

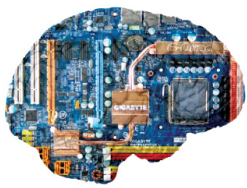
Association for the Scientific Study of Consciousness

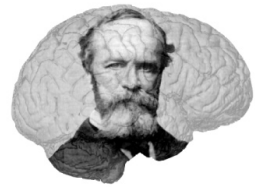
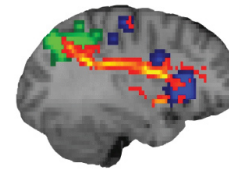
12th Annual Meeting

June 19-22, 2008

Gis Convention Center
Taipei • Taiwan

意識科學研究學會 第十二屆年會
台北 • 台灣



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Welcome to the 12th annual meeting of the Association for the Scientific Study of Consciousness! Welcome to Taiwan!

A tri-continental consciousness research community, Asian, European, and American, is born because of ASSC 12. We are very pleased to welcome our approximate **99** new Asian members, and all other attendees from all over the world. With your contribution this year, ASSC will extend its "boundary of consciousness" to Asia.

ASSC has always been a prominent forum for disseminating frontline consciousness research, stimulating creative ideas, and debating on controversial issues in the past 11 years. All these accomplishments have harvested an integrated but diversified, sizable but functional, acute but interesting consciousness research community as many have experienced in the past annual conferences.

Yet the pursuit of globalizing research communities has not been accomplished. Considerable number of Asian consciousness researchers spread out East Asia, but are disconnected from the community of ASSC. It is our honor to provide such an opportunity to bridge "the continental gap" among the communities and "synchronize" research "frequency" among researchers.

Special thanks to all symposium proposal submitters and abstract submitters. Your contributions make a high quality meeting possible. This year the acceptance decision is pleasantly harsh for committee members because of the high submission. We have received **241** abstract submissions. All the presentations therefore are highly selective. We guarantee you will enjoy this meeting very much.

The Mind-Science Foundation (www.mindscience.org) is active in a variety of initiatives to support the development of a science of consciousness. Under the auspices of the Tom Slick award, they continue to fund an excellent and diverse range of studies. We are very happy to receive generous support from it for all excellent symposia and the meeting in general this year. We would especially like to thank the executive director, Joseph Dial, for his deep commitment and enthusiasm in sponsoring ASSC 12.

The student committee has been active again in organizing the annual student party. The idea is to bring together students from a wide variety of disciplines to meet and discuss ideas about consciousness. Additionally, a mentoring program

for students has been organized at the meeting. The program aims at providing students a means of access to established researchers informally, allowing students to have causal academic discussion and careers guidance. We thank Andrew Brook, Axel Cleeremans, Casey Blood, Christof Blood, Ned Block, Shinsuke Shimojo, Stephen Macknik, Susana Martinez-Conde for generously agreeing to be part of this program.

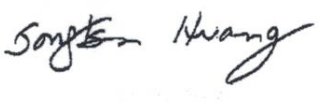
We would like to appreciate that a local foundation, 財團法人江許笋文教基金會, generously offers USD $500 financial support per student. There are 20 student recipients. We would also like to thank all the other financial sponsors including National Science Council, Ministry of Education, National Yang Ming University, National Taiwan University, and China Medical University for their generosity of advocating consciousness research.

Many thanks to the scientific program committee who were responsible for guiding the selection of keynotes, symposia, talks, and tutorials within the program. This was composed of Ralph Adolphs, Allen Y. Houng, Max Coltheart, John-Dylan Haynes, Dan Lloyd, Stephen L. Macknik, Michael Pauen, and Shinsuke Shimojo. Special thanks to Ralph Adolphs, the co-chair of the program committee, for his enormous hours of hard workings, high standard of quality control, and strong commitment in making scientific program a great success.

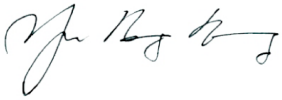
Finally, we would like to thank all the local organizing committee members who were extremely helpful in coordinating local arrangements. Their unwavering and enduring support, both in administrative and academic aspects, has been critical to the success of this meeting.

We also thank Patrick Wilken for his year-long assistance and valuable advises in all respects. Without his enthusiasm and unconditional behind-the-scene workings, ASSC 12 would be impossible.

Enjoy ASSC 12!



Jong-Tsun Huang
Co-Chair, Local Organizing Committee, ASSC 12
President, China Medical University



Allen Y. Houng
Co-Chair, Local Organizing Committee, ASSC 12
Professor, Institute of Neuroscience
National Yang Ming University

COMMITTEES

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ASSC 12 SCIENTIFIC PROGRAM COMMITTEE

Co-Chairs
Ralph Adolphs, California Institute of Technology, United States
Allen Y. Houng, National Yang Ming University, Taiwan

Committee Members
Max Coltheart, Macquarie University, Australia
John-Dylan Haynes, Bernstein Center for Computational Neuroscience, Germany
Dan Lloyd, Trinity College, United States
Stephen L. Macknik, Barrow Neurological Institute, United States
Michael Pauen, Humboldt-Universität zu Berlin, Germany
Shinsuke Shimojo, California Institute of Technology, United States

ASSC 12 LOCAL ORGANIZING COMMITTEE

Co-Chairs
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Chen-Tung Yen (嚴震東), National Taiwan University, Taiwan
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Caleb Y.-Y. Liang, (梁益堉) National Taiwan University, Taiwan
Yuk Man Leung (梁育民), China Medical University, Taiwan
Chon-Haw Tsai (蔡崇豪), China Medical University, Taiwan
Yei-Yu Yeh (葉怡玉), National Taiwan University, Taiwan

PAST CONFERENCES

ASSC 11

June 22-25, 2007
The Imperial Palace Hotel, Las Vegas, United States

ASSC 10

June 23-26, 2006
St. Anne's College, Oxford, United Kingdom

ASSC 9

June 24-27, 2005
California Institute of Technology, Pasadena, United States

ASSC 8

June 25-28, 2004
University of Antwerp, Antwerp, Belgium

ASSC 7

Models and Mechanisms of Consciousness
May 30 - June 2, 2003
The University of Memphis, Memphis, United States

ASSC 6

Consciousness and Language: Reportability and Representation in Humans and Animals
May 31 - June 3, 2002
The "La Caixa" Foundation Science Museum, Barcelona, Spain

ASSC 5

The Contents of Consciousness: Perception, Attention, and Phenomenology
May 27-30, 2001
Duke University, Durham, United States

ASSC 4

The Unity of Consciousness: Binding, Integration, and Dissociation
June 29 - July 2, 2000
Université Libre de Bruxelles, Brussels, Belgium

ASSC 3

Consciousness and Self: Neural, Cognitive and Philosophical Issues
June 4-7, 1999
The University of Western Ontario, London, Canada

ASSC 2

Neural Correlates of Consciousness: Empirical and Conceptual Issues
June 19-22, 1998
Hanse Institute for Advanced Study, Bremen, Germany

ASSC 1

What Does Implicit Cognition Tell Us about Consciousness?
June 13-16, 1997
The Claremont Colleges, Claremont, United States

SCHEDULE

THURSDAY, JUNE 19, 2008

Time	Topic	Speaker	Location
9:30 *12:30*	Tutorial Workshops		
	T1 Conscious States and Conscious Creatures: Explanatory Strategies in the Science of Consciousness	Tim Bayne & Jakob Hohwy	Nietzsche Hall
	T2 Terminology in Consciousness Studies	Andrew Brook	Mchelangelo Hall
	T3 The Evolutionary Function of Consciousness	Juliane Wilcke	Raphael Hall
12:30 *13:30*	Lunch		
13:30 *16:30*	Tutorial Workshops		
	T4 Neurophilosophical Approaches to The Dreaming Mind—A Contrastive Analysis of Dreaming and Wakefulness	Jennifer Windt & Thomas Metzinger	Nietzsche Hall
	T5 Adaptive Anomalies in Conscious Time Perception	Shigeru Kitazawa & Shin'ya Nishida	Mchelangelo Hall
	T6 Emotions, Feelings, and Decision-Making	Antoine Bechara	Raphael Hall
17:00 *17:30*	Opening Ceremony		Alexander Hall
17:30 *18:30*	Presidential Address	Chair: Christof Koch	Alexander Hall
	Why Are Mental States Ever Consciousness?	David Rosenthal	
18:35 *19:20*	2008 William James Prize	Chair: Christof Koch	Alexander Hall
19:30	Opening Reception		Gallery of NTU History

FRIDAY, JUNE 20, 2008

Time	Topic	Speaker	Location
9:00 *10:00*	Keynote Lecture	Chair: Victor A. F. Lamme	Alexander Hall
	The Phenomenal Self and the First-Person Perspective	Thomas Metzinger	
10:00 *10:30*	Coffee Break		
10:30 *12:30*	Symposium 1: Implicit Processing and Awareness	Chair: Su-Ling Yeh	Alexander Hall
	Explicit vs. Implicit Perception and Working Memory Processes	Shaul Hochstein	
	Interactions between Implicit Processing and Working Memory Revealed through Visual Extinction	Glyn Humphreys	
	The Colavita Effect: An Example of Crossmodal Extinction in Normal Participants?	Charles Spence	
	Coding of Cognitive Control Demand in the Medial Prefrontal Neurons	Keiji Tanaka	
12:30 *14:00*	Lunch		
14:00 *16:00*	Concurrent Session 1		
	CS 1.1 Feedback, Control, and Self-Regulation	Chair: Shinsuke Shimojo	Socrates Hall
	The Role of Feedback in Visual Masking, Visual Awareness and Attention	Stephen L. Macknik	
	Conscious Emotion Regulation Suspenses Genetically Determined Differences in Amygdala Reactivity	Henrik Walter	
	When Fear is in My Voice but not My Brain: Feedback Effects of Emotional Voice Transformation on Self-Rated Emotion Experience	Rodrigo Segnini	
	Conscious Control of Perceptual States Differs from Spontaneous Control Both in Behavior and in Brain Activity	Eugenio Fernando Rodriguez	

	CS 1.2 Access and Phenomenal Consciousness	Chair: Ned Block	Locke Hall
	Phenomenal Consciousness and Accessibility	Tobias Schlicht	
	The Phenomenal-Concept Gap	Benjamin Daniel Young	
	The Ability to Report is Neither Sufficient nor Necessary for the Occurrence of Conscious Experience	David Cannon Drake	
	Quantifying the Limits of Introspection	Jerome Sackur	
	CS 1.3 Discriminating Consciousness from Non-Consciousness	Chair: Ryan McKay	Plato Hall
	Weak Signal or No Signal? How Imaging and Firing Rate Signals Missed a Robust Functional Circuit for Brightness Perception	Chou Po Hung	
	Bridging the Gap? A Neurophilosophical Assessment of "Mind Reading" Technology	Stephan Schleim	
	Three Different Continuous Awareness Scales Predict Performance in a Visual Identification Task and Support the View that Consciousness Is a Gradual Phenomenon	Kristian Sandberg	
	Mapping the Transition from Unconscious to Conscious Knowledge	Ryan Bradley Scott	
16:00 16:30	Coffee Break		
16:30 17:30	Keynote Lecture	Chair: Jong-Tsun Huang	Alexander Hall
	Microsaccades: Windows on the Mind	Susana Martinez-Conde	
17:30 19:30	Poster Session 1		VIP Room & Archimedes Hall
20:00	Student Party		I Swear Café

SATURDAY, JUNE 21, 2008

Time	Topic	Speaker	Location
9:00 *10:00*	Keynote Lecture	Chair: Ralph Adolphs	Alexander Hall
	Comparative Cognitive Science: Trade-off Theory of Memory and Symbolization in Humans and Chimpanzees	Tetsuro Matsuzawa	
10:00 *10:30*	Coffee Break		
10:30 *12:30*	Symposium 2: Basic Neuroscientific and Clinical Approaches to Disorders of CNS Arousal	Chair: Donald Pfaff	Alexander Hall
	Generalized CNS Arousal in Animal and Human Brains	Donald Pfaff	
	Neural and Chemical Substrates of Consciousness across Waking and Sleeping	Barbara Jones	
	Imaging in Disorders of Conscious	Haibo Di	
	Eyes Open, Brain Shut: Consciousness in the Vegetative State	Steven Laureys	
12:30 *14:00*	Lunch		
14:00 *16:00*	Concurrent Session 2		
	CS 2.1 Decision-Making	Chair: Nicholas Georgalis	Socrates Hall
	Choice Blindness and Consumer Decision Making	Petter Johansson	
	Gambling on the Unconscious	Zoltan Dienes	
	Reexamining the Effect Of Long-Term Outcome and Gain-Loss Frequency: From Unconsciousness to Consciousness	Ching-Hung Lin	
	Unconscious Formation of Free Intentions: Functional Dissociation of Different Regions in Prefrontal Cortex	Chun Siong Soon	
	CS 2.2 New Methods for Studying Consciousness	Chair: Keng-Chen Liang	Plato Hall
	Novel Paradigms for Studying Subjective Experience in Motion and Object Perception	Chia-Huei Tseng	

