

SCIENTIFIC REPORT

ESF EXPLORATORY WORKSHOP:

THE DREAMING MIND-BRAIN, CONSCIOUSNESS AND PSYCHOSIS: BRIDGING THE GAP FROM THE PHENOMENOLOGY OF MENTATION TO NEURONES

25th -28th of MAY 2009

in

CHALLAND SAINT-ANSELME (AO)
VAL D'AOSTA, ITALY

CONVENED BY

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ESF Exploratory Workshops

EXECUTIVE SUMMARY

In the ESF Val d'Ayas Dream Workshop, the common denominator of dreaming, with its strong correlation with REM sleep in studies of normal and abnormal states of consciousness, was seen as a surprising and scientifically strong link binding apparently disparate fields of science together.

The main objectives of the Workshop were:

- 1) To discuss the state of the art in basic dream research and in neuroscience research dealing with the problem of consciousness: psychosis as well as dissociative states seem to naturally fit in this context but modern research in psychiatry fails to bridge these overlapping fields of interest
- 2) To discuss converging interests amongst research groups and develop European networks that could cooperatively plan future studies on hybrid or unstable states of consciousness such as those found in neurological and psychiatric disorders.

From a phenomenological perspective, the physiological experience of dreaming seems to share various qualitative similarities with the pathological experience of psychosis, ranging from the loosening of associations to the distortion of time and space parameters and the incongruity and bizarreness of the experience itself. Recent studies on changes in neuromodulatory balance seem to indicate that both acute psychosis and dreaming are associated with the dynamic interplay between the aminergic and cholinergic neuronal systems. Some research in neuroscience now appears to support the study of the dreaming brain as an invaluable model for elucidating the physiology as well as the pathology of human cognitive styles. On one side, the dreaming brain is indeed the biological proof that consciousness or subjective experiences are possible in absence of sensorimotor activity: the dreaming world, though internally generated, is complete with its objects, spaces

and actors which interact in often quite complicated events. The study of the isolated brain during dream sleep therefore appears central to the debate on the neural underpinnings of consciousness. On the other side, the peculiar characteristics of the dream experience, lacking space and time parameters and rich in illogical and bizarre thoughts, with the absence of insight over the 'objective' dreaming experience, suggest an intriguing similarity between the cognitive organization of the physiological dreaming brain and psychotic cognition.

The European Science Foundation, represented by Joaquim Ribeiro suggested ways and means of pursuing the scientific strength of a network devoted to the study of dreaming and other states of consciousness. Interesting collaborations were discussed amongst participants. On one hand, basic dream researchers will collaborate in bridging knowledge across to psychiatric patients with the aim of building a solid methodological implant that may prove of use in the field of psychiatry, where the interest in patients' dreams has progressively fallen out of both clinical practice and research. On the other hand, neuroscientific investigators discussed ways of extending their work (mainly modern EEG techniques) to psychiatric conditions, using sleep research paradigms to interpret data from acute psychotic and dissociated states of the brain-mind. The complexity of the brain-mind is probably better understood when experts from confining fields of research merge their knowledge, and the workshop succeeded in opening collaboration prospects amongst psychiatrists, philosophers, psychologists and basic neuroscientists.

The main conclusion of the workshop is the need to form a strong network amongst researchers interested in bridging dream and sleep research with research in psychiatric disorders, in view of developing a solid experimental basis that may be brought forward in various European departments over the next few years. The formation of a unified database seems an important step in the consolidation of such a network, as different expertises may converge on standardized data to develop new exploratory theories and directions for research.

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SCIENTIFIC CONTENT OF THE EVENT

Jennifer Windt, a young collaborator of German philosopher Thomas Metzinger, considered the philosophical implications of dreaming as a conscious state and as a model for psychosis, arguing strongly for the contrastive analytic approach suggested by Bernard Baars. This conceptually valuable work, which aims to assess the validity itself of research in subjectivity, is currently being proposed in a European Platform for Life Sciences, Mind Sciences, and the Humanities project titled “Approaching the Dreaming Mind: Experimental Modification of Dreams within a New Neurophilosophical Framework”. Valdas Noreika, a Finnish member of this project, also discussed this approach during the Workshop.

