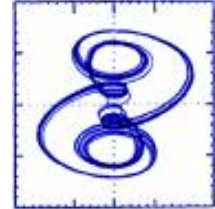


10TH HERBSTACADEMY
SELF-ORGANIZATION IN THE LIFE SCIENCES



Dear participants of and contributors to the 10th „Herbstacademy“,

We are glad to present you the scientific and cultural programme of this anniversary conference on synergetics and nonlinear dynamics in psychology, psychiatry, and related fields.

Because of the large number of interesting presentations every talk is restricted to 30 minutes of presentation time including discussion. Please respect this time schedule strictly.

If you arrive by train, leave the train at the station Bad Endorf. We will organize a shuttle service for the 5th June at 18.30h, 19.30h, and 20.30h.

If you prefer to take a taxi, taxi phone numbers are 08053 677 or 08053 1006 or 08053 1555.

Our meeting point on Wednesday evening is the restaurant at the conference centre. In the later evening (in case the restaurant is already closed), you will find us at the “Klosterstüberl” (bar of the conference centre).

If you have any questions, please contact us by e-mail (gschiepek.fksh@t-online.de or guido.strunk@wu-wien.ac.at) or by phone (G. Schiepek: 0049 711 3411998 or 0049 241 8089821; G. Strunk: 0043 1 31336 4010 or 0043 699 1040 8711).

The phone numbers during the conference are 0049 8624 897 301 and 0049 8624 897 0

If you run into any problems during your journey and want to contact us on Wednesday, the 5th of June, please use Günter Schiepek’s mobile phone number: 0172 84 23 308.

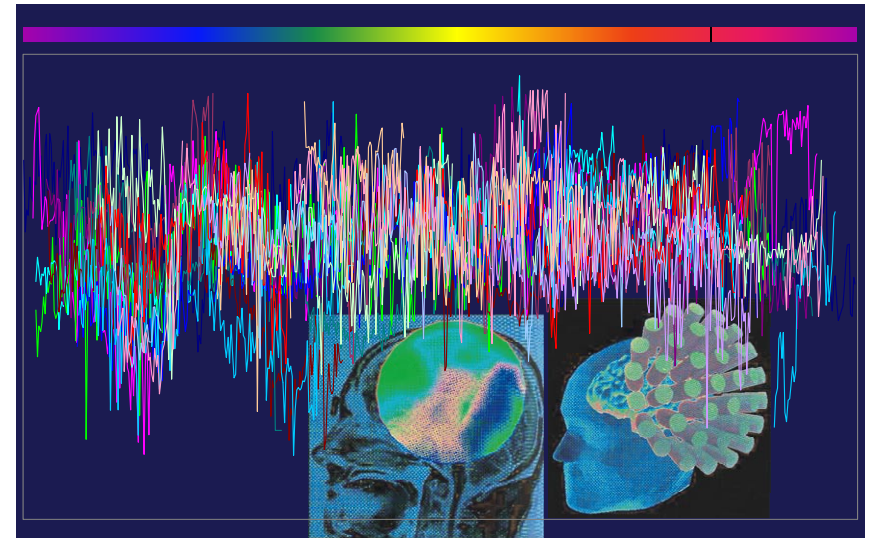
Already curious about your contributions, we wish you a good journey and are looking forward to meeting you in Seeon!

Sincerely yours

Günter Schiepek and Guido Strunk

SELF-ORGANIZATION

IN PSYCHOLOGY, PSYCHIATRY,
AND SOCIAL SCIENCES



EMPIRICAL APPROACHES TO SYNERGETICS IN
PSYCHOLOGY AND LIFE SCIENCES

PROGRAMME

Bildungszentrum Kloster Seeon

6th – 8th June 2002

SELF-ORGANIZATION

IN PSYCHOLOGY, PSYCHIATRY,
AND SOCIAL SCIENCES

EMPIRICAL APPROACHES TO SYNERGETICS
IN PSYCHOLOGY AND LIFE SCIENCES

PROGRAMME

- Welcome Addresses
- General Information
- Scientific Programme
- Abstracts

Large Welcome to Seeon

at the conference on Self-Organization in Psychology, Psychiatry and the Social Sciences: Empirical Approaches to a Psychological Synergetics, organized by Günter Schiepek, Ewald J. Brunner and Wolfgang Tschacher.

This is now the tenth enterprise of this kind, originally called "Herbst-Akademie" ("autumn academy"). I still remember very well how delighted I was when Günter Schiepek invited me to the first "Herbst-Akademie" he was going to organize at Bamberg in 1990. At that time, a meeting on such a topic surely was an endeavor. Why should Synergetics, a field that originated from physics and then spread into other disciplines of science, should be applicable to the humanities, and here in particular to psychology and psychiatry? This would mean a paradigmatic shift towards the concept of self-organization. Its basic idea implies that the psychologists and psychiatrists do not try to directly change the attitude of their clients, but rather help them to find their new attitude by themselves. I still remember the sadly sounding remark by a psychiatrist that whenever he had successfully treated his client, that man (or woman) felt that he/she had cured him/herself. So I told the doctor that this is the greatest success he could have: cure by self-organization. Understanding a rather complex theory is one thing, but applying it to bring out practical results is still another. Günter Schiepek and his colleagues have not only pioneered psychological synergetics by establishing this series of conferences, but also by their own active work in basic research and medical practice under this new paradigm. I am delighted that more and more practitioners and scientists join in this new approach that also finds its home in a number of institutions and societies, such as the Deutsche Gesellschaft für Komplexe Systeme and Nichtlineare Dynamik as well as the Society for Chaos Theory in Psychology and Life Sciences. I am looking forward to an exciting conference with inspiring presentations and many fruitful discussions. I am sure you will be pleased by the friendly atmosphere and beautiful surrounding.

Enjoy your stay at Seeon.

Hermann Haken

Dear colleagues,

Welcome to this 10th conference on synergetics and complexity research. It is called „Herbstacademy“, although - like this - not all Herbstacademies took place in the season of autumn. Founded in 1990 at the University of Bamberg the Herbstacademies offered an important platform of discussions and the exchange of ideas from its beginning until today. Successively theoretical considerations were followed by empirical results and by more formal models, while the interest in complexity, self-organization, and dynamics continued. “Thinking in complexity” in psychological fields had become an empirical science. New methods of assessment and measurement were introduced, primarily in order to get time series data of physiological, psychological, and social phenomena. Perhaps an important next step will be now to introduce this kind of thinking, theorising, and doing research to a broader public and to ask for its practical gains and consequences.

In my opinion, there is no other scientific paradigm which contributed in a similar way to the integration of scientific cultures and disciplines as synergetics and the theory of nonlinear dynamic systems did. The contribution of Prof. Dr. Dr. h.c. mult. Hermann Haken to this development can not be estimated and appreciated enough. Starting within mathematical physics he developed the tools for a deeper and more adequate understanding of human’s behaviour, thinking, and feeling. He offered new perspectives and answers to some of the important old questions of psychology, medicine, and other human sciences. From the first to this tenth Herbstacademy, Prof. Haken accompanied and supported these conferences.

Until now, the series organisers were Prof. Ewald J. Brunner, Prof. Wolfgang Tschacher, and me. Many thanks will be addressed to Dipl. Psych. Guido Strunk (Vienna University of Economics and Business Administration), Dipl. Soz. Michaela Pichlbauer (Sozialwissenschaftliches Institut München), Dipl.-Oec. Heiko Eckert (Management Zentrum St. Gallen) and Dr. Andreas Manteufel (Rheinische Landeslinik Bonn) for assisting the organization of this conference.

I hope we will have an interesting and inspiring conference earning some impulses for our future work and for science and practice of human life. Enjoy this event and the charming atmosphere of the Seeon monastery and its surrounding landscape.

Prof. Dr. Günter Schiepek
Klinik für Psychosomatik und Psychotherapeutische Medizin
Universitätsklinikum der RWTH Aachen

General Information

LOCATION

The conference will take place at the conference centre "Bildungszentrum Kloster Seeon" (Bavaria, Germany). The conference centre is placed on a peninsula situated at the Lake of Seeon. This former monastery is an island of tranquillity and hospitality for training and cultural events in the picturesque Chiemgau (Bavaria, half way between Munich and Salzburg)

TRAVEL ROUTES

Nearest airports are located in Munich and in Salzburg (Austria). From Munich as well as from Salzburg travelling by train is possible to Bad Endorf (nearest train station). For further information see the folder the conference centre or visit our conference web side.

ACCOMODATION

The conference centre offers overnight accommodations. Charges: 84,36 Euro for a single bedroom incl. breakfast. 66,47 Euro per person for a double bedroom incl. breakfast. Reservations should be addressed directly to the

Kultur- & Bildungszentrum Kloster Seeon
Klosterweg 1
D-83370 Seeon
Phone: 08624 897 0, Fax: 08624 897 420
e-mail: kontakt@kloster-seeon.de

For alternatives please visit our conference web side.