	Global Encoding of Affective Space in Large-Scale Patterns of Human Brain Activity	Silke Anders	
	Decoding Monkey's Conscious Experience during Ambiguous and Unambiguous Motion Percept Reveals Initial Non-conscious Spike Activity and Later Neuronal Correlates of Consciousness in Area MT	Naotsugu Tsuchiya	
	Gradual Change and Implicit Detection: A New Methodological Approach	Bruno Berberian	
	CS 2.3 Modeling Consciousness	Chair: Thomas Metzinger	Locke Hall
	Consciousness and Metarepresentation: A Computational Sketch	Axel Cleeremans	
	Nonlinear Functional Connectivity in Visual Awareness: A Small-World Study	Hung-Wei Lee	
	Does the Brain Implement Some Form of Delay Coordinate Embedding?	Vikas Shah	
	Simulation of Bistable Perception with Long Range Correlations Using Reentrant Nonlinear Perception-Attention-Memory Coupling	Norbert Fuerstenau	
16:00 *16:30*	Coffee Break		
16:30 *18:30*	Poster Session 2		VIP Room & Archimedes Hall
19:30	Banquet		Shanghai Shanghai (at Agora Garden, Taipei)

SUNDAY, JUNE 22, 2008

Time	Topic	Speaker	Location
9:00 *10:00*	Keynote Lecture	Chair: Axel Cleeremans	Alexander Hall
	Computational Advantages of Internal Models as Self-Consciousness	Mitsuo Kawato	
10:00 *10:30*	Coffee Break		
10:30 *12:30*	Symposium 3: Delusions	Chair: Robyn Langdon	Alexander Hall
	Are Delusions Pathologies of Consciousness?	Tim Bayne	
	Conscious and Unconscious Processes in Persecutory Delusions - Evidence for a Defense Account	Ryan McKay	
	The Misidentification Delusions	Ian Gold	
	The Role of Conscious Experience Differentiates between Received and Reflective Delusions	Robyn Langdon	
12:30 *14:00*	Lunch		
14:00 *16:00*	Concurrent Session 3		
	CS 3.1 Mary Revisited	Chair: Ian Gold	Locke Hall
	An Examination of No-Concept Reply to Frank Jackson's Knowledge Argument	Yasuko Kitano	
	Cognition and Consciousness	Nicholas Georgalis	
	Trouble with Dretske's Accessibility	Karen Yan	
	What It Is Like to Think. On Cognitive Phenomenology, Functionalism, and Externalism	Marius Dumitru	
	CS 3.2 Blindsight in Normal and Lesioned Brains	Chair: Zoltan Dienes	Socrates Hall
	Neural Correlate of Reduced Visual Awareness in the Superior Colliculus of Monkeys with Blindsight	Masatoshi Yoshida	
	Motion Induced Blindness: The More You Attend the Less You See	Olivia Carter	

	TMS on Intraparietal Sulcus Triggers Perceptual Disappearance	Ryota Kanai	
	Visual Awareness Correlates with Layer-Specific Activity in Visual Cortex	Alexander Maier	
	CS 3.3 Anaesthesia and Coma	Chair: Jen-Chuen Hsieh	Plato Hall
	Unconsciousness and the Energy Consumption of Brain During Resting State	Feiyan Chen	
	Resting State Connectivity Integrity in the Default Network Reflects the Level of Consciousness Impairment in Brain-Injured Patients. An fMRI Study in Brain Death, Coma, Vegetative State, Minimally Conscious State and Locked-In Syndrome	Athena Demertzi	
	Diversity of Conscious Experiences During General Anaesthesia	Valdas Noreika	
	The Effects of Anaesthetics on the Cortex as Revealed by Voltage Sensitive Dye Imaging	Michael R. H. Hill	
16:00 16:30	Coffee Break		
16:30 18:30	Symposium 4: Consciousness and Accessibility	Chair: Ned Block	Alexander Hall
	Attention and Consciousness: Two Independent Processes	Christof Koch	
	How Neuroscience Should Attack the Hard Problem	Victor A. F. Lamme	
	Unattended and Unaccessible Consciousness: Puzzle or Illusion?	Sid Kouider	
	Evidence That Phenomenal Consciousness Has a Distinct Neural Basis from Cognitive Access	Ned Block	
20:30	After Party		Café Lumiere

POSTER LIST

POSTER SESSION 1

PHILOSOPHY

Presenter	Title	Location	Poster Board
Bailey, A. R.	Embodied Cognition: Dualism Redux?	VIP Room	P1
Cheng, H. Y.	Practical Self-Awareness in Expertise	VIP Room	P2
Chien, P.	Time and Representation of Time in Conscious Experience	VIP Room	P3
Ghosh, M.	Theory of Mind and Mental Simulation – Possibilities of Combination	VIP Room	P4
Lane, T. J.	Dissociative Identity Disorder, Somnambulism, and the Higher-Order Thought Theory of Consciousness	VIP Room	P5
Lin, K.	A Re-evaluation of the Contribution of Buddhist Philosophy to the Study of Consciousness	VIP Room	P6
de Sousa, C. E. B.	Neurophenomenology and Neurobiology: Dual Explanations in the Qualia Debate	VIP Room	P7
Chambaron, S.	The Role of Time and Pace in Sequence Learning	VIP Room	P8
Chen, Y. J.	Transparency Explained	Archimedes Hall	P9
Lin, S. S.	Überbewusstsein. The Reconstruction of Consciousness-Process and Consciousness in the Postmodern	Archimedes Hall	P10
Merritt, M. C.	It's Not All in Your Head: An Externalist-Process Approach to Consciousness	Archimedes Hall	P11
Nagel, S. K.	Critical Theory Meets Cognitive Science	Archimedes Hall	P12

Ozgoren, M.	Anatolian Interaction on Antique and Medieval Roots of Modern Cognitive Science	Archimedes Hall	P13
Savostyanov, A. N.	Concept of “Consciousness” in the Context of Russian Psychophysiological Theories: Philosophical and Methodological Analysis	Archimedes Hall	P14
Slaby, J.	Boredom and the Experience of Time	Archimedes Hall	P15
Suchy-Dicey, C. M.	What the Gist?	Archimedes Hall	P16
Thompson, M. L.	Antinomy of Identity- The Self and Self-Consciousness	Archimedes Hall	P17
van Rysewyk, S.	First-Person Utterances of Facial Expressions Are Typically Avowals	Archimedes Hall	P18
Wang, X.	On the Consciousness of Slips of the Tongue	Archimedes Hall	P19
Yang, J.	Turning the Table on the Dual Content Structure of Self-Representationalism	Archimedes Hall	P20
Yoon, B.	On the Disjunctivist's Account of Hallucination	Archimedes Hall	P21

SCIENCE

Presenter	Title	Location	Poster Board
Asai, T.	Schizotypal Personality Traits and Prediction of One's Own Movements in Motor Control: What Causes an Abnormal Sense of Agency?	VIP Room	S1
Blood, C.	Quantum Mechanics and the Nonphysical Mind	VIP Room	S2
Chang, S. D.	Learning under Pentobarbital Anesthesia in Rats: An Enabling Effect of Epinephrine Injected Systemically on Two Fear Conditioning Tasks	VIP Room	S3

Chen, C. C.	Symmetry Perception is Strongly Affected by Awareness of the Axis Location	VIP Room	S4
Chen, M. Y.	“Sadness” Components Dominated Expression Judgment on Ambiguous Faces	VIP Room	S5
de Gardelle, V.	How Consciousness and Spatial Frequencies Interact during Face Processing	VIP Room	S6
Destrebecqz, A.	How Do We Find Words in Implicit Artificial Language Learning?	VIP Room	S7
Eckstein, D.	Conscious Reports Matter: Semantic 'Subliminal' Priming Differs According to Objective and Subjective Measures of Prime Awareness	VIP Room	S8
Fu, Q.	Dissociation of Conscious and Unconscious Knowledge in Sequence Learning: Evidence from Event-Related Potentials	VIP Room	S9
Galmar, B.	Can Neural Adaptation Occur at the Semantic Level? A Study of Semantic Satiation	VIP Room	S10
Gelskov, S. A. V.	Visual Masking and Conscious Face Perception in 5-Month-Old Infants	VIP Room	S11
Han, J.	Does Unconscious Observation of Manual Actions Induce Action Priming?	VIP Room	S12
Huang, S. L.	Exploring Consciousness via Attention Studies: The Capture Effect of the Angry Faces	VIP Room	S13
Huang, Y. T.	Selective Attention Modulates the Motion Sensitivity After a Speed Learning Task	VIP Room	S14
Isa, T.	Internal Model Theory of Visual Awareness: Convergent Evidence from Studies of Monkeys with Blindsight	VIP Room	S15

Kobayashi, Y.	Pedunculopontine Tegmental Nucleus Neurons Signal Predicted and Actual Reward for Reinforcement Learning	VIP Room	S16
Koene, A. R.	Perceived Object Size Depends on the Relative Size of Background Elements	VIP Room	S17
Lin, J.	Syncronized Oscillations as the Neural Correlate of Consciousness	VIP Room	S18
Lo, S. Y.	Multisensory Stimulus-Response Compatibility Effect Occurs Only When the Stimuli Are Consciously Perceived	VIP Room	S19
Mano, T.	Different Patterns of Eye Movements between Implicit and Explicit Processes in Visual Search	Archimedes Hall	S20
Matsumiya, K.	Influence of Awareness on Adaptation to Visuomotor Distortions	Archimedes Hall	S21
Mitsumatsu, H.	On the Common Representation between Physical and Mental Causations	Archimedes Hall	S22
Mroczko, A.	The Role of Semantic Representations in Grapheme-Colour Synaesthesia	Archimedes Hall	S23
Pasquali, A.	Chunking in Serial Reaction Time Tasks: An Objective Measure of Conscious Learning	Archimedes Hall	S24
Pinna, B.	Consciousness and Perceptual Organization: the Illusion of Meaning	Archimedes Hall	S25
Song, X.	The Division of Labor for Internal-External Information Processing-An Extended Theory of Global Workspace	Archimedes Hall	S26
Su, W. C.	Subjective Experiences during Sleep Onset	Archimedes Hall	S27
Sugimori, E.	The Effect of Generation on Output Monitoring and the Sense of Agency in Speech	Archimedes Hall	S28

Tachi, M.	Can People Estimate the Memory Accuracy from the Self-Rated Confidence?: Confidence-Accuracy Relations in an Eyewitness Memory and a General Memory Test	Archimedes Hall	S29
Takei, S.	Perceptual Ambiguity Does Not Increase Perceptual Latency of Bistable Visual Stimuli	Archimedes Hall	S30
Toda, S.	A New Paradigm from the Bedside for Patients in a Vegetative State: Neuroethics ''Toward'' Consciousness	Archimedes Hall	S31
Tsai, S. H.	Endogenous and Exogenous Attention Effect on Visual Afterimage	Archimedes Hall	S32
Wan, L.	Intentional Control in Implicit Learning Based on Familiarity	Archimedes Hall	S33
Wang, S. F.	Correlate Visual Motor Control and Alternation of Conscious Experience in Perceptual Rivalry	Archimedes Hall	S34
Wilcke, J. C.	Supporting Hypothesized Evolutionary Functions of Consciousness	Archimedes Hall	S35
Yu, Y.	Incremental Effective Connectivity Is in Response to Differential Working Load Demands of An N-back Working Memory Network: A DCM Study	Archimedes Hall	S36
Schnakers, C.	Using an Active Event Related Paradigm to Detect Consciousness in Coma Survivors	Archimedes Hall	S37
Vanhaudenhuyse, A.	Neural Correlates of the Two Dimensions of Awareness: Awareness of Environment and Awareness of Self	Archimedes Hall	S38

POSTER SESSION 2

PHILOSOPHY

Presenter	Title	Location	Poster Board
Batalion, N.	Most Important Insights About Consciousness	VIP Room	P1
Chan, T.	Consciously Accessible Beliefs and Practical Reasoning	VIP Room	P2
Chi, C.	A Confusion of the Term "Subjectivity" in the Philosophy of Mind	VIP Room	P3
Chiu, C. H.	Can Mary Know What She Is Not Aware of?	VIP Room	P4
Farber, I.	Change Blindness, Choice Blindness and Dream Logic	VIP Room	P5
Huang, T. L.	A Defense of Noë's Vehicle Externalism	VIP Room	P6
Hsu, S. P.	Can We Close the Gap without a priori Entailment?	VIP Room	P7
Klincewicz, M. W.	Self-representationalism's Aristotelian Troubles	VIP Room	P8
Liu, H. W. D.	How Real is the Self?—Considering its Regulatory Role	VIP Room	P9
Menant, C.	Evolution as Connecting First-Person and Third-Person Perspectives of Consciousness	VIP Room	P10
Musholt, K.	Self-Consciousness and Non-Conceptual Content	Archimedes Hall	P11
Parthemore, J.	Concepts, Consciousness and Self-Reference	Archimedes Hall	P12
Peng, E. M.	A Trope-Ontological Ground for Psychoessentialist Cognition	Archimedes Hall	P13
Pompe, U. S.	Analyzing Conscious Visual Experience	Archimedes Hall	P14
Shih, H. K.	Is the Mind Equal to the Brain?	Archimedes Hall	P15

Su, Y. S.	There is No One-Way but Complex Dynamic Feedback Relation between Perception and Action: Two-Level Interdependence View	Archimedes Hall	P16
Yang, Y. C.	Troubles with the Representational Theory of the Mind	Archimedes Hall	P17
Zhu, J.	Can Machines Have Free Will?	Archimedes Hall	P18