Dream phenomenology was approached by different perspectives. Teresa Paiva from Portugal and Michael Schredl from Germany both presented data on content and form of dreams in pathological populations. The former found clear links between dream content and topographical brain dysfunction, with aggressiveness associated with frontal dysfunction in Parkinson’s Disease and reduced in epileptics with amygdaloid lesions; animal-related dreams in PD seem to enhance common traits with the dreams of children and primitive populations, arguing in favour of some “regression” associated with the cognitive decline; death characters in PD and low rates of fortune and success in temporal lobe epilepsy may mirror psychological or existential factors associated with the absence of perspectives for the future and low quality of life scores detected in both disorders. The latter described his Continuity Theory of Dreaming in psychiatric patients, underlining the significant increase of negatively toned dreams in depressed patients, with the severity of symptomatology being directly related to dream content within the patient group. Both researchers also assessed formal aspects of dreams such as bizarreness, which was found to be higher in the dreams of schizophrenic subjects than in the rest of the psychiatric population tested.

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This newer approach of measuring formal features rather than the narrative aspects of dream reports of subjective experience was highlighted by Ivan Limosani and Armando D'Agostino from Milan, who used a scale of dream bizarreness to assess the cognition emerging from dream reports and responses to the Thematic Apperception Test in schizophrenic, manic-depressive and normal subjects. Independent of diagnostic categories, the waking mentation of acutely psychotic subjects seems to share similar formal features with dream mentation. These results found on the phenomenological level indicate that psychosis, defined as a state of the brain-mind characterized by senso-perceptual anomalies, with heightened perception of internal stimuli and impairment in the interpretation of external stimuli, reality-testing and ideo-affective integration, may share common neurobiological underpinnings with dreamlike states of consciousness. Miranda Occhionero from Bologna discussed the presence of autoscopic phenomena in dreams, a complex experience including the visual illusory reduplication of one's own body, that can be phenomenologically subdivided into autoscopic hallucinations, heautoscopy and out-of-body experiences: the dysfunctional pattern which can also be found in certain neurological or psychiatric conditions involves a multisensory disintegration in personal and extrapersonal space perception.

The workshop strongly endorsed the development of a uniform scale for the assessment of experiential data. Such a set of measures was deemed especially essential as a complement to the reaction time objectification of conscious states taken by cognitive neuroscience.

The physiological substrate of dreaming and other altered states of consciousness was studied by Sophie Schwartz of Switzerland (PET and fMRI studies of REM sleep), the British Daniel Collerton and Elaine Perry (Hallucinations and Visual System Physiology and Cholinergic Mechanisms of abnormal states of consciousness respectively), George Mashour of the United States (Anaesthesia And Quantitative EEG Analysis) and Thomas Raedler, a German researcher now

working in Canada (Muscarinic Mechanisms of Schizophrenia). Raffaele Manni of Pavia emphasized the role of dopamine in modulating the motor and sensory disturbances of Parkinson Disease including the REM sleep behaviour disorder. Ursula Voss from Germany showed how quantitative EEG techniques could be used to define lucid dreaming as a hybrid state intermediate between REM sleep and waking. The physiologically suppressed ego functions of dreaming appear to emerge in lucid dreams through an induction technique requiring a standardized training. The visualization of such a peculiar state through brain maps based on statistical elaboration of quantitative EEG data gives new insight into neurobiological underpinnings of purely functional abnormal mental states. It was discussed during the workshop that this type of analysis may yield precious information on several psychiatric conditions involving abnormal dissociation of consciousness during wakefulness (not only psychosis but also depersonalization/derealization, pseudoseizures, etc.).