PRESENTATIONS

For oral presentations overhead, LCD and slide projectors will be available.

REGISTRATION

The regular conference fee is 130,- Euro; for students it is 80,- Euro. Registration takes effect with (electronic) fund transfer to the current account of the Herbst – Academy:

Account number 542 8222
Code word "Herbstakademie"
Bank code 710 520 50
Kreissparkasse Traunstein-Trostberg

Please register by sending an E-Mail to:

gschiepek.fksh@t-online.de

<http://www...>

Further information about the conference, location, accommodation, download of abstracts and programme you will find on our conference web side:

<http://www.wu-wien.ac.at/inst/ivm/herbstakademie/>

Scientific Programme

Thursday, 06.06.2002

- 9.00-9.15 **Opening and Welcome**
- 9.15-10.00 **Complexity Reduction**
Herrmann Haken
- 10.00-10.30 **Synergetics, and Complexity Research in Psychology –
Where We Stand and Where We Go**
Günter Schiepek
- 10.30-11.00 **Synergetics in Psychology: Vistas and Impasses Along the
Road**
Wolfgang Tschacher
-
- 11.00-11.30 **Break**
-
- 11.30-12.00 **On the Organization of Movement Actions from the
Psychological and Synergetic Point of View**
Karl-Heinz Leist
- 12.00-12.30 **A Further Development of the Haken-Kelso-Bunz Model on
Movement Coordination using Experimental Surveys/Tests**
Markus Blaufuß
- 12.30-13.00 **Nonlinear Dynamics of Cognitive Processes**
Zbigniew J. Kowalik, & Vladimir Gheorghiu
-
- 13.00-15.00 **Lunch**
-
- 15.00-15.30 **Consciousness and Self-Organization**
*Maria Eunice Quilici Gonzalez, Maria Candida Soares Del-Masso &
Pim Haselager*
- 15.30-16.00 **Avoiding the Categorization Trap in Self-Organized Learning**
Roul Sebastian John & Christian Werner
-
- 16.00-16.45 **Break**
-
- 16.45-17.15 **Complexity and Determinism of Short Symbolic Sequences:
Application to Linguistic Processes in Psychopathology**
L. Pezard, F. Leroy, J.-L. Nandrino & D. Beaune
- 17.15-17.45 **Self-Organization in Language Acquisition**
Annette Hohenberger

- 17.45-18.15 **Self-Organization in Language Development:
A Dynamic Account of Adult Second Language Acquisition**
Carolina Plaza Pust
-

- 20.00 **Cultural Event:**
Brass concert of the "Grassauer Blechbläser":
One of the most important European brass ensembles will be
giving a concert exclusively for us.
-

Friday, 07.06.2002

9.00-9.30	Information Dynamics and Self-Organization New Perspectives of Research in Systems Science, Informatics, and Humanities <i>Klaus Mainzer</i>
9.30-10.00	SIRN (Synergetic Inter-Representation Networks), Artifact and Snow's Two Cultures <i>Juval Portugali</i>
10.00-10.30	Break
10.30-11.00	Creativity and Self-Organization <i>Maria Eunice Quilici Gonzalez, Maria Candida Soares Del-Masso, Jônatas Manzolini & Pim Haselager</i>
11.00-11.30	Decision Making under Complex Uncertainty <i>Thomas Augustin</i>
11.30-12.00	The Influence of the Future: Temporal Characteristics of Nonlinear Synthesis of Complex Structures <i>Helena Knyazeva</i>
12.00-14.00	Lunch
14.00-14.30	Searching for a Common Mechanism in Psychological, Physiological, and Prebiotic „Self-Organization“: The Need for Problem Appropriated Semantics in Synergetics <i>Holger Schmid-Schönbein</i>
14.30-15.00	Variability of Blood Pressure in Normotensive Subjects and Hypertensive Patients. Applicability and Interpretations of Different Non-Linear Evaluation Concepts <i>H. Reiber, S. Schermann, H. Bettermann, D. Cysarz & C. Jacobi</i>
15.00-15.30	Break
15.30-16.00	Synorder of Physiological Rhythms during Harmonic Exercise <i>Birol Cotuk, Volker Perltz, Ralf Vandenhousten & Holger Schmid- Schönbein</i>
16.00-16.30	Daily Psychosocial Stressors are Connected with Cyclic Fluctuations in Both Urine Cortisol and Urine Neopterin in Patients with Systemic Lupus Erythematosus <i>Christian Schubert, Astrid Lampe, Willi Geser, Bianca Noisternig, Paul König, Dietmar Fuchs, Günter Schiepek & Gerhard Schüßler</i>

16.30-17.00	Break
17.00-17.30	Adaptivity of the Cardiovascular System under Variable „Load“: the Universal Applicability of the Haken-Koepchen- Concept of „Quasi-Attractors“ <i>Volker Perltz, Birol Cotuk, Akin Sen, Nir Kahn, Ernst Richard Petzold & Holger Schmid-Schönbein</i>
17.30-18.00	Extraction of Respiratory Sinusarrhythmia from Spectral- Doppler Data <i>Nir Kahn, Volker Perltz, Hendrik Jörn, Ernst Richard Petzold, Werner Rath & Holger Schmid-Schönbein</i>
19.00	Cultural Event: Songs about the “self-organization of love”: “Wie hab’ ich nur leben können ohne Dich...” Voice: <i>Cordelia Zipperling</i> Piano: <i>Andreas Manteufel</i>
20.00	Social Event: Short walk to the village of Seeon. Dinner in the “Rauchhaus”.

Saturday, 08.06.2002

- 9.00-9.30 Entropy Analysis of Psycho-physiological Reactions in the Therapeutic Process Taken as a Dynamical System
Thomas Villmann & Michael Geyer
- 9.30-10.00 Exploring the Development of Inner Control with Time Series Models: A Comparison of a Treatment and a Control Group
Ferdinand Keller & Maja Storch
- 10.30-11.00 Psychotherapy as a Non-Linear Dynamic Process: Identifying Changes of Dynamic Patterns and Coherence in Psychotherapeutic Time Series
Thilo Trumpf, Heiko Eckert, Stefan Weihrauch & Günter Schiepek
-

11.00-11.30 Break

- 11.30-12.00 Complexity Matters – Measures of Order are Related to Treatment Outcome in Schizophrenia
Zeno Kupper & Wolfgang Tschacher
- 12.00-12.30 Psychosis Therapy: A Novel Theoretical and Therapeutic Approach for the Special Treatment of Psychotic Patients in General Psychiatry
Gary Bruno Schmid
- 12.30-13.00 How May Conceptual Tools from Theories of Self-Organization Enhance Research on Change Processes in Psychotherapy?
Henri Schneider
-

13.00-15.00 Lunch

- 15.00-15.30 Social Self-Organization
Michael A. Stadler
- 15.30-16.00 How can Noise-Induced Nonlinear Phenomena be Detected in Data Sets in Psychology?
Marc-Thorsten Huett
- 16.00-16.30 Are the Stabilizing and Destabilizing Influences of the Planetary Gravitational Field on the Structural Formation of Biological Patterns Real?
Michael E. Nitsche
-

16.30-17.00 Break

- 17.00-17.30 What makes Innovation Non-Linear?
Nicole J. Saam & Wolfgang Kerber
- 17.30-18.00 Synergetics in Management Action
Timo Meynhardt & Heiko Eckert
- 18.00-18.30 Training of Systems-Thinking and Skills for Social Systems Development with Gaming and Simulation
Willy Christian Kriz
-

19.00 Social Event:
We will tour the Chiemsee by boat, concluding the conference by a dinner in a restaurant on the "Fraueninsel" ("women's island").

9.15-10.00

Complexity Reduction

Herrmann Haken

Humans are highly complex systems. Such systems consist of very many individual parts, whose cooperation may generate complex behavior. At first sight, the appropriate description of such systems requires an enormous amount of data. In order to be able to understand complex systems, this amount must be compressed by experiments as well as by their theoretical interpretation in an adequate manner. The concept of order parameters introduced in synergetics allows for such data compression in many cases. Order parameters play a double role: on the one hand, they describe the macroscopic state of the system, on the other hand, they determine the behavior of the individual parts (slaving principle). This relation between order parameters and enslaved parts can be of quite different kinds depending on the nature of the order parameters and the subsystems. In some systems, order parameters and parts are of physical nature, in others the order parameters are abstract quantities, while the enslaved parts are of physical or physiological nature. How can we measure the relation between order parameters and parts and also treat it theoretically? We develop a general concept and provide examples from psychology, including Gestalt psychology, pattern recognition, behavior of groups, and analysis of medical imaging.