SCIENCE

Presenter	Title	Location	Poster Board
Ariga, A.	Neuromagnetic Activities in Failure Retrieval versus Success Retrieval of Japanese Kanji Characters	VIP Room	S1
Balas, R.	Non-Conscious Acquisition of Preferences through Evaluative Conditioning	VIP Room	S2
Chen, K. M.	Attention Mediates the Facilitatory Effect of Task-Irrelevant Sound on Subjective Expansion of Visual Duration	VIP Room	S3
Chen, Y. C.	Using the Repetition Blindness Paradigm as an Implicit Measure of Awareness: a Crossmodal Integration Study	VIP Room	S4
Chien, S. H. L.	Equating the Influence of Conscious Attentional Control with the Effect of Automatic Bottom-Up Bias in Necker Cube Reversals	VIP Room	S5
Edelman, D. B.	The Eyes Have It: The Evolution of Complex Vision as a Precondition for the Emergence of Consciousness	VIP Room	S6
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CONFERENCE ABSTRACTS

Global Encoding of Affective Space in Large-Scale Patterns of Human Brain Activity

Silke Anders, University of Luebeck, Germany
John-Dylan Haynes, Charite-Universitatsmedizin, Germany

June 21, 14:00-16:00: Concurrent Session 2.2

When people experience emotions, a distributed network of brain regions is activated. Different emotions activate the nodes of this network to different degrees, suggesting that the large-scale pattern of brain activity carries information about a person's emotional state. However, it is currently unclear how specific emotions relate to global activity in this distributed network. Here we investigated whether the similarity between different emotional feelings is related to similarities in corresponding patterns of brain activity. We used functional magnetic resonance imaging (fMRI) and correlation analysis to compare patterns of brain activity associated with five different emotions (joy, anger, disgust, fear, sadness). We show that correlation analysis can be used to decode an individual's emotional state from his brain activity, both in individuals recalling emotional events and in individuals observing other people's facial expressions. Emotional states could be successfully decoded even when the brain activity of another individual was used as reference. Moreover, the brain activity of an individual observing another individual's facial expression could be correctly classified based on the sender's brain activity alone. This indicates that the global pattern of brain activity for each emotion is very similar across individuals and induction methods. Importantly, the similarity of patterns of brain activity associated with different types of emotion reflected the similarity between emotional experiences in psychological models of affective space. These findings show that different types of emotions evoke distinct large-scale patterns of brain activity that (1) are reproducible across individuals, (2) can be communicated between individuals, and (3) reflect similarity of emotional experience.

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Neuromagnetic Activities in Failure Retrieval versus Success Retrieval of Japanese Kanji Characters

Atsunori Ariga, The University of Tokyo, Japan
Katsumi Watanabe, The University of Tokyo; ERATO; AIST, Japan

June 21, 16:30-18:30, Poster Session 2

Two types scripts are used in writing in Japan: syllabic (kana) and logographic (kanji) scripts. Although most Japanese words can be written in both the scripts, Japanese people often feel that there are some kanji characters that they can read (or recognize) but cannot write (or retrieve) due to their numerous variations and complex shapes. We focused on such characteristics of Japanese kanji characters and measured neural activity that specifically occurred during the retrieval process of kanji characters, by using a magnetoencephalography (MEG). A short sentence was initially presented on the display, a segment of which was written in kana and was underlined (a key segment). The participants' task was to retrieve a kanji character that corresponded to the key segment (i.e., kana-to-kanji translation). After a brief retrieval period, they reported whether they could successfully retrieve the corresponding kanji character with high confidence or they could not. Neuromagnetic activities were measured with a PQ1160C whole-head neuromagnetometer (Yokogawa Electric Corporation). MEG signals were analog-filtered and digitized for the retrieval period. We compared the neuromagnetic activities between trials where the participants reported they could successfully retrieved correct kanji characters versus trials they reported that they could not. Significant differences in neuromagnetic activity were found from frontal and temporal channels. These activities may correspond to either the encoding level or the retrieval processes of kanji characters, or both. Interestingly, even earlier in the retrieval period (about 1s after the sentence onset), the neuromagnetic activity differed from each other, being related to the participants' later reports. This result points to the possibility that the neural activity may, in some degree, predict whether the participants can retrieve a specific kanji character or not before they realize it.

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Schizotypal Personality Traits and Prediction of One's Own Movements in Motor Control: What Causes an Abnormal Sense of Agency?

Tomohisa Asai, University of Tokyo, Japan

June 20, 17:30-19:30: Poster Session 1

Background; Positive schizophrenic symptoms, especially passivity phenomena, including auditory hallucinations, may be caused by an abnormal sense of self-agency, which schizotypal personality traits also tend to exhibit. A sense of self-agency asserts that it is oneself who is causing or generating an action. It is possible that this abnormal sense of self-agency is attributable to the abnormal prediction of one's own movements in motor control.
Method; The present study conducted an experiment using the "disappeared cursor" paradigm, in which participants are required to click a target using an invisible mouse cursor. Prediction error was defined as the distance between the target and the click point.
Results; The results showed that not depressive or anxiety personality traits, but rather schizotypal personality traits, have deficits in predicting movements of the subjects' left hand. In particular, auditory hallucination proneness had the strongest relationship with movement prediction error. In this report, we also discuss the error tendency (overestimations or underestimations of one's own movements).
Conclusions; This finding is in accordance with the idea that passivity phenomena or proneness may be caused by the abnormal prediction of one's own actions or movements.

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Embodied Cognition: Dualism Redux?

Andrew R Bailey, University of Guelph, Canada

June 20, 17:30-19:30: Poster Session 1

This paper examines the consequences of recent movements in cognitive science—attention newly being paid to embodiment—for the theoretical status of phenomenal consciousness.

I provide an analysis of the thesis of embodied cognition, developed by considering the sources of empirical evidence typically adduced for embodiment (as a distinctive thesis from classical cognitivism), and distinguish six different key claims that may form part of an embodiment hypothesis:

• partialness of mental models;
• action-orientation of mental models;
• off-loading off cognitive work to the environment;
• non-representational mental models;
• embodiment constraints on cognitive capacities;
• rejection of organism-environment dualism.

I consider some of the ways in which these claims may be—and have been—combined, and some of the ways in which they are in mutual tension.

I identify a particularly central philosophical cluster of embodiment theses—common, I argue, between such important recent embodiment hypotheses as enactivism and neurophenomenology. I argue that this form of embodiment, though often touted as anti-Cartesian and opposed to various out-dated dualisms, in fact introduces a new form of dualism (or, alternatively, reintroduces an old dualism in a new form). This is a dualism between consciousness and mind.

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Non-Conscious Acquisition of Preferences through Evaluative Conditioning

Robert Balas, Warsaw School of Social Psychology, Poland
Joanna Sweklej, Warsaw School of Social Psychology, Poland

June 21, 16:30-18:30: Poster Session 2

The two reported studies address the question whether conscious awareness is necessary condition for acquiring preferences. Also, two alternative theoretical accounts (referential vs transfer of affect) of evaluative conditioning were tested as well its resistance to extinction. Both studies adopted evaluative conditioning paradigm in which initially neutral stimulus (CS) is repeatedly paired with affective stimulus (US) leading to a change in the valence of the CS consistently with the valence of the US (positive or negative). After initial affective ratings of the stimuli participants were shown neutral stimuli paired either 8 times with a single US (positive or negative) or 8 times with 8 different USs of the same valence (conditioning phase). Affective change of the CS was indirectly assessed in affective priming task and participants' awareness of the pairings was measured with recognition task. Additionally, Study 2 included extinction phase in which participants were exposed to CS only and a second measurement of affective rating was collected. Results show affective change due to conditioning that was independent of conditioning procedure and awareness of specific pairings used in conditioning phase. Also, there was no effective extinction of conditioned preferential responses. These data show that conscious awareness is not necessary for preference acquisition and that evaluative conditioning effects are robust.

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Most Important Insights About Consciousness

Nathan Batalion, Binghamton University, United States

June 21, 16:30-18:30: Poster Session 2

Akin to the experience of Jill Bolte Taylor, a brain scientist at Harvard who had a stroke and then shared the experience (You-Tube presentation "How It Feels To Have A Stroke") I was a math prodigy with a philosophic bent who later suffered a left-brain meltdown. I had a high fever and suddenly became aphasic (unable to speak in whole sentences and think mathematically). The odds of being a prodigy and later developing aphasia (plus recovering) are so minuscule I may be the only person on Earth able to communicate such a joint experience. In the process my whole worldview changed "day and night." The most important insight was that the flow between my brain hemispheres or "consciousness" was my life's essence. To fail to understand this risked not fathoming what kept me alive or prevented serious ailments in me, others, and nature. Functionally, however, what was this consciousness really? Because it ties us to everything, consciousness' definition may appear impossible to close in on. Philosophers and scientists have tried brilliantly to outline its functions, metaphysics, contents, aspects, qualia, and neural correlates. However, my second key insight appeared as such a closing in. I saw how consciousness forms a universal relationship of connection, again both within myself, others and nature. To be conscious of X was simply to connect to X. As childishly simple as this may sound, this has revolutionary implications. For example, nothing was more absolutely certain for me than using math symbols to gain truths. After this aphasia, that belief was broken. A third key insight arose that math symbols, demythologized, are tools for separating elements of consciousness. In evolving physics and chemistry they do not guide us towards consciousness' essence. If too deeply used to redesign nature mechanically, we also create eco-crises that threaten life. Not surprisingly, we further see epidemics like life-threatening cancers. Such dark shadows, amid explosive technological progress, are anomalies. Inescapable anomalies force us to challenge and change core paradigms. Here there is a hope of rescuing ourselves and the planet, and as we move towards a higher integrity and depth of understanding.

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Conscious States and Conscious Creatures: Explanatory Strategies in the Science of Consciousness

Tim Bayne, University of Oxford, United Kingdom
Jakob Hohwy, Monash University, Australia

June 19, 9:30-12:30: Tutorial

The search for the neural correlates of consciousness currently takes two forms. Some theorists focus on identifying the mechanisms that are implicated in allowing a creature to be conscious at all. We might call this approach the creature-based methodology. This approach doesn't attempt to control for the contents of consciousness, but looks to contrast conscious creatures with unconscious ones. Other theorists focus on identifying the mechanisms that underpin fine-grained phenomenal contents, such as the conscious states associated with colour or pain. We might call this approach the content-based (or state-based) methodology. This approach doesn't attempt to control for consciousness as such, but looks to contrast one content with another.

This tutorial examines how these two methodologies are, or should be, related. Should one be preferred over the other? What are their relevant strengths and weaknesses? Can they be pursued independently, or should we be looking to develop methodologies that allow us to identify both the global and local mechanisms responsible for consciousness? How might the contrast between these two methodologies be related to debates concerning the structure of consciousness? We aim to shed some light on these issues from both philosophical and empirical angles.

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Are Delusions Pathologies of Consciousness?

Tim Bayne, University of Oxford, UK

June 22, 10:30-12:30: Symposium 3

On the face of things, delusions seem to be pathologies of consciousness: the delusional patient has a belief which, from his or her own perspective, ought to be rejected, and one of the functions of consciousness is to reject implausible candidates for belief. I examine this proposal in light of accounts of delusions on the one hand and in light of accounts of the functions of consciousness on the other. I argue that despite its intuitive appeal, there is little firm reason to believe that delusions are pathologies of consciousness. Nonetheless, there are important lessons to be learned about the functional role of consciousness by asking whether delusions might qualify as pathologies of consciousness.

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Emotions, Feelings, and Decision-Making

Antoine Bechara, University of Southern California, United States

June 19, 13:30-16:30: Tutorial

The somatic marker hypothesis provides a systems-level neuroanatomical and cognitive framework for decision-making and its influence by emotions and feelings. The key idea of this hypothesis is that decision-making is a process that is influenced by marker signals that arise in bioregulatory processes, including those that express themselves in emotions and feelings. This influence can occur at multiple levels of operation, some of which occur consciously, and some of which occur non-consciously. The frontal lobes are key elements of this neural circuitry and play a crucial role in decision-making. However, there are other neural structures that also play key roles in emotions, feelings, and decision-making, namely the amygdala and the insular cortex. In this seminar, several studies are reviewed, which confirm various predictions from the hypothesis. Specifically, evidence will be presented to argue that (1) decision-making is a process guided by emotions and feelings; (2) conscious knowledge alone is not sufficient for making advantageous decisions; (3) the implementation of decisions under certainty engage different neural circuitry than that of decisions under uncertainty or ambiguity; and (4) emotion may not always be beneficial to decision-making: there are conditions under which emotion can be disruptive.

One learning objective of this seminar is to have an overview of the neural basis of emotions, feelings, and decision-making, based on work in patients with focal brain damage. A second objective is to provide a perspective on how this knowledge can be applied to understanding human choice at a social, as well as clinical level.

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Gradual Change and Implicit Detection: A New Methodological Approach

Bruno Berberian, Cognitive Science Research Unit (ULB), Belgium
Axel Cleeremans, Cognitive Science Research Unit (ULB), Belgium

June 21, 14:00-16:00: Concurrent Session 2.2

Recent findings have revealed our surprising inability to detect large changes to scenes from one view to the next ('change blindness'). Similarly, extremely gradual changes generally do not draw attention even if we might subsequently notice that a change has occurred. At the same time, recent evidence suggests that explicit change detection measures may underestimate our ability to process and represent changes in our visual system and that the brain can represent and process some information outside the focus of attention or below the level of awareness—phenomena well known as implicit change detection.

In this context, the goal of this study was to characterize observers' abilities to detect gradual changes and to explore putative dissociations between the conscious experience of change and behavioral adaptation to the changing stimulus. In this perspective, we developed a new experimental paradigm to study change detection based on an original conception of variability as an index of memory stability. On each trial, participants were first shown a dot pattern on the screen. Next, the pattern disappeared and participants had to reproduce it. We assume that an increase in the variability (response variation across trials) is an index of visual change detection. To investigate gradual change detection, the target configuration was gradually rotated of 2 degrees per trial, with a global change of 30 degrees. Verbal reports and a choice task were used to evaluate the level of awareness of the change.

