices of the grammatical markers of pretend can be understood only if we suppose an early ability of the child to creative employ abstract universal principles on the basis of which the languages of the world grammaticalize meanings.

## **Social behaviour and sociometric positions of Greek students of third and fourth grade**

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### **Abstract**

105 third- and fourth-grade youngsters nominated peers for acceptance, rejection, and provided 28 positive and negative behavioural descriptions. Boys and girls were nominated equally often for prosocial behaviours, while boys were nominated more often for aggressive behaviours. Acceptance and rejection scores were only slightly negatively correlated with one another. Peer acceptance was strongly related to prosocial behaviour nominations, but not to aggressive/antisocial nominations, while peer rejection was significantly related to both aggressive/antisocial and prosocial nomination scores. Rejection was more closely related to aggressive behaviours for boys, while popularity was more closely related to prosocial behaviours for girls. Behaviour profiles for sociometric groups were similar to those found for American youngsters; popular youngsters obtained low nominations for aggressive / antisocial and high nominations for prosocial behaviours; rejected youngsters received the opposite pattern of nominations; controversial youngsters combined characteristics of both rejected (high aggression) and popular (high prosocial) youngsters; neglected youngsters received the lowest nominations on a number of behaviours, but otherwise scored close to the average group. In general, there was little evidence of differences between Greek and American youngsters, thereby supporting the generality among elementary school children of: (a) the processes at work in the formation of peer relations; (b) the relative importance of aggressive behaviours to status among boys and that of prosocial behaviours to status among girls; and (c) the contribution of prosocial behaviour characteristics in determining both acceptance and rejection among peers.

## **Sophocles' Philoctetes: strategies for conserving triangulation**

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### **Abstract**

Sophocles' tragedy "Philoctetes" describes a hero motivated by his hate towards his companions who had robbed him of his position in the army. The group - army has narcissistic bonds and offers Philoctetes idealising and dependence relationships with the group itself and the companions, relationships which are under the influence of archaic mechanisms. This fragile situation, in periods of crisis, can easily be reversed, transforming the companions into rejecting and persecuting objects (chiefs, Ulysses) and the subject (Philoctetes) into rejected - persecuted - excrement. Philoctetes' narcissistic personality is a result of a childhood phantasy of being mother's part-phallic object. In order to get out of this archaic type of psychic organization, Philoctetes, who is unable to elaborate object loss through depression, tries narcissistic identification with his companions (doubles). This process is, however, inefficient and Philoctetes tries to install an oedipal system through auto-aggressive behaviour in which he projects his father's death-wish for him, a death-wish through which he is recognised as his father's child.

## **Field dependence / independence and intellectual functioning among Greek 11-12 year-olds: a preliminary approach**

**P. Vlontakis**

### **Abstract**

Field dependence (FD) and field independence (FI) refer to analytical ability. They signify contrasting tendencies to rely either on external or on internal frames of reference, respectively, in processing information. The objective of the present study is to test the relationship of this analytical ability to intellectual functioning. For this purpose a number of appropriate tests were administered to a sample of 34 children (24 boys, 10 girls) aged 11-12 years. The findings confirm the initial hypothesis that the relationship between field dependence/independence and standard tests of intelligence is a function of a common cognitive factor distinct from the verbal one, i.e. of the capacity to overcome embeddedness. Being field independent does not exclude the possibility of being highly verbal. However, one can excel in the field independence dimension without excelling in the verbal domain.

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