10.00-10.30

Synergetics, and Complexity Research in Psychology – Where We Stand and Where We Go

Günter Schiepek

The interdisciplinary approach of synergetics and nonlinear dynamics gave rise to intensive theoretical as well as empirical efforts in psychology and its associated disciplines. Since its enthusiastic beginnings in the early 80ies of the last century, the "Herbstacademies" accompanied and mirrored an important part of this way. At the 10th of these conferences, let me ask the question: Where we stand and what about the promises of this approach? In my opinion, synergetics founded a paradigm of psychological research, characterized by the important function of time and dynamics (instead of timeless qualities and traits), patterns (instead of atomistic features), autonomous activity (instead of mere reactions to stimuli or treatments), and eruptive or phase-transition like behaviour (instead of continuous and linear developments). Theorizing is done by means of mathematical formalization or by computer simulations, and new methods of measurement and data analysis (nonlinear time series analysis) were developed. But: Is it a paradigm without "scientific normality"? Does interdisciplinarity prevent from intradisciplinary acceptance? How to cope with the discrepancies between scientific creativity and failing institutional integration and financial support? What can we do if we know about nonlinearity and complexity, and what are the consequences for practice in psychotherapy and management? Are steps to practical applications the key to "normality" and acceptance in science and business? What is the state of the developments of synergetic process-management strategies and data-based navigation through self-organizing processes in humans and organizations? Are there valid congruencies between brain dynamics and the dynamics of human behaviour and experience?

10.30-11.00

Synergetics in Psychology: Vistas and Impasses Along the Road

Wolfgang Tschacher

The development of systems theory and synergetics has offered a general framework, often called the dynamical approach, for disciplines that deal with complex systems. Psychology has been among the domains where major progress was foreseen as soon as the novel dynamical methods and concepts could be implemented. Since its initiation in 1990, the Herbstakademie community has been a promotor of such implementations. In this talk, I present a personal view that addresses

the achievements and vistas as well as the impasses of the dynamical approach in psychology. Firstly, I think that valuable contributions have been provided to clinical psychology by the notions of order increase (pattern formation) and by the application of vector autoregression to times series of therapeutic change mechanisms and of symptom ratings. Secondly, synergetics of cognition provides explanations to focal questions of cognitive science and even opens up perspectives of philosophical value. Nevertheless, numerous impasses of the dynamical approach have appeared in recent years, among them the radical-constructivist foundation of and debate in systemic psychotherapy and family therapy. I believe radical constructivism is inherently anti-scientific and has had detrimental effects on fields of "systemic" practice. In addition, metaphors based on chaos theory have entailed but little empirical support. I conclude that more effort and work should be invested in the promising "vistas" of the dynamical approach.

11.30-12.00

On the Organization of Movement Actions from the Psychological and Synergetic Point of View

Karl-Heinz Leist

For the successful execution of movements from the psychology of action point of view, the cognito-affective anticipation of the complete course of the movement (including the rhythm), constant anticipation of the situational dynamics, anticipation of the accentuation of certain actions, control of situations, becoming involved in the situational dynamics, etc., are all part of the process. Using experimental results, this will be compared with the relevant variables and their process dynamics from the synergetic point of view. The possibilities for classifying and for checking up on these should then be queried.

12.00-12.30

A Further Development of the Haken-Kelso-Bunz Model on Movement Coordination using Experimental Surveys/Tests

Markus Blaufuß

To start with a short explanation of the mathematical principles will be made, as they are necessary for the further understanding of this development. After describing the Kelso-Finger experiment, regarded as a milestone in motoric research, the Haken-Kelso-Bunz model, which simulated the Kelso and similar experiments, will be gone into. In the ensuing experiment it was not possible to confirm one essential aspect of HKB model. As a result, a new model for the coordination of bimanual movements was developed. Finally, the consequences for motor teaching and learning processes, resulting from the theory of complex systems and non-linear dynamics seen in its entirety, will be made clear using examples.

12.30-13.00

Nonlinear Dynamics of Cognitive Processes

Zbigniew J. Kowalik, & Vladimir Gheorghiu

The transition between synchronous and anti-synchronous movement in the bimanual coordination task can be explained either with a help of the specialized processing center (control center) or due to the self-organized states (control parameter).

If we do agree that the control center is not equivalent to some spatially concentrated region of the brain then these apparently opposite models of the dynamics will collapse to a unique and consistent one. We support here this hypothesis on basis of a simple "cognitive experiment" showing how can the local order be transformed into a global one. In our experiment a free controlled circle drawing task with a growing velocity of the drawing was measured in means of magnetoencephalographic (MEG) responses. The transition was then observed both in a regular

space (video recordings) and in the signal space of magnetic activation. We found a change of the magnetic brain activity corresponding to the observed transition in a motor-, temporal-, and in the frontal cortices. The analysis was performed by applying methods of nonlinear systems theory (NLD) and classic cross-correlation functions. NLD shows rapid reduction of dimensional complexity and stability measure in the mentioned brain regions. Our results suggest that qualitative transition is coupled with the change of the "decision space" - slow events are detected as a temporal series of events and fast events as an oscillatory process.

15.00-15.30

Consciousness and Self-Organization

Maria Eunice Quilici Gonzalez, Maria Candida Soares Del-Masso & Pim Haselager

Based upon principles of the self-organization theory (Asbhy, 1962; Bateson, 1972; Debrun, 1997; Gonzalez et al. 1999) and hypotheses developed by Vygotsky (1993) on the sociocultural notion of consciousness, we characterize the human mind as an embodied, embedded, self-organized system in which consciousness occupies a sampling of different parts. From this perspective, our central question is that of the linkage between consciousness, the world and the remainder of the mind. We argue that consciousness emerges out of the dynamic coordination of different brain areas (Edelman & Tononi, 2000; Parvizi & Damasio, 2001; Bressler & Kelso, 2001) that are in continuous interaction with the eco-social environment. We suggest that the metaphor of consciousness understood as "an observer behind a one way mirror" should be replaced by a more dynamic view. Instead we propose the metaphor of consciousness as a collective, self-organizing coupling of body and environment. According to this view, specific environmental and social conditions constrain the causal properties of the cerebral mechanisms. From the Vygotskian perspective, we argue that consciousness, guided by social regularities, translates reflexes of one bodily domain into another in a self-organized way.

Asbhy, W. (1962). Principles of the self-organizing system. In: Von Foester & Zopf (Eds). Principles of self-organization (pp.225-78). London: Pergamon.
Bateson, G. (1972). Steps to an ecology of mind. Chicago: The Univ.Chicago Press.
Bressler, S.L., Kelso, J.A.S.(2001). Cortical coordination dynamics and cognition. (pp.26-36). Trends in Cognitive Science, 5 (1).
Debrun, M. (1997). Auto-Organização e Ciências Cognitivas. In: Gonzalez, M.E.Q. et al (Org.). Encontro com as Ciências Cognitivas (pp.27-34). Marília: FFC.
Edelman, G.M., Tononi, G. (2000). A universe of Consciousness. New York: Basic Books.
Gonzalez, M.E.Q., Broens, M.C., Del-Masso, M.C.S. (1999). Memory and Self-Organization. Revista Electronica Informação e Cognição. Available from <http://www.marilia.unesp.br/atividades/extensao/revista/artigos.html>
Parvizi, J., Damasio, A (2001) Consciousness and the brain stem. (pp.135-59). Cognition, 79.
Vygotsky, L.S. (1993) Collected works; v.2. Edited by Robert Rieber & Aaron Carton. London: Plenum Press.

15.30-16.00

Avoiding the Categorization Trap in Self-Organized Learning

Roul Sebastian John & Christian Werner

One major challenge in building autonomous mobile robots (autonomous agents) is to equip them with a form of self-organized learning which should allow them to adapt to regularities in the interaction with a dynamic environment. Animals do show such abilities of learning and adaptation. We thus propose a methodology, called "Comparative Cognitive Robotics", to develop empirically grounded mobile robot models of learning based on comparative animal psychology. However, it can be shown that robot modelling, as well as any other form of modelling of self-organized learning, is constrained by what might be called the "categorization trap", i.e. mistaken assumptions about the

role of categorization in learning. As an alternative, we suggest an exemplar-based model of learning, memory and categorization. Theoretical accounts and our own empirical studies of categorization and discrimination learning in chickens (*Gallus gallus* fd) show that an exemplar-based approach is superior to feature- or prototype-based accounts (e.g. symbolic and artificial neural network models) in terms of: fit to empirical results, ecological validity and parsimony.

16.45-17.15

Complexity and Determinism of Short Symbolic Sequences: Application to Linguistic Processes in Psychopathology

L. Pezard, F. Leroy, J.-L. Nandrino & D. Beaune

Symbolic dynamics allows the quantification of series of discrete symbols such as linguistic data. We first investigated the validity of measuring the complexity of short symbolic sequences using topological, metric and algorithmic entropy indices. The possible detection of deterministic structures was also tested using surrogate methods.

Linguistic data obtained in a recall task, in schizophrenic patients, were then analyzed. We show that dynamical methods provide a more complete description of the linguistic structure in both controls and schizophrenic patients.