Results showed that 70% of subjects had no conscious experience of change. However, we observed that the reproductions were characterized by a high level of variability for all the subjects.

Moreover, we observed a behavioral adaptation to the gradual rotation of the target configuration, marked by a gradual rotation of the subject's reproductions. The above result tends to confirm the idea of implicit detection and suggests that some changes may produce a change signal that is large enough to be seen but not large enough to draw attention. These results argue for different level of detection and for a flexibility of these levels and are

considered in a more global theory of change detection.

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Evidence That Phenomenal Consciousness Has a Distinct Neural Basis from Cognitive Access

Ned Block, New York University, United States

June 22, 16:30-18:30: Symposium 4

Evidence will be described that phenomenal consciousness and cognitive access have distinct neural bases. Lamme's appeal to simplicity and Kouider's appeal to partial awareness do not challenge this interpretation. The relation to issues of attention will be examined.

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Quantum Mechanics and the Nonphysical Mind

Casey Blood, Retired (from Rutgers University), United States

June 20, 17:30-19:30: Poster Session 1

In the Schroedinger's cat experiment, quantum mechanics says that the cat is both dead and alive at the same time. More generally, in the mathematics of quantum mechanics, several potential versions of the physical universe can exist simultaneously. But we perceive only a single, seemingly objective version of the world.

To explain this, one might suppose that, in addition to the multi-version wave function, there exists an objective reality made up of particles. In spite of the treatments given in modern physics texts, however, there is no evidence for the existence of particles. All the usual "evidence" put forth--the photoelectric and Compton effects, localization (in which a spread-out light wave exposes only one grain of film), particlelike trajectories in cloud and bubble chambers, the discrete properties of matter such as charge, mass, and atomic "graininess"--can be accounted for by the properties of the wave function alone.

One could also obtain an objective reality if the wave function collapsed to just one version. But experimental attempts to find evidence of collapse have not been successful.

These two together--no evidence for particles or collapse--imply it is reasonable to suppose that only the wave function, with all its versions of reality, physically exists. One can show that Everett's many-minds interpretation is not valid because he makes unwarranted assumptions in his derivation of the probability law. Thus, instead of all versions being aware, we infer that only one version of the brain corresponds to our conscious awareness.

What is it that perceives--is aware of--a single version? One can prove that "that which perceives one version" cannot be subject to the mathematics of quantum mechanics. But the widespread successes of quantum mechanics make it reasonable (to a physicist) to define the physical universe as that to which quantum mechanics applies. Under this definition, then, "that which perceives" is outside the physical unverse. More specifically, there must be a nonphysical "Mind" aspect within each of us that is consciously aware of just one quantum version of our physical brain. (Note: The nonphysical

Mind just perceives; it does not collapse the wave function.)

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Resting State Connectivity Integrity in the Default Network Reflects the Level of Consciousness Impairment in Brain-Injured Patients. An fMRI Study in Brain Death, Coma, Vegetative State, Minimally Conscious State and Locked-In Syndrome

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Luaba Tshibanda, University of Liège, Belgium
Marie-Aurélie Bruno, University of Liège, Belgium
Pierre Boveroux, University of Liège, Belgium
Quentin Noirhomme, University of Liège, Belgium
Caroline Schnakers, University of Liège, Belgium
Athena Demertzi, University of Liège, Belgium
Didier Ledoux, University of Liège, Belgium
Bernard Lambermont, University of Liège, Belgium
Gusatve Moonen, University of Liège, Belgium
Robert-Ferdinand Dondelinger, University of Liège, Belgium
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Steven Laureys, University of Liège, Belgium

June 22, 14:00-16:00: Concurrent Session 3.3

The 'default network' is defined as a set of areas, encompassing posterior-cingulate/precuneus, anterior cingulate/mesiofrontal cortex and temporoparietal junctions, showing more activity at rest than during attention-demanding tasks. This network has been involved in higher cognitive functions like self-related processes, emotion, and memory. Recent studies have shown that it is possible to reliably identify this network in healthy volunteers in the absence of any task, by resting state connectivity analyses. The aim of this study was to test if the integrity of resting-state connectivity in the default network would differ in different pathological alterations of consciousness. Thirteen acutely brain damaged patients in brain death (BD; n=1), coma (5), vegetative state (VS; 3), minimally conscious state (MCS; 3) and locked-in syndrome (LIS; 1)) and 12 healthy controls participated to the study. Patients were assessed using the Coma Recovery-Scale Revised. For each subject, a 10 minutes resting-state acquisition was performed. Data were analysed using independent component analysis (ICA) and statistical parametric mapping (SPM). A goodness-of-fit comparison was performed

(Greicius et al. PNAS 2004; 101: 4637-42) on individual subjects' Z maps, taking the control group's default network as a template. Our analysis searched for differences in the selected components between controls and patients groups. Mean goodness-of-fit scores for individual default network components were respectively 1.25 for controls, 1.22 for LIS, 1.15 for MCS patients, 0.79 for VS and 0.77 for coma. In the BD patient, no cortical spatial map could be identified. Significantly less activity was observed within all areas of the default network for coma and vegetative state patients as compared to controls. Locked-in and minimally conscious patients were not significantly different from controls. Finally, all default network areas connectivity was shown to be linearly correlated with the degree of clinical consciousness impairment of the patients, ranging from coma, to vegetative state, minimally conscious state and locked-in syndrome. Our data show that default network connectivity is decreased in severely brain-damaged patients, in proportion to their degree of consciousness impairment. Ongoing work on a larger patient cohort is currently performed, aiming to evaluate the prognostic value of the presented methodology.

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Terminology in Consciousness Studies

Andrew Brook, Carleton University Ottawa, Canada

June 19, 9:30-12:30: Tutorial

Consciousness studies currently displays a profusion of mostly ill-defined technical or quasi-technical terms. One recent survey counted over 50 such terms (Brook, forthcoming). Just a sample: Access consciousness, phenomenal consciousness, self-consciousness, creature consciousness, state consciousness, monitoring consciousness, peripheral consciousness, prereflexive consciousness, background consciousness, focal consciousness, peripheral consciousness, awareness, conscious awareness ... and on and on. There is no agreement even on something as basic as whether, to be called 'conscious', a psychological state must, at least in part, be about one's own psychological states. It is unlikely that consciousness studies will ever achieve a sound scientific footing with such an imprecise and ungainly conceptual toolbox. In this workload, researchers from behavioural/experimental, neuroscientific, and philosophical backgrounds will lay out and, to the extent possible, organize the existing terminology, then begin the task of forging a single framework of concepts for consciousness studies. At least half of the three hours of the workshop will be devoted to open discussion.

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Motion Induced Blindness: The More You Attend the Less You See

Olivia Carter, Harvard University, United States
Robert Luedeman, Harvard University, United States
Stephen Mitroff, Duke University, United States
Ken Nakayama, Harvard University, United States

June 22, 14:00-16:00: Concurrent Session 3.2

During motion induced blindness (MIB), visually salient objects vanish from awareness when presented on a background of coherent motion. Here we investigate the influence of attention on the perceptual disappearance of an individual stimulus target by systematically changing the number of stimulus items, grouping categories and the attentional demand at a central fixation task. In Experiment One, 1-4 square targets (varying in color and angular rotation) were each presented centered within one of the four visual quadrants. When a single target was presented alone it was visibly suppressed for 23.4% of the 40 second trials. Surprisingly, the disappearance of the same target was reduced by more than half to an average of 11.4% of the trial when additional targets were presented. In Experiment Two, the effect of group number was considered. In every trial, all 4 target squares were presented within the same quadrant. Targets defined as "in group," shared feature properties (color, texture, proximity and alignment of border contours), "out-group" targets differed in respect to all features. Despite only moderate effects of the grouping cues (i.e., simultaneous disappearance of all 4 targets only increased from 0.5% when targets formed 4 out-groups to 2% when targets formed a single group), an increase in group number lead to greater total disappearance without any associated increase in the disappearance of the individual targets. In Experiment Three, we selectively manipulated attentional load with a central detection task. Subjects reported less disappearance of a single target in high attention conditions relative to fixation and low attention conditions. In all experiments, a simulated MIB condition ruled out the effect of task difficulty or response inaccuracy. Together these results indicate a striking paradox: the more attention allocated towards a target object, the more that object will be suppressed from awareness. A number of mechanisms are considered to explain this surprising effect.

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The Role of Time and Pace in Sequence Learning

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Dominique Ginhac, Université de Bourgogne, France
Axel Cleeremans, Université Libre de Bruxelles, Belgium

June 20, 17:30-19:30: Poster Session 1

In this study, we investigated the role of the pace of the learning task on sequence learning in a serial reaction time (SRT) task. We manipulated the value of the response-stimulus interval (RSI), i.e the interval between the response and onset of the next target.
We assumed that a random RSI would disturb chunk formation during the training phase and would have a detrimental effect on learning.
To test this hypothesis, we ran a series of experiments in which we systematically compared SRT and recognition performance in training conditions differing by the averaged length and the variable or constant nature of the RSI. In Experiment 1, we compared SRT and recognition performance between a variable short RSI condition (0, 200, 400, 1000 ms) and a constant short RSI condition (400 ms). In Experiment 2, we compared SRT and recognition performance between a variable long RSI condition (1000, 1200, 1400, 2000 ms) and a constant long RSI condition (1400 ms). If longer RSI improve explicit sequence learning, we expect SRT and recognition performance to be improved in the long RSI as compared to the short RSI conditions. If temporal organization is predominant, we expect improved performance in the constant RSI conditions compared to the random RSI conditions.
Previous studies about impact of RSIs variation on the learning showed that implicit sequence learning is sensitive to organizational variables. Stadler (1993) showed a better learning when the organization of the sequence was conserved. Similarly, Willingham & Greenberg (1997) showed performance improvement when the RSI varied according to a fixed pattern, compared to random variation. Moreover, Destrebecqz & Cleeremans (2003) and Miyawaki (2006) indicate that longer RSI improves explicit learning.
By contrast, our results are very interesting and reveal that while a random RSI had no impact on SRT performance, recognition of sequence fragments was only observed with constant RSI. It is therefore argued that:
(1) Temporal organization of the sequence is mandatory for explicit sequence

learning to take place.
(2) The organization is primordial to recognize but not to learn the sequence.

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Consciously Accessible Beliefs and Practical Reasoning

Timothy Chan, University of East Anglia, United Kingdom

June 21, 16:30-18:30: Poster Session 2

This paper investigates the distinctive mode in which an agent's beliefs are consciously accessible to him-/herself. Most of our beliefs are accessible to consciousness. While we are at any one time conscious only of very few of our beliefs, normally we can become aware of a belief simply by directing our conscious attention to its subject matter. There are, however, significant exceptions, with some beliefs being inaccessible to its agent, for example due to self-deception. In these cases, the overall pattern of the agent's action shows that he lacks the belief which he sincerely professes to have. Many propositional attitudes are similar in being generally, but not always, consciously accessible. What is distinctive about belief is that, as Evans writes, we become conscious of them by 'directing our eyes outward'. When asked 'Do you believe that p?', we normally answer (with sound warrant) by considering whether p is the case. As Moran observes, this characteristic of belief, which he calls transparency, is highlighted by the fact that Moore-Paradoxical assertions of the form 'p but I do not believe that p' or 'p but I believe that not-p' express absurd beliefs. Such beliefs may well be true, but seem to be as obviously rationally defective as the contradictory 'p and not-p'. By contrast, 'Dangers abound here but I feel no fear' is not similarly absurd. (It may be an expression of courage.) The irrationality of Moorean beliefs, I argue, can be accounted for by considering the different roles played in practical reasoning and action by transparent beliefs and unconscious (i.e. not consciously accessible) ones. Both kinds of belief function as premises in practical reasoning which rationalizes the agent's actions, but the reasoning is seen by the agent as his own only when its key premises are consciously accessible to him in a transparent manner. Transparent beliefs are thus, I suggest, essentially involved in intentional actions which are fully endorsed by the agent. I conclude by indicating some implications of this account for the relationship between consciousness and rational agency, as well as the metaphysics of belief.

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Learning under Pentobarbital Anesthesia in Rats: An Enabling Effect of Epinephrine Injected Systemically on Two Fear Conditioning Tasks

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June 20, 17:30-19:30: Poster Session 1

Whether new association could be acquired under anesthesia is controversial. The few studies reporting positive findings usually employed aversive stimuli which may release epinephrine (E) acting as an endogenous memory modulator. A former study showed that in a conditioned emotion task E given systemically enhanced association of tone and shock presented to anesthetic rats. To test the generality of these findings, the present study examined the effect of E on acquisition under anesthesia in two fear conditioning tasks: conditioned-fear potentiation of startle and conditioned freezing. Male Sprague-Dawley rats received a session of one or five training trials of tone-shock pairing after an injection of pentobarbital (45 mg/kg) or saline. Fear responses, as measured by potentiation of startle or freezing, to the conditioned stimuli were assessed 24 hrs later under a wakeful state. Results showed that in the conditioned-fear potentiation of startle task trained under wakefulness with one trial, E administered before training enhanced conditioning at 0.01 or 0.1 mg/kg but impaired it at 1.0 mg/kg. E had no effect on the response acquired in one trial under anesthesia but enhanced that acquired in five trials under anesthesia, yet the effective doses shifted to 0.1 and 1.0 mg/kg. This effect could not be due to alteration in shock sensitivity or anesthesia. On the other hand, in the conditioned freezing task E injected after a training trial at various doses failed to enhance conditioned freezing if the response was tested directly, no matter when the rats were trained under wakefulness or anesthesia. When the rats previously trained under anesthesia and receiving E were retrained under wakefulness and receiving no drug, they showed significant saving in comparison with the rats previously having saline. In summary, these results showed that E did play a permissive role in learning various responses under anesthesia, yet the effects rely on the behavioral procedures and the drug dose.