The existence of REM sleep in many mammals and birds was stressed as providing both an animal model for dreaming and an indirect proof of the functional significance of REM sleep for learning and memory (Lisa Marshall from Germany), and for instinctual threat avoidance, as discussed by Katja Valli, a collaborator of Antti Revonsuo, the Finnish philosopher who developed the Threat Simulation Theory of dreaming. According to the theory, dream consciousness is an organized and selective simulation of the perceptual world specialized in the simulation of threatening events: exposure to real threatening events supposedly activates the system and simulations produced are perceptually and behaviorally realistic rehearsals of threatening events. This theory holds that the ancestral environment in which the human brain evolved included frequent dangerous events that constituted extreme threats to human reproductive success, thus presenting serious selection pressures to ancestral human populations and fully activating the threat simulation mechanisms.

One of the subjects discussed during the workshop was the possible link between this theory and the threatening content of paranoid delusions and a large part of the hallucinatory phenomena occurring in psychotic subjects. Theories of psychosis implying a transfer of dreaming brain-mind phenomena into wakefulness can certainly integrate this aspect, and further studies on the content of mentation in psychosis will certainly yield interesting findings.

Allan Hobson of the United States suggested that threat simulation may be just one of the many purposes of dreaming, which he considers as the subjective correlate of a proto-consciousness state of the brain-mind used to construct consciousness itself. This theory arises from the observation of the ontogenetic predominance of REM sleep: a limited set of genetic instructions would supposedly be converted by self-organization to an activation program that thereafter interacts with the environment to develop the specific data that become a part of consciousness over time. According to the theory, contents are added during each waking period and integrated with the automatic program of dream consciousness during sleep, compatibly with evidence for the consolidation of daytime learning by nocturnal sleep.

The presence of REM sleep in the early life of highly evolved animals was considered in relation to temperature control, complex brain equilibrium (Petr Bob) and the emergence of consciousness. Because evolutionary theories are so difficult to test experimentally, the workshop strongly encouraged increased attention to studying the developing brain and more detailed exploitation of animal models. The description of visual experience in the dreams of congenitally blind humans and auditory experience in the dreams of the congenitally deaf (Ana Rita Peralta) was discussed in relation to the theory of genetically determined proto-consciousness as against post-natal synesthetic construction of phenomenal experience from such other sensory modalities as touch and movement.

FINAL PROGRAMME

Monday 25th May 2009

Morning/Afternoon *Arrival*

- 19.00-19.20 **Welcome by Convenor**
Silvio Scarone (Università degli Studi di Milano, Milan, Italy)
- 19.20-20.00 *Welcome Cocktail*
- 20.00 *Dinner*