17.15-17.45

Self-Organization in Language Acquisition

Annette Hohenberger

Even though language acquisition is dynamical, dynamical paradigms have not yet been exploited by many researchers in this field. I want to argue that core issues of self-organization crucially apply to language acquisition and can help overcome the limitations of static linguistic paradigms such as generative grammar. I will explore symmetry-breaking as a mechanism of change, the role of control and order parameters in acquiring grammatical features (functional categories), variation as an indicator of an approaching bifurcation, the fractal nature of adult and child sentences (phrase markers), bootstrapping, oscillations, and, most importantly, the time-dependence of the acquisition process.

Hohenberger, A. (2002). Functional Categories in Language Acquisition: Self-Organization of a Dynamical System. Tuebingen: Niemeyer.

17.45-18.15

Self-Organization in Language Development: A Dynamic Account of Adult Second Language Acquisition

Carolina Plaza Pust

In the present paper I will show that a dynamic account of language development opens a new perspective on our understanding of adult second language acquisition. Evidence from different fields of linguistic research shows that the development of grammars is characterised by both variation and uniformity. Particularly in the field of adult second language acquisition, variation has been subject to an ongoing controversy regarding the cognitive mechanisms underlying this form of language acquisition. The realisation that language qua functionally complex system is also subject to processes of self-organization allows us to further investigate the creative potential which is implicit in our modularly organised language faculty.

On the basis of adult L2 German data we will see that dynamic processes are equally relevant in the organization of multilingual knowledge as they are in the internal organization of a language-specific grammar. Crucially, apparent conflicts resulting from linguistic contact situations gain a new significance under a dynamic approach: they pave the way for necessary changes.

9.00-9.30

Information Dynamics and Self-Organization New Perspectives of Research in Systems Science, Informatics, and Humanities

Klaus Mainzer

In recent time, information processing in complex systems has become a great challenge of systems science and informatics. Self-organization is a leading paradigm of information dynamics in nature. Therefore, cellular and neural communication systems of natural evolution are blue-prints of artificial information systems in technology. Soft Computing is a new approach of informatics to integrate aspects of human cognition and social behavior into technical systems in order to overcome the traditional interface of man and machine. Research in this field needs an interdisciplinary cooperation of systems science, informatics, cognitive science, and psychology. Obviously, there are fruitful applications in medicine and neural science. The paper finishes with new perspectives toward a sustainable future of information society on the background of self-organization.

9.30-10.00

SIRN (Synergetic Inter-Representation Networks), Artifact and Snow's Two Cultures

Juval Portugali

Consider the following scenario of city dynamics: Agents come to a new city in order to find a location and live in it. They take their location and action decisions according what they know about cities in general and that specific city in particular. That is to say, according their cognitive maps of the city. Each agent takes decisions and actions locally, yet the synergistic interaction between the many local decisions and actions of agents gives rise to the global dynamics and structure of the city. The latter, in their turn, feed back on the cognitive map of every individual agent, which once again decides and acts in the city according to its cognitive map and so on in circular causality. On the face of it there is nothing unusual in the above scenario. The fact is, however, that such a description starting as it does from humans' innate cognitive capability to construct cognitive maps, moves to their synergistic effect on the global structure of the city and back again to each individual memory, rarely exists. The majority of urban models derive their explanation from first principles of economics, society or culture, etc., overlooking or oversimplifying in the way the cognitive dimension of such principles. On the other hand, cognitive studies simply disregard cities and their dynamic for the simple reason that they consider them as 'not cognitive'. The question is why? In my paper I answer this question by reference to a conjunction between Simon's (1999) notion of "The Sciences of the Artificial" and Snow's thesis about science's "Two cultures". I then argue that Haken's synergetic approach to complexity and self-organization defines a research domain that has the potential to bridge Snow's two cultures and as a consequence allows a cognitive treatment of cities. This argument follows "Self-Organization and the City" (Portugali, 1999) and the notion of SIRN (Synergetic Inter-Representation) as developed by Haken and Portugali.

10.30-11.00

Creativity and Self-Organization

Maria Eunice Quilici Gonzalez, Maria Candida Soares Del-Masso, Jônatas Manzolli & Pim Haselager

Is it appropriate to investigate creative processes from a mechanistic perspective or do they involve subjective elements which cannot - in principle - be investigated from such a perspective? These two basic questions will guide this paper which investigates Creativity focusing on premises of the Self-Organization Paradigm. Possible contributions of Cognitive Science - and especially of connectionism - to the understanding of Creativity will be discussed from the Philosophical

perspective. As an initial hypothesis we characterise Creativity as a self-organizing process in which abductive reasoning occurs allowing the expansion of well structured search spaces. This process is considered a part of the establishment of order parameters in the flow of distributed information available to self-organizing systems. In this sense, we argue that promising contributions of Cognitive Science to studies of Creativity could be given with the understanding of how self-organizing processes involving abductive reasoning may take place in dynamic systems which process parallel information.

11.00-11.30

Decision Making under Complex Uncertainty

Thomas Augustin

Statistical decision theory provides a widely accepted framework for determining optimal actions in decision problems under uncertainty. In complex systems, however, the sound applicability of that theory is quite limited by the very strong assumptions it requires. By postulating that all the uncertainty can be expressed by a precise probability distribution, the mathematical apparatus in the background asks for a level of precision and internal consistency of the information which can hardly be satisfied in complex environments. As a consequence, several paradoxes arise.

In the last years more and more researchers have been objecting to the paradigms of classical probability theory, aiming at a generalization of the mathematical formalization of probability which has the power to model complex and uncertain knowledge appropriately, in order to avoid deceptive conclusions.

The talk wants to give an impression of this new development in statistics, which could be of interest for various disciplines. Based on some simple examples, firstly concepts of classical decision theory and their pitfalls are considered. Then solutions based on the new concept of probability are brought up for discussion

11.30-12.00

The Influence of the Future:

Temporal Characteristics of Nonlinear Synthesis of Complex Structures

Helena Knyazeva

The models of emergence of structures and their fast evolution in nonlinear dissipative media elaborated by the Moscow school of synergetics and nonlinear dynamics at the Keldysh Institute of Applied Mathematics RAS allow to develop a holistic vision of evolutionary processes. Some constructive principles of nonlinear synthesis, of co-evolution of complex structures having different rates (tempos) of evolution, of assembling a complex evolutionary whole from mobile parts are formulated. The most important and paradoxical consequences of these holistic notions are: 1) the explanation why and under what conditions a part can be more complex than a whole; 2) space-time characteristics of complex structure-attractors that are described by invariant-group solutions which provide us with a key how to see the past and the future of these structures in the today's picture of their evolution; 3) the possibility of a direct influence of the future, even the possibility of touching an infinitely remote future at a certain stage of evolution and in certain regimes. The demonstration of the notions is given in the paper on the materials from cognitive science: the temporal structure of cognitive act, as it was studied in F.Varela's conception of enactive cognition, is considered.

The research is supported, in part, by the Russian Foundation of the Humanities (grant # 01-03-00367).

[1]. Knyazeva, H. and Kurdyumov, S.P. (2001) Nonlinear Synthesis and Co-evolution of Complex Systems. In: World Futures. Vol.57. P.239-261.

[2] Knyazeva, H. and Kurdyumov, S.P. (2002) Foundations of Synergetics: Blow-up Regimes, Self-organization, Tempoworlds. St.Petersburg: Alethea. 413 p. (book in Russian to appear).

Searching for a Common Mechanism in Psychological, Physiological, and Prebiotic „Self-Organization“:

The Need for Problem Appropriated Semantics in Synergetics

Holger Schmid-Schönbein

The paradigms (defined as a mode of description for a collectively observed mode of operation of dynamic systems) currently studied in the field of general and physiological synergetics are strongly disturbed by the traditional physical semantics stemming from the 19th and early 20th century. Since about 1900, i.e. Max Planck's discovery of the combination of holistic and eruptive in subatomic physics and Charles Sherrington's disclosure of „reactions per saltim“ in compound reflexes in awake animals, the natural sciences are aware of the fact that eruptive kinetics on the one hand, and „self-optimising efficiency“ can be frequently observed in periodically functioning, powerfully driven systems.