Symmetry Perception is Strongly Affected by Awareness of the Axis Location

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June 20, 17:30-19:30: Poster Session 1

In a symmetric display, some part of the stimulus is a reflection of another part about some axis. Mathematically, one cannot decide whether two parts of an image are symmetric unless the location and orientation of the symmetric axis is determined; while one cannot determine the symmetric axis location unless two parts of the image are recognized as reflections of each other. We investigated how the human visual system resolves such chicken-and-egg problem by observing how prior information about symmetry axis affects symmetry detection.

The symmetric stimuli consisted of random dot displays structured to have symmetry about an axis whose orientation was either vertical, horizontal, or one of the two diagonals. In each trial, either a symmetric (target) or a non-symmetric pattern was superimposed on another random pattern (mask). The observers were to determine whether the target was presented in each trial. The stimuli were viewed through eight apertures (1o diameter) evenly distributed around a 6o diameter circle. The information about the axis was manipulated by (1) priming: half of the trials had a line flashed before the trial indicating the axis orientation and (2) salience: the axis location fell within the apertures on half of the trials, but between them on the other half. We also systematically manipulated the mask dot density and measured the psychometric functions of percentage correct responses for a range of mask densities in a constant stimuli paradigm.

The slope of the psychometric functions, a measure of the observer's state of uncertainty, was about the same regardless of the priming and axis salience manipulations. However, when the axes were visible and/or primed the target threshold showed up to a 10-fold reduction. Conversely, the target threshold vs. mask density function was flat at low mask density and increased with a slope of one beyond the same critical density that was increased by both salience and priming. Thus, we conclude that the awareness of the axis orientation increases perceptual sensitivity to symmetry and decreases the effect of the noise mask without affecting the level of uncertainty about the axis location.

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Unconsciousness and the Energy Consumption of Brain During Resting State

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June 22, 14:00-16:00: Concurrent Session 3.3

Functional magnetic resonance imaging (fMRI) and PET have been widely used to investigate the neural basis of human cognition such as perception, attention, memory, emotion, and so on. Majority of such studies focused on what happened in the brain during a specific goal-oriented task Recently, there have been increasing interests in the brain's activities during resting state. Many experiments have suggested that there is ongoing intrinsic activity in the brain which is related to information processing and accompanied by large energy consumption during resting state. Without reasonalble explanation of this phenomenon, the large energy consumed by the brain during resting state is named of "Dark Energy".

In this article we discuss the characteristic of unconsciousness and review some studies about the brain's intrinsic activity during resting state and energy consumption. Then, we put forward the viewpoint that the large energy consumption of brain during resting state is devoted into unconscious activity. We argue that (1) unconsciousness is the process of durative information processing in the brain rather than a state; (2) besides it's implicit effect on behavior, ongoing intrinsic unconscious activity consumes substantive energy of brain; (3) we should foucus on the psychological meaning of unconsciousness as well as the neural correlates and the physiological meaning of unconsciousness.

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Attention Mediates the Facilitatory Effect of Task-Irrelevant Sound on Subjective Expansion of Visual Duration

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June 21, 16:30-18:30: Poster Session 2

The perceived duration of attended stimuli is lengthened compared to that of unattended ones (Fraisse, 1963). In our previous study we found that a synchronized but task-irrelevant sound expands the perceived duration of visual stimuli more than that of visual stimuli without sound (Chen & Yeh, VSS 2007). According to the scalar expectancy theory (Gibbon, Church, & Meck, 1984), two possible mechanisms in the pacemaker-accumulator internal clock can account for this augmented expansion of visual time by sound. One is the increment of arousal in the pacemaker which is reflected by a multiplicative relation, and with equivalent arousal the ratio of expansion at different durations should remain the same. The other is the decrement in latency of switch closure by focused attention which is reflected by the constant expansion across different durations. In this study an oddball paradigm was adopted to test the subjective expansion of time. A visually presented oddball was inserted into a series of standards and the participants compared the duration of oddballs to that of standards. Two durations of standards (750ms and 1050ms) were used and a synchronized sound accompanied the oddball. In the control condition, no such sound was added. The perceived durations of the oddball were computed separately for the uni- and bi-modal oddballs. Results showed that (1) the augmented expansion of visual time by sound was replicated for both standard durations, consistent with our previous study; (2) the ratios of uni- and bi-modal expansions at the two standard durations were not identical; and (3) the difference between uni- and bi-modal expansions remained the same. These results demonstrate that the amount of augmented expansion of visual time by sound remains identical for different durations. We conclude that the added sound decreases the latency of switch closure so that the pulses of timing ticks are accumulated earlier, as compared to the no-sound condition. The perceived durations of visual stimuli are lengthened due to enhanced attention by sound.

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"Sadness" Components Dominated Expression Judgment on Ambiguous Faces

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June 20, 17:30-19:30: Poster Session 1

Facial expression, as a combination of movements and states of facial muscles, is an efficient and accurate indication of emotion. A reliable judgment of one another's expressions is important for human activities in a social environment. We are interested in how such efficient and reliable expression judgment is possible given that there are only subtle differences in facial features among different expressions. In this study, we investigated how the visual system integrates emotional signals transmitted on individual or a combination of facial features into a unified percept of facial expressions. We used face images with different emotion valence that were created by interpolating either between neutral and happy or between neutral to sad. In each trial, the stimulus was a composite face whose upper and lower parts were randomly selected from different morphs. The task of the observers was to press keys to indicate whether the stimulus represents "sad" or "happy" in each trial. When the expressions of the upper and lower parts of the face were consistent, the probability of "happy" response increased with happy valence and decreased with sad valence. However, when they were inconsistent, the observers always made "sad" response. In addition, the increment of happy valence actually led to an increment in the "sad" response. This result suggests that the information used for facial expression judgment to a whole face cannot be a simple combination of information provided by local components. Components for a negative emotion may be able to attenuate the effects of the components for a positive emotion. As a result, components for a negative emotion dominate our expression judgment of an ambiguous face.

Using the Repetition Blindness Paradigm as an Implicit Measure of Awareness: a Crossmodal Integration Study

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Su-Ling Yeh, National Taiwan University, Taiwan

June 21, 16:30-18:30: Poster Session 2

The type-token hypothesis of perceptual awareness (Kanwisher, 2001) proposed that linking an activated type with a spatiotemporal token representation is the gate for that particular type to reach consciousness. Accordingly, the repetition blindness (RB) paradigm can serve as an implicit measure in exploring perceptual awareness. RB refers to the failure to see the repeated item in rapid serial visual presentation, which results from the failure of a given type to be tokenized twice within a short interval (Kanwisher, 1987). Chen and Yeh (in press, Psychonomic Bulletin & Review) demonstrated that repeated visual events were better perceived when they were accompanied by two different sounds than by no sound, which implies that multisensory stimuli have a better opportunity to gain visual awareness. In the present study we explore further whether this sound-facilitatory effect in RB is due to enhancement of crossmodal interaction, or formation of new percept by crossmodal integration. We manipulated three conditions (no-sound, same-sound, and different-sound) and classified two groups of participants (detectors or non-detectors) based on their subjective reports of having either detected that there were two different sounds presented or not. The results showed that only the detectors led to different performances in the same-sound and different-sound conditions, and they did not suffer from RB in the no-sound condition; whereas the non-detectors suffered from RB in the no-sound condition and the two sounds facilitated the perception of repeated visual events, regardless of sound identity. These results suggest that enhancement due to crossmodal interaction can be observed by using the RB paradigm, while the new representation formed by crossmodal integration can only be observed after the possibility of rendering RB has been overcome. We conclude that the RB paradigm is particularly suitable for issues such as “how perceptual events achieve consciousness” and amongst the mechanisms multisensory integration is one of them.

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Transparency Explained

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June 20, 17:30-19:30: Poster Session 1

Transparency is the thesis that when introspecting one's own experience, one cannot be aware of the properties of one's experience, but can only be aware of the properties of objects represented by experience. This feature of experience thus poses a challenge to those who believe in qualia, which are supposed to be qualities of experience. If via introspection, we can't find such qualities, then it is tempting to say there are no qualia, no phenomenal character not exhausted by the qualities of represented objects.

Objections to the transparency thesis typically take the form of counterexamples. In phosphene-experience, Ned Block claims, we can be aware of mental paint, those qualities that represent. Also, it is claimed that there is a phenomenal difference between seeing things blurrily and seeing things normally, whereas there is no difference in qualities of represented objects. These counterexamples to transparency suggest, at least, transparency is not so obvious in every kind of experience.

I will argue that Dennett's account of qualia can explain both transparency in normal experiences and the degree of transparency as shown in the counterexamples. The thought experiments given by Dennett, like the coffee tasters Chase and Sanborn, strongly suggest that there are no introspectible qualities of experience independent of our reaction to them. In normal perception, external objects are the obvious targets of our judgment and reaction. Thus conceived, Dennett's account of qualia provides a good explanation of transparency. Meanwhile, the degree of transparency can be explained by the ease to form judgments in our normal visual experiences and the difficulty to form judgments in counterexamples, and can in turn be explained by the absence of obvious target to react or judge. In contrast, those who believe in qualia have the burden to explain why in normal situations there seems to be no introspectible qualities of experiences, and why there seems to be a degree of transparency. In the transparent aspect of experience, Dennett's account seems more satisfactory.

Practical Self-Awareness in Expertise

Huei-Ying Cheng, Cheng-Chi University, Taiwan

June 20, 17:30-19:30: Poster Session 1

Sapience and sentience are two major aspects of human being's mental life. The history of the interests concerning these two fabulous aspects is arguably more than two millennia. Since 1970s, phenomenologist Hubert Dreyfus (1978, 1992, 2000, etc.) has undertaken the task to articulate correct paths to understand "sapience" through his critique of artificial intelligence. Recently he opens a new debate over rationality and action with philosopher John McDowell. McDowell (1996, 2007) holds that our movements of limbs underlying intentional actions are conceptual and therefore rational all the way out, but Dreyfus (2007) descents. He proposes a distinction between "detached rule-following" and "situation-specific ways of coping" (and refines it later) and uses it to interpret several intriguing examples, such as Grandmasters in chess games. Dreyfus argues that in expertise, we never step back and reflect our ways of coping with our immediate environment, and if we do step back, our skillful ways of coping will degenerate significantly. I have argued, in another occasion, that Dreyfus's position presupposes too narrow conceptions of "rationality," "concept," and "agency." In this poster I would like to concentrate on another aspect of the debate: in criticizing McDowell, Dreyfus says something about "sentience" in passing, and I think it should be rejected either. According to Dreyfus, when experts skillfully cope with their situations, they are in complete flows and therefore without any self-awareness. I shall argue that this view of sentience violates a crucial distinction between expertise and cases like "alien hand," originally reported by Banks and his colleagues (1989). Alien hand patients have no feeling of control over particular portions of their bodies when the syndrome appears, and experts sometimes report that they do not actively control their actions. However, there is still a vital difference between these two kinds of case: we can attribute implicit, practical self-awareness to the latter, but not the former. And this difference helps further clarify important notions concerning sapience, such as "rationality" and "agency," as mentioned above. The wider aim of this discussion is to connect phenomenology to scientific studies with regard to consciousness.

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A Confusion of the Term "Subjectivity" in the Philosophy of Mind

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June 21, 16:30-18:30: Poster Session 2

Through this paper, I would like to argue that unlike the mental concepts "pain" and "red", the concept "subjectivity" is a reducible concept. My main reason is that we cannot find any subjective phenomenon or quale that especially belongs to "subjectivity." Although we say that all types of qualia or subjective phenomena have subjectivity, there is no similarity among them except that they are all subjective. I think this "subjective" is the only place where we know about "subjectivity." In addition, I argue that this "subjective" can be explained by a self-detection mechanism, which can refer to nothing subjective.

Through this argument, I suggest that the term "subjectivity" is a misleading concept in the discussion of the philosophy of mind. We have to separate the problems between quale and subjectivity. The quality of mental phenomena may result in a real problem in the philosophy of mind. However, since the term "subjectivity" can refer to nothing subjective, there is no real problem in the problem of subjectivity.