Tuesday 26th May 2009

- 08.50-09.10 **Presentation of the European Science Foundation (ESF)**
Joaquim Ribeiro (University of Lisbon, ESF Standing Committee for the European Medical Research Councils (EMRC))
- 09.10-12.30 Morning Session**
- 09.10-09.40 **"The dreaming mind-brain, consciousness and psychosis"**
Allan Hobson (Harvard University, Cambridge (MA), United States)
- 09.40-10.10 **"The dream and waking mentation of psychotic subjects: experimental support of overlapping features"**
Armando D'Agostino & Ivan Limosani (Università degli Studi di Milano, Milan, Italy)
- 10.10-10.40 **"Dreaming as a model of hallucinatory experiences: continuity and discontinuity"**
Daniel Collerton (University of Newcastle upon Tyne, Gateshead, United Kingdom)
- 10.40-11.0 *Coffee / Tea Break*
- 11.00-11.30 **"Cholinergic components of consciousness: from drug and disease induced states to dreaming"**
Elaine Perry (University of Newcastle upon Tyne, Newcastle upon Tyne, United Kingdom)
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- 11.30-12.00 **"Muscarinic hypothesis of schizophrenia"**
Thomas Raedler (Foothills Medical Centre
Department of Psychiatry, Calgary (AB), Canada)
- 12.00-12.30 **Discussion**
- 12.30-15.00 *Lunch + Free Time*
- 15.00-18.00 Afternoon Session**
- 15.00-15.30 **"Contrasting dreaming and wakefulness as a
first step towards solving the integration
problem"**
Jennifer Windt & Valdas Noreika (Johannes
Gutenberg
University of Mainz, Germany & Univeristy of Turku,
Turku, Finland)
- 15.30-16.00 **"Neural complexity, dissociation and
schizophrenia"**
Petr Bob (Charles Univeristy, Prague, Czech Republic)
- 16.00-16.30 **"The cognitive unbinding paradigm: implications
for anesthesiology, psychoanalysis and
psychiatry"**
George Mashour & Katherine MacDuffie (Univeristy
of Michigan, Ann Arbor, United States)
- 16.30-16.50 *Coffee / tea break*
- 16.50-18.00 **Discussion**
- 19.00 *Dinner*
- 21.00 *Organ Concert by Leonardo Rous in the Church of San
Maurizio (Brusson, AO)*

Wednesday 27th May 2009

- 09.10-12.30 Morning Session**
- 09.10-09.40 **"Cognitive and brain function during sleep:
insights from dream reports"**
Sophie Schwartz (University of Geneva, Geneva,
Switzerland)
- 09.40-10.10 **"The threat-simulation theory of dreaming"**
Katja Valli (Univeristy of Turku, Turku, Finland)

- 10.10-10.40 **"The continuity hypothesis of dreaming in psychiatric patients"**
Michael Schredl (Central Institute of Mental Health, Mannheim, Germany)
- 10.40-11.00 *Coffee / Tea Break*
- 11.00-11.30 **"Quantitative EEG in lucid dreaming"**
Ursula Voss (Johann Wolfgang Goethe-Universität, Frankfurt/Main, Germany)
- 11.30-12.00 **"Autoscopic hallucinations and dreams"**
Miranda Occhionero (Università degli Studi di Bologna, Bologna, Italy)
- 12.00-12.30 **Discussion**
- 12.30-16.00 *Lunch + Free Time*
- 16.00-20.00 Afternoon Session**
- 16.00-16.30 **"Dream bizarreness in neurologic patients with frontotemporal dysfunction"**
Teresa Paiva (University of Lisbon, Lisbon, Portugal)
- 16.30-17.00 **"Hallucinations, REM Behavior Disorder and Parkinson's Disease"**
Raffaele Manni (IRCCS Mondino, Pavia, Italy)
- 17.00-17.20 *Coffee / tea break*
- 17.20-17.50 **"Cortical excitability during sleep and its functional role for cognitive capacities"**
Lisa Marshall (University of Lübeck, Lübeck, Germany)
- 17.50-18.20 **"Dream content in sensory dysfunctional subjects"**
Ana Rita Peralta (University of Lisbon, Lisbon, Portugal)
- 18.20-20.00 **Discussion on follow-up activities/networking/collaboration**
- 20.30 *Closing Dinner*

Thursday 28th May 2009

Departure

STATISTICAL INFORMATION ON PARTICIPANTS

12 MALES – 11 FEMALES

MEAN AGE 45,1 (AGE RANGE 22 – 76)

MEAN AGE OF MALES 47,3

MEAN AGE OF FEMALES 42,6

COUNTRIES: ITALY 5

GERMANY 4

PORTUGAL 3

UNITED KINGDOM 3

UNITED STATES 3

FINLAND 2

CANADA 1

CZECH REPUBLIC 1

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**The Dreaming Mind-Brain, Consciousness and Psychosis:
Bridging the gap from the Phenomenology of Mentation to
Neurones**

Challand Saint Anselme (Aosta) Italy, 25th–28th May 2009

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