Extending Ludwig von Bertalanffy's analysis of living systems as „sites of flow equilibria“, the project of physiological synergetics has been focussing on the microscopic and submicroscopic movement patterns and their „drive dependent consensualisation“. It is now established beyond reasonable doubt that the latter are underlying the emergence of „resonant modes of operation“ in ensembles conventionally paraphrased as „non-linearly reacting“. Moreover, it is now established that – when seen from an energetic point of view – macroscopically visible (or technically detectable) „activities“ in actual fact represent passive movements, which by the appropriate stimuli are „released“ from a previously dominating inhibition. Closely related inhibitory systems are also responsible for „flow equilibria“ (often categorised as „non-equilibrium states“). It could be shown that „self-organization“ is neither spontaneous (since it occurs in a drive dependent fashion) nor does it affect material (but it rather follows from the consensualisation of a priori existing movements of mixed phases). It thus becomes obvious that the awkward phrase „non-linear non-equilibrium reactions“ in actual fact represents self limiting impulsive discharge events occurring in systems robustly sustained in a dysequilibrated state by a set of inhibitions which physically loose their dominating influence. Extensive studies in prebiotic, cellular, organ related, neurodynamic and organismic systems have disclosed a priori unexpected universalities of prima vista entirely different systems which all are controlled by disinhibition-reinhibition sequences. The one's our group has studied are ranging from the operation of pulsed LASER's via small ensembles of membrane channels to the dynamics of socio-dynamic events like the La Ola-Phenomenon in „excited crowds“ assembled in sports stadiums.

The „order“ found in these paradigmatic examples of „natural efficiency“ (physically speaking resulting from the elimination of „inefficient“ modes of operation) is, of course, by no means new. As a matter of fact, as recently shown by Thomas Buchheim, the presocratic concepts of „physis“ (a term translated into the German Term „Eigenwüchsigkeit“, a composite noun having the same connotation as Whitehead's „becomingness“) are reflecting the Greeks had the idea that „natura naturans“ were based on what we call „self-organization“ today. The mechanisms of self-limiting discharge can thus provide a novel explanation for many of the aspects of „natural goal orientation“, which can now be comprehended in the Kantian sense of an „as if teleology“, which is a term improving the precision of his word „Als ob Teleologie“. Natural systems and their elements know nothing about goals, but when strongly driven they are endowed with a force like inclination to proceed from highly unlikely to less unlikely states via modulation of inhibitory effects.

Variability of Blood Pressure in Normotensive Subjects and Hypertensive Patients. Applicability and Interpretations of Different Non-Linear Evaluation Concepts

H. Reiber, S. Schermann, H. Bettermann, D. Cysarz, & C. Jacobi

Reduced complexity of heart rate variability in patients with heart diseases compared to normal subjects induced many questions and many research projects in the past years.

It was the aim of our study to find additional examples which can confirm this general approach to understand chronic diseases with changing complexity of self-organizing processes and to compare clinical relevance of different non-linear evaluation methods (1).

We investigated patients with arterial hypertension, fear syndromes (agoraphobia) and patients with a combination of these phenomena. Photoplethysmographic arterial pressure (Portapres, Amsterdam, sampling rate: 100Hz) was recorded at the finger tip and series of successive systolic maxima were evaluated by three methods: phase portraits, approximate entropy (ApEn) (2, 3) and double logarithmic plot (power plot).

Results: The logarithm of frequencies is a linear function of the logarithm of the size of systolic blood pressure differences in case of normal volunteers and patients with a fear syndrome. Patients with arterial hypertension under different medical treatments show a non-linear curve in this power plot.

The evaluation by ApEn (difference between real time series and surrogate data) shows an age-related decrease in normotensive subjects, which does not correspond to an age-independent slope in the double logarithmic plot of these volunteers.

Evaluation by phase portraits was not possible due to the nonstationarity of the time series.

[1] Wagner CD and Persson PB. Nonlinear chaotic dynamics of arterial blood pressure and renal blood flow. *Am J Physiol* 1995, 37: H621-H627.

[2] Pincus S. Approximate entropy (ApEn) as a complexity measure. *Chaos* 1995, 5:110-117.

[3] Cysarz D, Bettermann H, and Van Leeuwen P. Entropies of short binary sequences in heart period dynamics. *Am J Physiol* 2000, 278: H2163-H2172.

Synorder of Physiological Rhythms during Harmonic Exercise

Biról Cotuk, Volker Perltz, Ralf Vandenhouten & Holger Schmid-Schönbein

Problem: During „harmonic exercise“, subjects are allowed to choose time-variable power output and locomotion frequency according to their subjective perception of ease or load, resp. By closing the eyes, listening to classical music, and trying to reach a relaxed state of mind, a psychological detachment of sensorimotor afferences is hypothesized to be promoted. To test this method, eight test persons (7 male, 1 female) exercised at constant power output on a bicycle ergometer at their own preferred exercise intensity (all subjects choose levels between 100-110 W).

Method: Heart beat (thoracic ECG), blood pressure (Finapres-method), respiration (strain gauge), cutaneous blood volume oscillations (photoplethysmography, PPG), and locomotion frequency (light gate) were continuously recorded non-invasively. Time series were analysed for autonomic nervous system rhythms using mathematical tools developed in the context of non-linear time series analysis: recurrence plot [RP], post event scan [PES], time frequency distribution TFD [Morlet-Wavelet transformation], pointwise transinformation [PTI], and Hilbert-Transformation [HT].

Results: Various n:m coordination patterns between respiration (BR), heart beat (PU), locomotion (LO), and microcirculatory oscillations (MO) were observed during harmonic exercise. Phase walks and transitions of coordination ratios interrupted defined periods of phase locking. Preferred coordination ratios were 1:2 & 1:3 & 1:4 for MO:BR; 1:1 & 2:3 & 4:3 for LO:PU; and 1:2 & 1:3 for BR:LO. Interestingly, respiration was coupled stronger to microcirculatory oscillations than to locomotion, although episodes of phase-synchronization between respiration and locomotion were also present. Heartbeat and locomotion cadence were tightly coupled and exhibited long epochs of phase-synchronization. This dyadic pattern of coordination, namely MO with BR and PU with LO, was present in all subjects, albeit to a varying degree. The emergence of a ca. 0.15 Hz rhythm in the circulatory system, as evidenced by TFD analysis of skin blood content fluctuations, heart rate variability and blood pressure oscillations, was found both to be a significant marker of established „psycho-physical harmony“, as well as the basic frequency of coordination for the physiological subsystems. The ca. 0.15 Hz rhythms was vividly prominent in cutaneous blood content fluctuations, and for all subjects the most stable coordination was between the ca. 0.15 Hz rhythm and breathing frequency. Most interestingly, for short epochs the dyadic pattern of coordination tended to yield a unitary rhythmicity by „hyper-coupling“ between respiration and locomotion without destabilization of former coordination patterns. We labeled this resonant mode of operation of

physiological rhythmicity “synorder”, emphasizing simultaneous n:m-coordination between multiple physiological processes founded on a basic frequency of ca. 0.15 Hz. These novel findings should be interpreted as evidence for synergetic consensualization of motor, breathing and cardio-vascular rhythms in the common brain stem (CBS) of the lower medulla.

16.00-16.30

Daily Psychosocial Stressors are Connected with Cyclic Fluctuations in Both Urine Cortisol and Urine Neopterin in Patients with Systemic Lupus Erythematosus

Christian Schubert, Astrid Lampe, Willi Geser, Bianca Noisternig, Paul König, Dietmar Fuchs, Günter Schiepek & Gerhard Schüßler

This project investigated the complex biochemical responses to individually meaningful everyday stressors in systemic lupus erythematosus (SLE), a chronic autoimmune disease. For this purpose, a new integrative approach to such data was developed.

Patients with SLE collected their complete urine for at least 50 days on a 12-hour basis for the determination of cortisol and neopterin, a cellular immune parameter. Additionally, using questionnaires, daily notes and interviews, extensive psychosocial and psychological time-series data were collected every 12 hours. These serial data were then analyzed using both ARIMA modeling and cross-correlational analyses.

In this project we were able to show that stressful incidents were associated with critical fluctuations and, moreover, with cyclic patterns in urine neopterin and urine cortisol. These findings indicate that the temporal connections between minor stressful incidents and biochemical parameters are more complex than usually assumed and should be taken into consideration when psychosomatic aspects are investigated.

17.00-17.30

Adaptivity of the Cardiovascular System under Variable „Load“: the Universal Applicability of the Haken-Koepchen-Concept of „Quasi-Attractors“

Volker Perltz, Birol Cotuk, Akin Sen, Nir Kahn, Ernst Richard Petzold, & Holger Schmid-Schönbein

Problem: Equally necessary as prominent is the ability of biological systems to adapt to changes in environment, reflected by „non-stationarity“, or “non-linearity” observable also in (psycho)-physiological time series. In the absence of changes in drive, these systems will naturally also exhibit deterministic responses. As contradictory as they are unfortunately considered, these features form the background for both arenas of research, one focussing on steady-state properties, relying exclusively on linear mathematics, the other – neglected widely for reasons of feasibility thus far – targeting those essential biological features, such as phase transitions, employing algorithms such as Morlet – Wavelet – Analysis, Post – Event – Scans, or Recurrence Plot Techniques (1). Albeit psychomotor relaxation is commonly regarded as a lucid example of steady-state behaviour, mediated by an increased level of parasympathetic nervous system activity, these techniques allow the identification of rhythmic behaviour transgressing frames and limitations imposed and nurtured by deterministic approaches.