Time and Representation of Time in Conscious Experience

Peng Chien, National Yang Ming University, Taiwan
Allen Y. Houng, National Yang Ming University, Taiwan

June 20, 17:30-19:30: Poster Session 1

With regard to the issue of time in consciousness, many think about the experience of time, e.g. the special present, the experience of duration, and the experience of order. Dennett and Kinsbourne's time stamp, Damasio's mind time and Wright's psychological stopwatch are examples.
Some also argue that as long as we understand the experience of time, we can solve the problem of the time of consciousness. For example, in Dennett and Kinsbourne (1992), they argue that the representation of time can solve the paradox of the time in consciousness, such as the color phi phenomenon, the cutaneous rabbit, and Libet's experiments of the backward referral in time and the subjective delay of consciousness of intention. In these four temporal anomalies, it seems that the perception of the event happens earlier than the neural processing of it. Dennett and Kinsbourne propose that what we are conscious of is the representation of time, the "time stamp" or the happening time of the event, but not the time of representation, the time of neural processing. Thus, what we are conscious of is not the perception happens before its neural processing but the representation of time which is earlier than the time of neural processing.
In this paper, I will argue that Dennett and Kinsbourne did not successfully dissolve the temporal anomalies. Besides, Damasio's mind time and Wright's psychological stopwatch, which are also representation of time, are not solution either. The main reason is that the representation of time is not 'time' in physics, but just representation. Furthermore, time in physics cannot be representation of time, and the representation of time is just the representation of "the order of events happening in consciousness." Thus, if we want to solve the problem of the "time" of consciousness, we cannot just provide "representation" as solution. What is really needed to solve the problem is "physical time." We have to answer the question: What is the role of physical time in conscious experience?

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Equating the Influence of Conscious Attentional Control with the Effect of Automatic Bottom-Up Bias in Necker Cube Reversals

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June 21, 16:30-18:30: Poster Session 2

Bistable figures are stimuli that afford at least two interpretations even though the physical displays remain unchanged. It is known that conscious control of attention can selectively bias the intended percept for bistable figures such as Necker cube. For Necker cubes, attentional control (or "top-down" influence) may operate by enhancing the desired representation, or suppressing the alternative representation. In addition, automatic processing of low-level cues (or "bottom-up" influence) (e.g., eye fixation) can also boost the desired percept by increasing the stimulus strength. Our goal is to directly compare the magnitudes of top-down vs. bottom-up influences on Necker cube reversals with a random noise paradigm.

In Experiment 1, we measured bottom-up influences in 55 naïve observers with passive viewing. The strength of bottom-up cue was manipulated by adding 0%-99% random noises exclusively in the lower square (biasing the "top-view" percept) or the upper square (biasing the "bottom-view" percept). In Experiment 2, we measured the extent of selective attentional control over the 0 % noise Necker cube in the same observers. Three instructions were given: (1) passive viewing; (2) perceive the cube from top; and (3) perceive the cube from bottom. In each 20-s trial, observers were instructed to maintain fixation while monitoring their perceptual state and reported perceptual switches by pressing one of two keys.

The results are as follows. First, selective attention effectively enhanced the intended percept. Second, the percentage of dominance duration of a percept increased reliably as a function of the noise density, indicating an effective bottom-up effect. Third, the magnitude of bottom-up influence was comparable to attentional modulation and was affected by the individual's initial bias.

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Can Mary Know What She Is Not Aware of?

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June 21, 16:30-18:30: Poster Session 2

The ability hypothesis (hereby AH) refutes the conclusion from the knowledge argument (Jackson 1982) that there are facts about the world that Mary, the hypothetical scientist who has complete knowledge of all physical facts, could learn only after being released from her black and white room to experience colors (eg.red) for the first time. To AH advocates, the phenomenal "knowledge" that " 'this' is what it's like to see red" is actually a set of abilities that are gained and exercised when Mary perceives red. She is aware of what it's like by being able to actively imagine, remember and recognize this particular shade of red (Lewis 1988, Nemirow 2007) . Therefore, there is no phenomenal "knowledge" on a par with physical knowledge, and therefore, no newly learnt phenomenal facts.

The sense of knowledge in AH refers to the "awareness" of "what is it like to be" instead of the raw feeling itself. Subjects impaired in their know-how abilities would still enjoy "what it's like to be" experiences, though the capability to visually entertain and be aware of them is lost with the abilities (Nemirow 2007).

I will argue that if there are no new knowledge learned, but only new abilities gained when Mary becomes aware of "what it is like to see red," AH can not explain that there still is a fact about the world-the "what" it 's like to be that is acquired only out of Mary's room- that is neither learned in the room nor a part of the abilities. Ned Block has argued from psychological and neurophysiologic evidence that there can be phenomenal experiences inaccessible and non-reportable to the experiencing subject. Sperling's memory task shows that this knowledge can be made aware of or accessible by means of special cues (Block 2007).

Therefore, phenomenal facts known to the subject may be consciously inaccessible, on a par with the physical facts known by Mary when she is currently not aware of them, though the facts are known to her at all times.

That the knowledge of phenomenal facts still exist even though the subject is unaware of them holds implications for other opponents of the knowledge argument that base their arguments on whether the subject could be introspectively aware of their phenomenal states.

Consciousness and Metarepresentation: A Computational Sketch

Axel Cleeremans, Université Libre de Bruxelles, Belgium
Bert Timmermans, Université Libre de Bruxelles, Belgium
Antoine Pasquali, Université Libre de Bruxelles, Belgium

June 21, 14:00-16:00: Concurrent Session 2.3

When one is conscious of something, one is also conscious that one is conscious. Higher-Order Thought Theory (Rosenthal, 1997) takes it that it is in virtue of the fact that one is conscious that one is conscious that one is conscious! Here, we ask what the computational mechanisms may be that implement this intuition. Our starting point is Clark and Karmiloff-Smith (1993)'s point that knowledge acquired by a connectionist network always remains "knowledge in the network rather than knowledge for the network": While such networks may become exquisitely sensitive to regularities contained in their input-output environment, they never exhibit the ability to access and manipulate this knowledge as knowledge. Instead, knowledge can only be expressed through performing the trained tasks and remains forever embedded in the causal pathways that developed as a result of learning. To address this issue, we present simulations in which two networks interact. The states of a first-order network trained to perform a simple categorization task become input to a second-order network trained either as an encoder or on another categorization task. Thus, the second-order network "observes" the states of the first-order network and has, in the first case, to reproduce these states on its output units, and in the second case, to use the states as cues in order to solve the secondary task.. This implements a limited form of metarepresentation, to the extent that the second-order network's internal representations become re-representations of the first-order network's internal states. We explore how well this mechanism accounts for observed dissociations between performance and report in the different situations recently explored by Persaud et al. (2007). We conclude that this mechanism forms the basis of mental attitudes, that is, a cognitive system's understanding of the manner in which its first-order knowledge is held (belief, hope, fear, etc.). Consciousness, in this light, involves knowledge of the geography of one own's internal representations — a geography that is itself learned over time as the results of an agent's attributing value to the various experiences it enjoys through interaction with itself, the world, and others.

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How Consciousness and Spatial Frequencies interact during Face Processing

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June 20, 17:30-19:30: Poster Session 1

The field of face perception has always played an important role in the research on visual consciousness. Moreover, the role of spatial frequencies has raised a great interest on face processing research. However, little is known about the interaction between spatial frequency and visual consciousness. Recently, Bar et al. (2007) proposed a model of object recognition that distinguishes the respective role of High vs. Low spatial frequencies (HSF vs. LSF). On the one hand, HSF are assumed to be processed slowly along the ventral stream, conveying the content of visual consciousness. On the other hand, LSF propagates faster and directly from early visual areas to orbito-frontal cortex, and in the model the result of this fast and automatic LSF computation can modulate the slow processing of HSF.

Here, we investigated whether the processing of spatial frequencies varies as a function of awareness during face perception. We used a masked face priming paradigm (Kouider & al., 2007) with hybrid prime images (i.e., mixture of LSF from one face and HSF from another) that where either visible or subliminal.

Our results show that both low and high spatial frequencies information had a comparable influence under subliminal conditions. In addition, there was also a strong interaction with awareness: while HSF influences greatly increased with stimulus visibility, LSF influences remained unchanged.

The fact that HSF information can be extracted from subliminal images goes against models that associate HSF with a slow and conscious processing. We also discussed the evidences in the light of the diagnostic approach (Ruiz-Soler & Bertrand, 2006, Smith & al, 2007), which predicts that the respective contribution of spatial frequencies are task-specific and context dependant. Further experiments are currently run in our lab to investigate diagnosticity and contextual modulation during subliminal and conscious face perception.

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Neurophenomenology and Neurobiology: Dual Explanations in the Qualia Debate

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June 20, 17:30-19:30: Poster Session 1

The qualia debate centers on the claim that qualia suppose to be "the way things seems to us" or "what it is like, for an organism, to experience something." In a sentence, qualia refer to the phenomenal content arising from conscious experiences. In such terms the discussion is bounded within the philosophical scope. Usually philosophers do not consider neuroscientific data and avoid naturalistic claims about consciousness. However available findings from cognitive neuroscience indicate that neurobiological processes underlie conscious events. But the controversies remain; there exist still few studies concerning the neurobiological processes underlying qualia. After all, qualia are just neurobiological mechanisms of detecting changes and assigning sense to incoming physical information. As a matter of fact, qualia-emergence depends on neurobiological processes, and the richness of conscious experience originates firstly in the sensory systems. Moreover, qualia have an evolutionary survival value. They play a fundamental role in maintaining organisms informed about the actual state of affairs inside and outside the body. By means of sensory systems – the sensory detectors and the interface between organism and environment, e.g., visual, olfactory, auditory systems, etc. – raw information is detected and selected from a multitude of patterns in the surroundings. The next step is processing and conversion into qualitative information which is performed by neuronal networks in the brain. At first sight no challenge presents to the standard conception of qualia. However an explanation on the neurobiological level could in principle diminish the importance of phenomenological level, even though they complement each other. The present hypothesis tries to take into account both levels of explanation, and does not imply reductionism or elimination. In other words it is an attempt to reconcile phenomenology with neuroscience, something near of what currently is called neurophenomenology. The present hypothesis is grounded on the Global Neuronal Workspace Theory of Consciousness, formulated by B. Baars and S. Deheane.

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Ethical Considerations for the Vegetative and the Minimally Conscious State

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June 21, 16:30-18:30: Poster Session 2

Introduction: Patients in vegetative state (VS) show relatively preserved arousal levels without manifesting signs of awareness. Minimally conscious state (MCS) patients are aroused and show inconsistent but reproducible signs of awareness. Medical guidelines have considered treatment withdrawal (artificial nutrition and hydration) in permanent VS ethically justified. The fact that almost half of chronic MSC patients are misdiagnosed as permanent VS (Andrews, Murphy, Munday, & Littlewood, 1996), raises the important ethical issue how MSC patients are to be considered, particularly when end-of-life decisions need to be taken.
Methods: A questionnaire about end-of-life issues in chronic VS or MCS (i.e. more than one year) was presented to people at meetings about disorders of consciousness in Belgium and other countries.
Results: The sample included 801 respondents (Mage= 40 yrs, range= 16-85, 42% women, 53% Belgians) and was analyzed based on their professional background: health-care workers (n= 601, 75%) and other professionals (n=200, 25%).
Among health-care workers, 49% (n=390) found treatment withdrawal in chronic VS acceptable and 18% disagreed (n=114). Fifteen percent of other professionals (n=119) agreed with treatment withdrawal, and 9% disagreed (n=74) (9 % no responses). The two groups differed significantly [$x2(2, 801)= 19.5$, $p< .01$]. When the respondents imagined themselves in chronic VS, 71% would not wish to be kept alive, whereas 26% would wish maintenance of treatment (2% no responses).
Among health-care workers, 21% (n=167) treatment withdrawal in chronic MCS acceptable, and 46% disagreed (n=366). Eight percent of other

professionals agreed with treatment withdrawal (n=62), and 17% disagreed (n=133) (8 % no responses). The two groups differed significantly [x2(2, 801)= 14.1, p< .01]. When the respondents imagined themselves in chronic MCS, 58% would not wish to be kept alive and 40% would wish maintenance of treatment (2% no responses).

Conclusions: The majority of health-care workers find treatment withdrawal in VS acceptable. However, their opinions differ significantly from laypersons. Although the majority of health-care staff disagrees with treatment withdrawal in chronic MCS, a small percent still finds it ethically justified.

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How Do We Find Words in Implicit Artificial Language Learning?

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June 20, 17:30-19:30: Poster Session 1

Implicit learning is often viewed as a central mechanism in natural language learning. In line with this idea, recent studies have shown that infants and adults could identify the "words" of an artificial language in which the only cues available for word segmentation are the transitional probabilities between syllables. However, the exact nature of the learning mechanisms and of the computational models that can account for these results remains controversial.

According to one class of models, statistical learning amounts to parse the speech stream by forming chunks between adjacent elements. In this view, the sensitivity to statistical regularities is an emergent property following from the acquisition of rigid, conscious, word-like representations. According to a second class of models (the Sequential Recurrent Network, SRN) learning is based on the computation of the statistical regularities present in the input. The ability to extract words out of the speech stream is then rooted in the processing of the basic statistical properties of the material. Learning occurs automatically and implicitly and the knowledge of the words follows from the flexible sensitivity to the transitional probabilities of the material.

In order to contrast these two hypotheses, we ran experimental and simulation studies in which we studied, within the context of a Serial Reaction Time (SRT) task, the participants' and model's ability (1) to process statistical contingencies between non-adjacent elements and (2) to flexibly learn different artificial languages composed of a different set of words but sharing the same transitions between successive elements. These two kinds of linguistic regularities are indeed particularly challenging for models based on chunking processes.

Our results show that the SRN can account for the essential features of human behavior suggesting that implicit statistical learning might be more powerful than previously anticipated and can indeed constitute a central mechanism of language processing.

Imaging in Disorders of Conscious

Haibo Di, Hangzhou Normal University, China

June 21, 10:30-12:30: Symposium 2

Objectives:
• Learn the difference between coma ,vegetative state ,minimally conscious state and locked-in syndrome
• Learn the clinical assessment of consciousness
• Learn what is the residual brain function and activation in disorders of consciousness
• Learn about the ethical issues and quality of life measures in these disorders
Financial Disclosure: this presentation will not include discussion of any commercial products or services.
New neuroimaging techniques are giving a better understanding of patients in coma and related conditions. Progress in medical care is increasing the number of people who survive brain damage. We can now save the lives of many patients who suffer trauma or anoxia but if the damage is severe, the victim will slip into a coma. Patients who recover from a coma typically do so within days. Others will die, and still others will awaken but remain unconscious, entering what is called a vegetative state. Even for experts, the vegetative state is very a disturbing condition. It illustrates how the two main components of consciousness can get dissociated: wakefulness remains intact but awareness - encompassing all thoughts and feelings - is abolished. In patients who recover from the vegetative state, the first signs of consciousness are minimal and appear gradually. The patient who starts making non-reflexive movements but remains unable to communicate enters a minimally conscious state. Like the vegetative state, the minimally conscious state may be transient on the way to further recovery, or it may be chronic, sometimes permanent. Making the distinction between vegetative and minimally conscious patients is challenging. Given that conscious awareness is subjective, first-person experience that is inherently difficult to measure in another being; functional neuroimaging offers a unique opportunity to objectively study disorders of consciousness. Positron emission tomography (PET) and functional MRI studies measuring neural activity in brain-damaged patients are disentangling the neural correlates of the vegetative from the

minimally conscious state and have major clinical and ethical consequences. More research efforts are awaited so that these new techniques can help in the prognosis and treatment of these devastating medical conditions.

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Gambling on the Unconscious

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Anil Seth, University of Sussex, United Kingdom

June 21, 14:00-16:00: Concurrent Session 2.1

Three experiments employing an implicit learning paradigm provide evidence against the current way wagering is sometimes used to measure conscious awareness. The most straightforward method of determining whether a person is aware of knowing is to ask the person after a judgment whether they knew the answer (to some degree) or were guessing. Another approach involves gambling, determining the degree to which a person is willing to put their money where their mouth is. There are several ways gambling can be used. Persaud et al (2006) used wagering, where a person bets a low or high wager on each judgment and either gains or loses that amount depending on whether they were correct. For a person maximizing expected profit, a low wager indicates no confidence whatsoever in the judgment, and a high wager some confidence. But can the amount of a wager be taken as such a direct reflection of awareness of knowledge? Gambling behaviour may also be affected by other factors, such as risk aversion, or simply a poor understanding of what is required to maximize profit. The accuracy of judgments for different types of wagers and for simple verbal confidence ratings was compared. We found that high rather than low verbal confidence was related to greater accuracy, indicating some awareness of knowing. Even so, when people claimed they were quite literally guessing, their accuracy was above baseline, indicating some unconscious knowledge. By contrast, with high-low wagering, there was no detectable difference in accuracy between a low wager and a high wager; in fact, wagering was significantly less able to predict accuracy than simple verbal confidence. These results suggest that wagering is not a good indicator of awareness of knowing. However, when we removed the element of risk aversion by only using wagers that might lead to gain but never loss, gambling was as sensitive as verbal report in predicting accuracy. If results are in, I may also report a study using other gambling measures theoretically superior to wagering for assessing the conscious status of knowledge.

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The Ability to Report is Neither Sufficient nor Necessary for the Occurrence of Conscious Experience

David Cannon Drake, National Chengchi University, Taiwan

June 20, 14:00-16:00: Concurrent Session 1.2

A subject's reports, verbal or otherwise, are a vital part of most investigations into the nature of conscious experience. I see this as unfortunate, but acceptable considering issues of practicality and the fact that we have yet to determine the neural correlates of consciousness. What I find unacceptable is the claim made by some researchers that the ability to report is a necessary condition for consciousness, some even going so far as to suggest that consciousness arises out of this report-giving ability. I will argue that the ability to provide a report is neither sufficient nor necessary for conscious experience. At best, reports are a kind of raw data that are generally useful in ascertaining the presence and nature of conscious experiences in a given subject, but we are not justified in assuming that it is always sufficient evidence or that it is a requirement. To support my argument I will draw upon several examples from the research literature. Evidence for the insufficiency argument can be found in various cases wherein seemingly normal experience-reporting speech is produced in what appears to be a verifiably unconscious state. As for the argument against necessity, split-brain patients (people who have had their corpus callosum severed) have shed light on the possibility that consciousness might be separable in a single human being: by some interpretations, there are (always or sometimes) two separate streams of consciousness in these patients, corresponding to their left and right hemispheres, with the right hemisphere being severely limited in its ability to provide (or contribute to) reports. If such an interpretation is sound, it raises the possibility that, in principle, any human brain could, at times, have two or more separate streams of consciousness occurring at the same time, some of which may be dissociated from the brain's ability to produce a report. Such a possibility is troublesome from a research perspective, but if the possibility exists then it should be investigated. I will also discuss pain asymbolia, potential cases of non-reportable conscious experience and how we might identify them, and issues relating to infants, fetuses, animals, and neuroethics.

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What It Is Like to Think. On Cognitive Phenomenology, Functionalism, and Externalism

Marius Dumitru, University of Oxford, United Kingdom

June 22, 14:00-16:00: Concurrent Session 3.1

The very idea of cognitive phenomenology is considered by many as a non-starter, because of a definitional restriction of phenomenology to non-cognitive states. But perhaps we should clarify the intension of the concept first and determine its extension on that basis, and not start with an exclusivist extension followed by the assignment of a concept to it. It seems to me that the concept of phenomenology allows cognitive phenomenology in its extension.

If we agree on the cogency of the very idea of cognitive phenomenology, there is a further question about its specification. One could hold that cognitive phenomenology just is a) the phenomenology of inner speech (Carruthers 2006, Jackendoff 2007) or b) the phenomenology of mental images, emotions, or feelings (of effort, conviction, understanding, etc.) conjured by thoughts. Fringe phenomenology (such as the tip-of-the-tongue phenomenon) may challenge the specification in terms of the phenomenology of inner speech. It seems to me that even if we bracket a) and b), which are typically present, we are still left with a phenomenological core: the phenomenology of cognitive meaning. Many authors (among others, G. Strawson, Siewert, Pitt) converge on a specification of cognitive phenomenology in terms of grasp of intentional contents and the experience of semantic comprehension, while others (Horgan & Tienson, B. Loar) emphasize the grounding of all content in a phenomenal basis (mental paint for Loar). I agree with a specification in terms of the experience of semantic comprehension, with the qualification that we should not consider it simpliciter, but as the end product of a complex process involving the mastery of conceptual structures.

My claim is that if there is intrinsic cognitive phenomenology, it has to be functionally exhausted to a great extent. Arguments are presented against exclusively equating it with the phenomenology of inner speech, and the feelings of comprehension and conviction, on the ground that these phenomenal aspects engender certain anomalies if considered separately as accounting for the phenomenology of thoughts.

Functional exhaustion for the case of cognitive phenomenology is shown to

be immune to inverted spectra and absent qualia objections, because from the point of view of inferential involvement, colour concepts are constructs derived from experience, and zombie arguments are not free from prior assumptions of separability between functional and phenomenal aspects in the case of thoughts.

This specification of cognitive phenomenology in (narrow) functionalist terms may entail an internalist view of mental content.

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Conscious Reports Matter: Semantic 'Subliminal' Priming Differs According to Objective and Subjective Measures of Prime Awareness

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June 20, 17:30-19:30: Poster Session 1

Words that are presented below visibility threshold are called 'subliminal', because it is assumed that they are processed nonconsciously to a certain extent. Psycholinguistic researchers for instance investigate orthographic priming with subliminally presented prime words, where the letter information in the prime words is known to have an effect on word recognition of a subsequent probe word (a so-called priming effect). One of the most frequent methods of subliminal presentation is to hide words in rapid sequences of pattern masks. Because the threshold of visibility depends on many factors that cannot be controlled in an experiment, word visibility must be controlled after a priming test. One way to assess visibility is to ask the participants to describe their phenomenal perception of the masked words. This measure is often thought to be too crude and unreliable. Another way involves measuring the visibility of masked words in a further experiment, where participants are asked to try to classify the masked words. We present experiments on subliminal category priming, for which prime visibility was assessed with various tests and verbal reports. Phenomenal awareness or unawareness of the prime words modulated semantic priming, as did prime visibility – but the two measures were not correlated and had clearly differential effects on priming. We discuss the implications for subliminal semantic priming and prime visibility tests.

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The Eyes Have It: The Evolution of Complex Vision as a Precondition for the Emergence of Consciousness

David B. Edelman, The Neurosciences Institute, United States

June 21, 16:30-18:30: Poster Session 2

Given increasing evidence for consciousness in a number of mammals, the strong possibility of consciousness in birds, and the documentation of sophisticated cognitive abilities suggesting at least the possibility of a form of awareness in some invertebrates, it is conceivable that consciousness appeared independently a number of times during animal evolution. If this is so, it is likely that, in some radically different animals, conscious states are based, not on structural homologies, but rather on functionally analogous sensory and neural architectures. Were there convergent conditions that favored the independent elaboration of neural substrates for consciousness a number of times? I suggest that the development of camera eyes with focusing lenses, in conjunction with neural circuitry allowing the rapid cross-modal integration of visual input, provided the basis for precisely the sort of unified perceptual scenes that are believed to underlie conscious states in mammals. Among the senses, arguably it is vision that involves the fastest processing of the largest amount of input. With some possible exceptions (i.e., sonar in bats and cetaceans), vision is unique in its wide spatial range. Many mammals and birds can see distant objects in great detail, but can't necessarily hear or smell over distance as acutely. Visual acuity over distance allows the tracking of a far-off moving object and, presumably, the time to plan an appropriate response. The visual systems of mammals and birds are well characterized in terms of the architecture of the eyes (a focusing lens projecting an image onto a retina populated by different opsin-based receptors), as well as the specialization of brain regions processing different aspects of the visual scene. However, although the structure of the eye is well documented in invertebrates such as coleoid cephalopods and spiders, the neural substrate for vision in these animals is not well understood. Nevertheless, the behavioral sophistication and visual capabilities of certain invertebrates suggest the possibility of a kind of cross-modal integration akin to that found in many vertebrates. I discuss the possible evolution of consciousness in different animal lines in the context of ecologies that may have engendered selection for animals with complex vision.

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Change Blindness, Choice Blindness and Dream Logic

Ilya Farber, Singapore Mgmt University, Singapore

June 21, 16:30-18:30: Poster Session 2

In previous work, I have argued that change blindness can best be understood as a consequence of the recurrent dynamical structure of the neural architecture underlying consciousness. More specifically, I interpret CB not as the failure of some (as yet unobserved) "change detection" mechanism, but as a failure of anomaly detection in the process of incorporating sensory updates into a dynamically maintained inner world-model. At ASSC10, I used this approach to investigate the temporal dynamics of CB and the contextual cues which might facilitate or suppress it. This time, I will use it to shed some light on two seemingly disparate phenomena: the tolerance of certain bizarre cognitive incongruities in dreams, and the "choice blindness" paradigm of Johansson et al. (2005). In each case, the key is to remember that "higher-order" or non-sensory features (e.g. senses of ownership or agency, preference, familiarity, identity, moral or logical acceptability) have no magic way of bypassing the binding problem: regardless of how they're generated, such feature representations can only have appropriate causal impact on the stream of consciousness if they are bound into a dynamic coalition with the other features which jointly constitute a conscious percept. With respect to choice blindness, I suggest that this approach can help to reconcile Johansson et al.'s finding that confabulatory reports are statistically near-indistinguishable from the reports of control subjects (on a variety of measures) with the natural intuition that there must be something more than confabulation going on when normal people report the recent contents of their own consciousness. In particular, I predict that looking at interactions between features of the subjects' reports and features of their (really or allegedly) chosen pictures may reveal patterns which are invisible to the authors' current method of analysis. With respect to dreams – and, more speculatively, to the similarly bizarre fantasies which some otherwise rational fronto-parietal patients produce in response to their deficits – I suggest that a key factor may be the relative statistical independence of the abovementioned "higher-order" features from the lower-order sensory features which make up the bulk of most conscious percepts, a consequence of the sensitivity of the former to potentially very fine distinctions among the latter.

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Dissociation of Conscious and Unconscious Knowledge in Sequence Learning: Evidence from Event-Related Potentials

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June 20, 17:30-19:30: Poster Session 1

This paper investigated how unconscious and conscious knowledge in sequence learning is reflected in event-related potentials (ERPs).
ERPs were recorded during an oddball-version of a serial reaction time (SRT) task. A sequence consisted mainly of regular triplets; the probability of a deviant triplet was .125. In the training phase subjects simply performed a complex reaction time task for either seven or 15 blocks. After the training two generation tests measured which triplets were known consciously according to Jacoby's process dissociation logic. On each test trial, subjects were asked to generate a triplet either the same as training (inclusion instructions) or different from training (exclusion instructions) and to report their confidence. RTs were faster for standard than deviant triplets whether trained for seven or 15 blocks, confirming that all subjects acquired some procedural knowledge about the sequence. Further subjects acquired conscious knowledge but only some time after more than seven blocks of training. Initially the knowledge was apparently unconscious.
To look at the ERP correlates of the conscious status of knowledge, chunks were classified according to whether they were learnt at all and whether the knowledge was conscious. For each chunk separately, procedural knowledge was measured by the RT speed up between the first and second half of training. Procedural knowledge was associated with N2 and N3 modulations. Conscious knowledge for each chunk was defined by the difference between inclusion and exclusion performance. In the absence of conscious knowledge, there were modulations in N2 and N3. For those chunks that became consciously known later in training, there were modulations of P3 late in training. That is, unconscious knowledge could be measured online by amount of N2 and N3 modulation and conscious knowledge by the amount of P3 modulation. These results challenge previous conclusions in the literature because previous

studies have not cleanly separated conscious and unconscious knowledge. Further, the findings suggest different neural systems are involved in the acquisition of conscious and unconscious knowledge in sequence learning.