Methods, Results & Discussion: Time series obtained in awake human subjects under 1. Autosuggestive relaxation, as well as 2. increasing levels of non-invasive pain exposure (blood-pressure cuff attached to the upper thigh) were analysed with above mentioned techniques. This led to an understanding that systems do not need to be examined at the rather arbitrary „physical resting conditions“, but allowed insight into such essential modes of operation, such as „attenuated“ or „driven“ states. In both cases, a self-organised rhythm at ca. 0.15 Hz emerges (and submerges) which was recently shown to represent collective activities in central and peripheral „effectors“. Furthermore, by plotting sequences of prolonged time series as Post – Event – Scans, clear, albeit

transient episodes of N:M-synchronisation appear at different levels of manifestation in different subjects.

[1]: Vandenhouten, R. (1999) „SAnTis“, ein Programmpaket zur Analyse instationärer, rauschbehafteter und nicht-linearer Zeitreihen. Ph.D. Dissertation, RWTH Aachen (now commercially available as Dataplore®).

17.30-18.00

Extraction of Respiratory Sinusarrhythmia from Spectral-Doppler Data

Nir Kahn, Volker Perltz, Hendrik Jörn, Ernst Richard Petzold, Werner Rath & Holger Schmid-Schönbein

Problem: During psychophysical rest and relaxation, heart rate will oscillate in direct (i.e. 1:1-coupling) response with respiratory activity. This phenomenon is also known as Respiratory Sinusarrhythmia (RSA), and is considered to be an indirect measure of parasympathetic nervous outflow to the heart. The presence, or absence, resp., of RSA therefore qualifies as an indicator of the individuals ability to generate stress avoidant self-regulation, a state termed according to W.R. Hess trophotropic state (i.e. serving nutrition). The healthy outcome of pregnancy requires much of this ability, and is impaired at certain disorders putting mother and foetus at risk. Abundant medical testing during pregnancy can easily become a contributing calamity to materno(-foetal) stress. Recognition of health promoting behaviour from otherwise obtained physiological data can thus hit two flies with one swat: reassure and control an essential measure of stress avoidance on the other hand, as well as reducing unnecessary medical testing on the other hand. To this end, we have devised a routine allowing the detection of the trophotropic state extracted from spectral-Doppler (SD) data, one of the most commonly and frequently applied tests during pregnancy.

Methods and Results: This routine extracts maxima of amplitudes of blood flow velocity from SD-data. This in turn allows identification of RSA using non-linear algorithms.

Validation of this routine was performed by parallel non-invasive recording of SD, respiration, ECG, and cutaneous vasoparalytic microcirculation (glabella region of the forehead), photoplethysmographia (PPG) of 1 volunteers in their 3. Trimenon, to be followed by comparison of vegetative measures from both data sets. Determination of RSA was achieved from both PPG- and SD-data using Morlet–Wavelet based algorithms which generate Time-Frequency-Distribution portrays (TFD). These images instantaneously allow visual recognition of 1:1-coupling between respiration and RSA-pattern

Conclusion: Development of computational devices helped identify for the first time recognition of markers of the autonomic nervous system which are fully established for the determination of vegetative states essential for the healthy outcome of pregnancies. The combination and implementation of these devices with state of the art doppler-spectrometry will minimize at the same time medical testing expenditure during pregnancy which is highly desirable from multiple point of views.

9.00-9.30

Entropy Analysis of Psycho-physiological Reactions in the Therapeutic Process Taken as a Dynamical System

Thomas Villmann & Michael Geyer

In this contribution we study for a single case the dynamic of psycho-physiological parameters during the course of a psycho-dynamic therapy for both patient and therapist. The measured values include heart rate, muscle tension, skin conductance and other for which we investigate the variability of changes. By application of an artificial neural network we are able to determine the non-linear relations between them [2] which allow a visualization of the therapy dynamics as a color description. Moreover we can derive the probability distribution of changes of the psycho-physiology and its entropy during the therapy for patient and therapist for further mathematical analysis. From this we result that both distributions are correlated using the respective entropies. This means that the psychophysiological reactions of patient and therapist are not independent. Thereby, the entropy can be interpreted as a measure of variability of psycho-physiological changes. A comparison of the entropies with the results of speech analysis according to the cycle model introduced by Mergenthaler shows that the psycho-physiological reactions are highly correlated with the structure in speech. Yet, the psycho-physiological reactions indicate the different phases in therapy more precisely.

Otherwise, if we take the therapy process as a dynamic system as suggested by Tschacher et al., the obtained entropies can be taken as an energy measure. In this way we are able to substantiate the formal energy concept in the approach from Tschacher taking the therapeutic process as a dynamical self-organizing system. Thereby, we show that high entropy values correspond to instable states whereas low values can be assigned to phases of restricted (stable) periods in therapy.

9.30-10.00

Exploring the Development of Inner Control with Time Series Models: A Comparison of a Treatment and a Control Group

Ferdinand Keller & Maja Storch

In a previous study, we examined time series methods for evaluating the dynamics of personality change in thirteen students who attended a course of personality development. In order to assess the expected smooth transformations in personality, the students rated their mood, activity, tension, and feeling of inner control on visual analogue scales twice a day during four months (4 weeks baseline, 6 weeks course, and 6 weeks after course). We could confirm that the students showed an increasing stability (i.e. decreasing standard deviations), but the two other hypotheses (higher innerpsychic coherence, i.e. increasing autocorrelation coefficients, and dissociation of mood and feeling of inner control, i.e. decreasing cross-correlation coefficients) could not be accepted. In this poster, we present results of a second study where another group of students (n=14) was assessed with the same instruments and time sampling. Additionally for methodological reasons, we included a control group (n=17). Data are currently analyzed and results will be compared between groups, in particular concerning the differences in the time series parameters.

10.30-11.00

Psychotherapy as a Non-Linear Dynamic Process: Identifying Changes of Dynamic Patterns and Coherence in Psychotherapeutic Time Series

Thilo Trump, Heiko Eckert, Stefan Wehrauch & Günter Schiepek

Assuming that human processes like learning or development are self-organizing processes, psychotherapy-induced changes can be understood as changes of behavioural and cognitive dynamic patterns. Changes of dynamic patterns are marked by the destabilisation of attractors.

Phenomena one can observe during those order transitions are extreme fluctuations and changes in coherence.

As an empirical approach to identify order transitions in psychotherapeutic processes we used time series data of daily mood and cognition ratings by psychotherapeutic inpatients. Two different methods of time series analysis were applied to the data: We used Recurrence Plots (Eckmann et. al., 1987) to identify dynamical changes by time delay embedding and complexity resonance diagrams (Schiepek et. al., 2001) to detect accumulations of extreme fluctuation and allocation. Then we related the so identified indicators of order transitions to the therapy results.

Eckmann, J.-P., Oliffson Kamphorst, S. & Ruelle, D. (1987). Recurrence Plots of Dynamical Systems. *Europhysics Letters*, 4, 973-977

Schiepek, G., Eckert, H., Honermann, H. & Wehrauch, S. (2001). Ordnungswandel in komplexen dynamischen Systemen: Das systemische Paradigma jenseits der Therapieschulen. *Hypnose & Kognition*, 18(1/2), 89-117

11.30-12.00

Complexity Matters – Measures of Order are Related to Treatment Outcome in Schizophrenia

Zeno Kupper & Wolfgang Tschacher

The symptoms of schizophrenia can be summarized as manifesting a loss of order and organization in cognition, emotions, and behavior. This view has been supported by descriptive psychopathological studies, using cross-sectional research designs. Mathematical approaches to complexity can extend this analysis to treatment courses. In such studies, complexity can be defined mathematically as the amount of symptoms' variation over time that follows an ordered pattern. In two independent studies, we explored correlates of order in schizophrenia spectrum disorders. Using psychopathological and functional ratings, we studied patients both during acute treatment and during rehabilitation. As a main result, order as well as increase in order were generally related to favorable states. Meaningful exceptions to this general result were found depending on the phase of treatment. Accordingly, order might be related to recovery from psychotic crisis and stable remission, but also to depressive states and negative symptoms.

12.00-12.30

Psychosis Therapy:

A Novel Theoretical and Therapeutic Approach for the Special Treatment of Psychotic Patients in General Psychiatry

Gary Bruno Schmid

This talk introduces a new approach to psychosis therapy with an emphasis upon the special treatment of psychotic patients in general psychiatry. It is the synthesis of over a decade of theoretical pondering, research work, and hands-on experience with people suffering from a psychotic disturbance. This synthesis has, over the past seven years, led to the development of a "synergetic" form of group psychotherapy which we call «Phantasy Therapy». For reasons which will become clear from the presentation, it is fitting to call this new approach a «mind-body-social approach». The first half of the talk discusses the theoretical foundations for a new evidence-based bioneurological hypothesis of the phenomenon «psychosis». The second half presents a novel, multimedial form of group psychotherapy for psychotic patients in acute (stationary) and rehabilitation (ambulatory) phases.

Schmid, G. B. (1997). Chaostheoretische Betrachtungen zu Psychiatrie, Psychologie und Psychotherapie. Teil 2: Neue Hypothese zur Natur der Psychose. *Forschende Komplementärmedizin / Research in Complementary Medicine*, 4(4), 194-208.

Schmid, G. B. (2001). Die Bedeutung Benedettis für die Therapie der Schizophrenie. Zu Ehren von

Gaetano Benedetti. Forum für Kunsttherapie, 1/2, 3-19.

Schmid, G. B., Eisenhut, R., Rausch, A., Ito, K., Dämpfle, S., Frei, K., & Giacometti Bickel, G. (2000). Phantasietherapie: In der Phantasie die Realität wieder finden. «Das praktische Gerüst». Forum für Kunsttherapie, 2, 34-49.

Schmid, G. B., Eisenhut, R., Rausch, A., Ito, K., Dämpfle, S., Frei, K., & Giacometti Bickel, G. (2001). Fantasy Therapy in Psychiatry: Rediscovering Reality in Fantasy. A Special Treatment for In- and Outpatients in General Psychiatry. Forschende Komplementär Medizin, accepted for publication.

12.30-13.00

How May Conceptual Tools from Theories of Self-Organization Enhance Research on Change Processes in Psychotherapy?

Henri Schneider

In the writings of psychotherapists as well as in research journals, sequences are described that emerge from the interaction of client and therapist and facilitate the client's change process. Increasingly, authors are drawing on theories of self-organization in order to capture the patterns underlying these "facilitating process phenomena" (as I have tentatively called them). An example from psychoanalytic literature is cited as an illustration.

By extracting productive process phenomena from therapeutic interaction and working out in detail how change can be facilitated by the therapist, a new research field may come into being. A basic requirement for this is the availability of concepts drawn from theories of self-organization that can be used as "tools" for extracting facilitating process phenomena from the interaction between client and therapist.

However, while the process phenomena described up to now may be said to be quite salient, the difficulty will be to supply conceptual tools that would allow detection of change patterns that are less easily recognizable (e.g. by being distributed over a number of episodes). An idea about how to do that is sketched.

15.00-15.30

Soziale Selbstorganisation

Michael A. Stadler

Komplexe Systeme bestehen aus elementaren Einheiten und elementaren Mechanismen, die das Verhalten der Einheiten determinieren. Ordnungsparameter basieren auf der Elementaraktivität der Teile, die sie gleichzeitig organisieren. Daher kann man von Kreiskausalität zwischen elementaren Teilen und globalen Ordnungsparametern sprechen. Ordnungsparameter zeigen emergente Eigenschaften, die die Teile selbst nicht besitzen. Dies alles ist von physikalischen, chemischen und biologischen Systemen wohl bekannt, untersucht und modelliert. Die Frage ist nun ob soziale Systeme, deren Elemente die psychophysischen Einheiten „Mensch“ sind, den gleichen Gesetzmäßigkeiten komplexer Systeme gehorchen. Auf der Verhaltensebene ist dies sicher der Fall, was an den Beispielen „Schwimmbad“, „La Ola“ und „Börse“ gezeigt werden kann. Das Neue und Besondere ist aber, daß wir daneben eine Innensicht der Elementareinheiten besitzen. Dies kompliziert die Untersuchung komplexer sozialer Systeme erheblich, ermöglicht aber auch neue methodische Zugänge: Serielle Reproduktion, Disambiguierung und Nichtlinearisierung. Hieraus werden einige Regeln sozialer Selbstorganisation abgeleitet und auf ihre Relevanz für die Lösung sozialer Probleme überprüft.

Stadler, M. (1996). Soziale Selbstorganisation aus der Innen- und Außenperspektive. Ethik und Sozialwissenschaften 7, 641-642.

15.30-16.00

How can Noise-Induced Nonlinear Phenomena be Detected in Data Sets in Psychology?

Marc-Thorsten Huett

A helpful view towards spatiotemporal patterns, e.g., in the life sciences is that neighbor interactions determine the time development of the individual elements and, in turn, lead to patterns on a large scale (compared to the size of a single element). Often these patterns emerge abruptly, when a critical value of a (slowly drifting) control parameter is passed. Such processes of self-organization, when observed in an experiment, require analysis techniques, which are capable of interpreting the data in terms of such local (neighbour) interactions.

The development of new analysis techniques can be complemented by studying model systems. This is particularly true for the experimental investigation of nonlinear systems. The idea is to generate sample data using models and then put similar restrictions on these sample data as in the case of an actual experiment. Examples for typical restrictions are (1) only one of the dynamical variable is measured, (2) the sampling rate is reduced or (3) the values of internal parameters for different time series are unknown. With the help of such sample data one can test, how well the analysis tools are capable of handling real-life data. In many cases one can improve the analysis techniques significantly on the basis of such tests.

In the present paper we focus on a particular set of analysis tools, namely spatiotemporal filters based upon nearest-neighbour rules similar to cellular automata. With these tools we study sample data with certain statistical properties. A focus is on the phenomenon of spatiotemporal stochastic resonance and on spatial

Correlations within the noise, which may help distinguish between internal and external noise. Implications for the study of spatiotemporal phenomena in psychology are discussed.

16.00-16.30

Are the Stabilizing and Destabilizing Influences of the Planetary Gravitational Field on the Structural Formation of Biological Patterns Real?

Michael E. Nitsche

A whole series of indications would seem to offer evidence that the relatively weak fluctuations in the planetary gravitational field have a non-linear influence on structure-building processes. Frequencies of the fluctuations, which remain relatively stable over long periods, show a correlation with biological structures. A correlation function displaying the stabilizing and destabilizing states with a certain probability forms a good way of describing these processes. Using this correlation function, correlations in the structural building of human intelligence, the stability of psychological processes and, indeed, the triggering of earthquakes have already been investigated. These results seem to indicate that the correlation function might also be suitable for describing influencing factors on other human evolutionary processes.

17.00-17.30

What makes Innovation Non-Linear?

Nicole J. Saam & Wolfgang Kerber

Innovation economics up to now explains the non-linearity of innovation by help of the concept of lock-ins. For example, lock-in effects can be caused by dynamic economies of scale (learning by doing) or network externalities, e.g., in case of technologies. Both can lead to first-mover advantages for the best firm, which cannot be caught up by the competing firms, even if they have developed superior technologies at a later point of time. So a wrong market selection can take place, because inefficient technologies can survive in the long run (David, 1985; Arthur, 1989).

From a simulation modell which is based on an evolutionary economics approach (von Hayek) we

Poster sessions will be held daily half an hour
before the afternoon session.

derive a new explanation for the non-linearity of innovation: lock-in effects due to the non-imitability of particular activities. The lock-in effect we elaborated is especially interesting for further research, because the non-imitability of particular activities in competition is a wide-spread phenomenon, which can be found in most markets.

In our model of the Hayekian competition processes of experimentation and mutual learning no first-mover advantages exist. The lock-in effect we described above has its cause in the fact that the non-leading firms cannot catch up to the best firm, because the latter is the leading one due to its non-imitable activity. The "lock-in" exists, because there is no systematic catching up by imitation of the superior hypotheses of the non-imitable activities. The consequence of that lock-in situation is that the systematic knowledge accumulation effect by experimentation and mutual learning in competition breaks off. These analyses show that already in the case of limited imitability with only one non-imitable activity complex dynamic processes emerge, which need a much more intensive analysis than it could be done in this paper.

17.30-18.00

Synergetics in Management Action

Timo Meynhardt & Heiko Eckert

In dynamic organizational environments with high velocity change and complexity, mechanistic control-oriented management is likely to underperform. Instead, synergetic processes of individual and collective coordination become increasingly important. Beyond theoretical reflection on the conceptual level, the current challenge in management research is to put synergetics into action. Our presentation introduces two methods on how to empirically "diagnose" those processes. One proposal is concerned with a quantitative method to identify and characterize organizational dynamics in order to improve corporate control processes. The second method, the "value knowledge grid" aims to characterize corporate culture and the processes by which it is produced and reproduced. Internalised by individuals, culture is assumed to serve as order parameter, i.e. providing orientation in uncertain environments.

18.00-18.30

Training of Systems-Thinking and Skills for Social Systems Development with Gaming and Simulation

Willy Christian Kriz

In the paper the structure and contents of a recently developed training program for the acquisition of systems-thinking and skills for sustainable social systems development with Gaming/Simulation are discussed. In addition some examples of concrete gaming and simulation methods as means of didactics are shown in interaction with the audience. Results of the evaluation of the program are presented. A total of 88 subjects took part in the study. The test group consisted of 48 people who had taken part in the training program. The control group consisted in 40 students who were part of another seminar at the University of Munich. Both groups were tested twice. The test group was tested prior to the training and following training. The results of the three confirmed hypotheses prove that the training groups proved clear training effects. In the complex simulation of a developing country, the training groups were able to achieve a significantly higher level of quality of the system. The improved quality compared to the control groups can be accorded to a significant increase in the quality of estimates in the effective relationships in the simulated system and to significantly improved teamwork processes in the trainings groups.

Non-Linear Dynamics and Discrimination Process

Yanik Miossec & Jean-Claude Darcheville

Tuller et al (1995) showed that speech categorization deals with perceptual non linear dynamics, which is characterized among other, by multistability, hysteresis, enhanced contrast. In this view, perceptual forms are the attractors of acoustic variations in time. Our purpose is to examine if such effect can be observed with artificial stimuli. Two stimuli (S1 and S21) were constructed with time and frequencies properties analogous to those of stop consonant like /d/ or /g /, and differing only in attack frequency (1500 or 3500 Hz). Subjects have to learn to associate them to a response (R1 or R21). After this brief discrimination training, subjects were tested in generalization procedure (random presentation of 21 stimuli, varying by step of 100 Hz in attack frequency) and in a sequential presentation, in ascending or descending order. Results yielded that dynamics patterns are observed only when discrimination is established, i.e. when generalization curves exhibit a rapid transition from response to non response . These dynamics patterns can be only ascribed to the reinforcement procedure. In this case discriminated operants are the attractors. The dynamics of perceptual categorization observed in our results raise the question of speech dynamics considered as a an operant process.

Complexity and Coherence of Dynamical Brain States

Viktor Müller & Ulman Lindenberger

Study of brain functions and dynamics contributes to an understanding of organizational principles of behavior. As noted by Hebb (1949), "the problem of understanding behavior is the problem of understanding the total action of the nervous system, and vice versa." Very important measures of brain functions and underlying brain dynamics are measures of complexity and coherence. Tononi and Edelman (1998) argued that high values of complexity reflect the coexistence of a high degree of functional specialization and functional integration within a system. The distributed neural process underlying conscious experiences must be functionally integrated and at the same time highly differentiated. In accordance with Nunez's local/global dynamic theory, EEG dynamics involve a state-dependent mixture of 'local' (more dominant functional segregation) and 'global' (more dominant functional integration) processes. Distinction between 'local' and 'global' processes is really artificial, because these processes are in sustained interaction (Nunez, 2000). In this study, we investigated different brain states observed with electroencephalography (EEG) or magnetoencephalography (MEG) refer to the measures of cortical complexity and coherence.

D.O. Hebb, The organization of behavior. A neuropsychological theory. John Wiley & Sons, New York, 1949, 335 pp.

P.L. Nunez, Toward a quantitative description of larger-scale neocortical dynamic function and EEG, Behav. Brain Sci. 23 (2000) 371-437.

G. Tononi and G.M. Edelman, Consciousness and Complexity, Science 282 (1998) 1846-1851.

Sense of Coherence in Patients with Psychosomatic Disorders: Study on its Predictive Value, Long-Term Change, and Comparison to Related Models

Kostas Papageorgiou

In his salutogenic model, A. Antonowski suggested that a Sense of Coherence is the key determinant in the maintenance of health. Psychosomatics inpatients' SOC levels were measured at admission, at discharge and 12-18 months after discharge. The relative change in the SOC measured at discharge (+8.1%) was the lowest among all related scales; moreover, any change had become minimal (+1.9%) within 18 months after discharge, in compliance with Antonowski's assumption that no long-term effects can be brought upon the SOC through any external influence

that does not radically alter the individual's pattern of life-experiences. However, the SOC at admission and at discharge showed a good predictive value, correlating significantly with both the patient's and the therapist's assessment of the therapeutic outcome. The SOC-component "Meaningfulness" displayed the highest correlation ($p < 0.01$) among all scales.

„Mind, not Space, is Science's Final Frontier.“ Why the Human Sciences have to Build up a New Paradigm and how it will be Constructed

Jochen Schmidt

The human sciences haven't yet come up with a unified theory and method. A unified theory and method will be a new paradigm. I will sketch out the realm of this paradigm (What does it describe and explain?),

- the general epistemological structure (Why and how can we observe?),
- the appropriate theory and method,
- the general basis and structure of verification processes (How can we verify the observations about our mind?), and
- the pragmatic implications (What will be the consequences for individuals and societies and what can we do?)

New Fields of Career.

How to Behave Successfully in the Field of Chronic Flexibility

Guido Strunk, Anett Hermann & Michael Schiffinger

Working life becomes more and more complex. This statement can be found in most scientific approaches to careers since the early 1990's. But there is only little theory development that takes these current changes regarding typical forms, actors and contexts of careers into account. Conceptual frameworks that allow for multi-level analysis and conceptually go beyond the organization as explicit or implicit arena for professional careers should prove particularly useful for a theoretical advancement of this domain. Based on Bourdieu's habitus and field concept, Mayrhofer et al. (2000) suggested four different fields of careers:

Company World (CW) is the field of the traditional organizational career. It refers to the structure of jobs in an organization in which there are few points of entry, other than at the bottom.

Free-Floating Professionalism (FFP) can be defined as the field of specialists. Individuals have tightly coupled relations with one customer for a limited time.

Self-Employment (SE) is the field of career with individuals working outside organizations. Typically, these are either self-employed professionals or entrepreneurs.

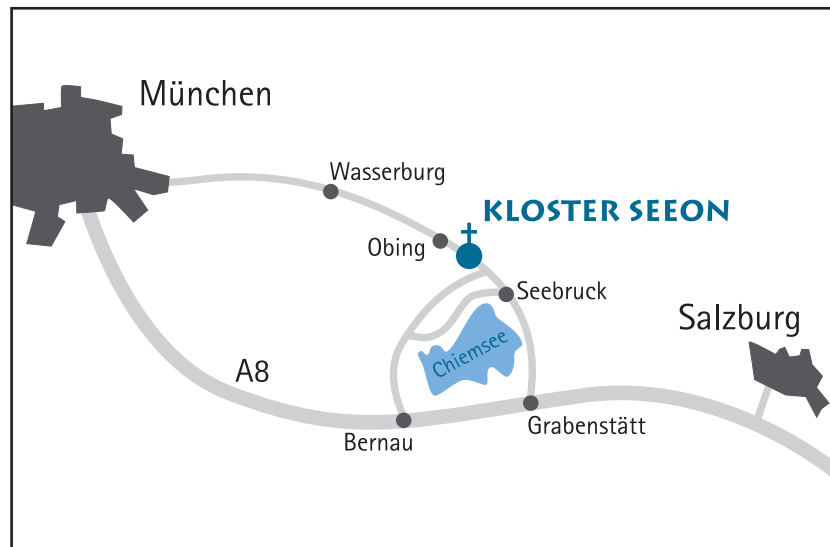
Chronic Flexibility (CF) may appear quite similar to Free-Floating Professionalism, since careers are also characterized by frequent job changes. The fundamental difference lies in the disappearance of the boundaries of a domain of expertise. This means that changing from one job to another may imply not only a change from one organization to another, but also from one industry to another, from being employed to self-employment, and so on.

A lot of work on behaviour that is said to lead to career success has been published – but only for the Company World career field. One of the most important theories dealing with career success in companies is the tournament theory, developed by Rosenbaum (1979). The paper we will present shows that in a Chronic Flexibility career field some suggestions for "successful" behaviour derived from the tournament theory seem to be misleading. Our approach uses a social simulation framework basing on co-operating normative agents. Different forms of actors' behaviour in a Chronic Flexibility career field are examined with regard to whether they entail success or not.

Mayrhofer, W., Steyrer, J., Meyer, M., Erten, C., Hermann, A., Iellatchitch, A., Mattl, C. & Strunk, G. (2000): Towards a habitus based concept of managerial careers. Toronto, Canada

Rosenbaum, J.E. (1979): Tournament mobility: career patterns in a corporation, in: Administrative Science Quarterly, 24, pp. 220-241.

ANFAHRTSKIZZE



Sie erreichen uns

mit der Bahn

bis Bahnhof Bad Endorf, von dort aus mit dem Taxi

mit dem PKW

von der A8 aus Richtung München Ausfahrt 106 Bernau / Prien
über Prien, Rimsting, Eggstätt, Roitham
oder über Prien, Rimsting, Breitbrunn, Gstadt am Chiemsee, Seebuck

von der A8 aus Richtung Salzburg Ausfahrt 109 Grabenstätt
über Grabenstätt, Chieming, Seebuck

von der B304 aus Richtung München
über Ebersberg, Wasserburg, Obing



Kloster Seeon

Kultur- und Bildungszentrum des Bezirks Oberbayern

Klosterweg 1 • 83370 Seeon

Telefon 0 86 24/8 97-0 • Telefax 0 86 24/8 97-4 20 und 8 97-2 10

www.kloster-seeon.de • e-mail: kontakt@kloster-seeon.de