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Simulation of Bistable Perception with Long Range Correlations Using Reentrant Nonlinear Perception-Attention-Memory Coupling

Norbert Fuerstenau, German Aerospace Center, Germany

June 21, 14:00-16:00: Concurrent Session 2.3

Simulation results of bistable perception due to ambiguous visual stimuli are presented which are obtained with a behavioral nonlinear dynamics (phase oscillator) model using perception–attention–memory coupling. As a kind of minimum architecture representing the Thalamo-Cortical and ventral ("what") V4–InferoTemporal–PraeFrontal–V4 loops the basic model couples the nonlinear dynamics of a macroscopic perception state order parameter with an adaptive attention (feedback gain) control parameter with reentrant delay T and additive band limited white noise (Fürstenau 2006, 2007). Quasiperiodic perceptual switching is induced by attention fatigue coupled to the perception state, with a perception bias which balances the relative duration of the alternative percepts, corresponding to the well known Synergetics model of Ditzinger and Haken (1989). As a new feature memory effects are introduced by allowing for the slow adaptation of the perception bias parameter via coupling to the perception state. The simulations exhibit long range correlations of the perceptual duration times in agreement with recent experimental results of Gao et al. (2006). They are determined by calculation of the self similarity (Hurst) parameter H of the reversal time series ($H > 0.5$). Deviations of the simulated reversal time statistics from the Gamma-distribution as typically observed in experiments, increase with decreasing memory time constant and attention noise. Mean perceptual duration times of 2 – 5 s are predicted in agreement with experimental results reported in the literature, if a feedback delay T of 40 ms is assumed which is typical for cortical reentrant loops and the stimulus-V1 latency (Lamme 2003). Numerically determined perceptual transition times of 3 – 5 T are in reasonable agreement with stimulus–conscious perception delay of 150 – 200 ms. The symmetrized absolute value of the attention parameter exhibits qualitative agreement with the dynamics of the eye blink rate and saccade frequency as reported by Ito et.al. (2003). Initial periodic stimulus simulations yields the reversal rate variation as a function of stimulus off-time in surprisingly good quantitative agreement with experimental results of Orbach et.al.(1966) when selecting adaptation and recovery time constants

of 1 – 2 s.

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Can Neural Adaptation Occur at the Semantic Level? A Study of Semantic Satiation

Bruno Galmar, National Cheng Kung University, Taiwan
Jenn-Yeu Chen, National Cheng Kung University, Taiwan

June 20, 17:30-19:30: Poster Session 1

When a stimulus appears, the neural system responds to it immediately. But, if the stimulus does not change, the neural system will respond less and less until it may not respond at all. That is, the stimulus disappears from consciousness. This has been known as neural adaptation or sensory adaptation. We are interested in knowing whether adaptation can occur at the semantic level by re-examining the much debated phenomenon of semantic satiation. The phenomenon refers to the experience of the temporary loss of meaning when the participant is repeatedly exposed to a word visually or auditorily. In one task of the present study, the participants judged whether, for example, PHILLIPINE is a COUNTRY for 30 trials, on each of which the word COUNTRY was shown with a country name or a non-country name. In a second task, the participants judged for 30 trials whether CANADA and JAPAN were both countries, without seeing the word COUNTRY. In the third task, serving as a reference, the participants received 30 different member-member pairs each of which came from a different category. They judged whether the members of each pair belonged to the same category. If adaptation occurs at the semantic level, we expect to observe a trend of prolonged response times over trials, not only in the first task, but most crucially, in the second task. In this talk, we will discuss the methodology and the theoretical implication of semantic satiation.

Visual Masking and Conscious Face Perception in 5-Month-Old Infants

Sofie A. V. Gelskov, Ecole Normale Supérieure, France

June 20, 17:30-19:30: Poster Session 1

Visual masking has become a standard method for assessing subliminal perception and how it differs from conscious perception (Kouider & Dehaene, 2007). Recent studies using both objective and subjective measure of consciousness have found a steep rise in visibility around 50ms, leading to a non-linear (i.e., sigmoidal) curve of visibility. While the literature on conscious versus unconscious processing is extensive for adult populations, there exist almost no empirical studies on this topic in infant populations partly because of methodological problems. In fact, it remains uncertain to what extent infants are conscious, and if they are, how much their consciousness resembles the one of adults. In this study, we present a new behavioral method to assess the presentational threshold of fast and masked visual stimuli and to study the curve of visibility at different presentation durations in 5-month-old infants. The method uses preferential looking as a measure of visibility and relies on the saliency of faces which naturally capture infants' attention in a two alternative forced choice setup. We report two experiments showing that 5-month-old infants can react to masked faces presented for as short as 150ms. In addition, as for adults, we observed a sudden rise in visibility for face durations above 150ms. These results suggest that although infants have a higher threshold for conscious perception (150ms vs. 50ms in adults) similar processes might be leading to conscious perception in infants and adults.

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Cognition and Consciousness

Nicholas Georgalis, East Carolina University, United States

June 22, 14:00-16:00: Concurrent Session 3.1

I distinguish two concepts often conflated: representation and information bearing. I argue that representation requires conscious and is intentional (is about or directed at objects or states of affairs). Information bearing does not require consciousness, and it is not intentional. This has consequences for the distinction between conscious and unconscious beliefs. Strictly there are no unconscious beliefs though there are information bearing states, lacking intentionality, that are systematically related to conscious beliefs, which are intentional.[1]

What are called 'unconscious beliefs' or 'unconscious representations' are innocently understood as a certain types of information bearing states, states that one has while asleep, otherwise unconscious, or conscious but thinking about other things. These states enable occurrent conscious belief states, but are neither representational nor intentional themselves. As such, they expose important features and relations of the basis for cognition, but not of cognition itself. If I am right about this, it would go far in explaining why there has been so much success in studies of cognition that ignore consciousness, even while consciousness is necessary for representation and ultimately for cognition itself. These studies succeed when they focus on unconscious states, which most assuredly are integral to the success of cognitive activities, and which are falsely assumed to have representational features of conscious states.

It is a grave error, therefore, and one that is frequently made, to infer from such successes that results pertaining to unconscious "beliefs" or "representations" are transferable to conscious beliefs and representations, or when it is thought that these successes show that consciousness itself is epiphenomenal or not central to cognition. These errors are based on the deeply flawed, but widely held, assumption that the sense of belief and representation employed in discussions of conscious and unconscious states is the same. If I am right, this assumption is false. That conscious beliefs are representational while the related but unconscious states are not is an important but unnoticed difference that goes far in both resolving and explaining some of the deep divisions in the literature as to the relevance of consciousness and the first-

person perspective to investigations of cognition.
A corollary is that Frank Jackson's refutation of his earlier Knowledge argument fails. It depends in part on the assumption that representational facts are in principle derivable from micro-physical facts. This assumption is false on the view advanced in my 2006.

1 Extensive arguments for these claims are presented in my book, The Primacy of the Subjective: Foundations for a Unified Theory of Mind and Language, Bradford Book, MIT Press, 2006.

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A Computational Model of Figure-ground Perception

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June 21, 16:30-18:30: Poster Session 2

The centre-surround model of receptive field in our visual pathway is a classical bottom up approach to visual information processing based upon brightness-contrast information. Its corresponding mathematical operator was first proposed by the empiricist Ernst Mach on the basis of the Mach band illusion. This model or its equivalents, though effective for explaining many brightness-contrast illusions, cannot account for many others like the White effect. Top down approach, on the other hand, is historically associated with the name of Hermann von Helmholtz, who argued that perception is the product of unconscious inference linked later to Bayesian inference or likelihood principle by many contemporary researchers. In between, the Gestalt school claims that perception is an outcome of recurrent bottom up and top down processes on the basis of such coherence criteria as proximity, similarity etc., thus enabling figure-ground separation-like feature extraction. In this work, we attempt to advance this approach with a new computational model of early perception that enables very effective figure-ground segregation. In continuation of our previous works (Biological Cybernetics, 94, 89-96, 2006), we had demonstrated that all brightness perception illusions can actually be classified into three separate contextual classes (Perception, 36(s), 54-55, 2007) and that these three classes probably represent three different attentional goals (Attention in Cognitive Systems: Theories and Systems from an Interdisciplinary Viewpoint, 386-403, 2007). Here, we address a new question that whether these three classes should be dealt on the basis of case-based-reasoning only, or whether there exists a unified mathematical theory. A new model, tries to answer this question in the affirmative. It modifies Mach's equation by introducing a bi-harmonic of Gaussian compared to Laplacian and a fourth moment dispersion measure compared to between and within-class variances akin to Gestalt coherence criterion of similarity (and dissimilarity) among pixels and frequently used in thresholding gray scale images for obtaining binary outputs. A single step convolution with such a combination at unique parameter values results in binary maps that are expressive of the main information content imbibed in

all the three classes of illusory images mentioned above and not obtainable by any standard grayscale thresholding method.

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Theory of Mind and Mental Simulation – Possibilities of Combination

Maushumi Ghosh, Jadavpur University, India

June 20, 17:30-19:30: Poster Session 1

The current state of the art in the Theory-Simulation Debate about mind-reading is that either people argue in a blind, partisan manner in favour of one theory (either the Theory Theory or the Simulation Theory) or they provide a vague suggestion about following a mid-way between theory-use and mental simulation. After having examined the views extant in the theory of mind literature, it seems to me that there is an urgent need to address the possibility of a hybrid solution to the theory of mind debate. This hybrid solution (we may call it in any name – we may call this 'syncretism' or 'a theory-simulation combination' or anything that gives a sense of reconciliation) may be approached from two directions and I have taken both routes. First, I will look at some of the available combinatorial suggestions from writers like Carruthers, Heal, Stich, Barnes & Thagard and a few others. Second, I will give a few suggestions of my own to show how theory-use and mental simulation combine in our folk predictive, ascriptive and explanatory practices. One thing is very clear – third-person psychological understanding cannot be explained only by the Theory Theory or the Simulation Theory. There are cases in which theory-use is redundant or mental simulation is ineffective. Furthermore, with the growing psychological complexity that accompanies chronological development, just simulation or just theory may not be the best way of understanding other minds. In the end I will work out what I consider to be the best way of combining the Theory Theory and the Simulation Theory in order to give the best possible explanation of our mindreading abilities.

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The Misidentification Delusions

Ian Gold, McGill University, Canada

June 22, 10:30-12:30: Symposium 3

The misidentification delusions, once thought rare, are now known to occur frequently in dementia. Although Ellis and Young's (1990) account of one of these delusions – the Capgras delusion – is perhaps the best model of any delusion, we still understand very little about the cognitive processes implicated in the misidentification delusions or their neural substrates. In this paper I make some suggestions about the neurobiology of the misidentification delusions and their cognitive origins.

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Entropy Analysis of Electroencephalogram Signals during Recovery from Coma

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June 21, 16:30-18:30: Poster Session 2

Introduction: With the improvement in reanimation techniques, the number of persons surviving severe brain injury is increasing. These patients in an altered state of consciousness represent a problem in terms of their diagnosis. Indeed, assessing the level and content of consciousness in a non-communicating person is intrinsically difficult and it has been demonstrated that around one patient in three who is clinically diagnosed as "vegetative" is in fact conscious or minimally conscious. It is hence mandatory to study the role of para-clinical markers of consciousness, such as electroencephalography (EEG) entropy, in order to objectively assess patients' consciousness. Here, we reduced the complex information contained in the EEG to state entropy values. The aim of the study was to investigate the utility of EEG entropy calculation to disentangle vegetative state [VS] from minimally conscious state [MCS] patients.
Methods: A multi-centric prospective study recording fronto-temporal artifact and sedation-free EEG recordings in 20 VS (8 traumatic) and 20 MCS (12 traumatic) patients. Behavioral (Coma Recovery Scale - Revised [CRS-R]) and automated entropy monitoring (Datex-Ohmeda S/5, Helsinki, Finland) assessments were obtained in the acute (n=21) and chronic setting (n=19).
Results: EEG entropy measurements showed a significant correlation with behavioral assessments (CRS-R total scores; r=0,586). Mean state entropy in VS patients were significantly different from mean values obtained in MCS (38 vs. 71, respectively). ROC analysis showed that a state entropy value cut-off of 48 differentiated VS from MCS with a sensitivity and specificity of 80%.

Conclusions: EEG-state entropy measurements are a promising tool in monitoring consciousness in non-sedated severely brain-damaged patients and permit differentiation of vegetative from minimally conscious states. False positives (20%) seem to be due to muscular artifacts. Our findings are encouraging in the search for electrophysiological correlates of consciousness in severe acute brain damage but require further improvements of the employed algorithms in order to be of use in the clinical setting and the individual patient level.

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Does Unconscious Observation of Manual Actions Induce Action Priming?

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Erik Chang, National Central University, Taiwan
Daisy L. Hung, National Yang Ming University, Taiwan
Ovid J. L. Tzeng, National Yang Ming University, Taiwan

June 20, 17:30-19:30: Poster Session 1

Although it has been suggested that the observation of actions facilitates motor responses consistent with the observed ones, it is unknown whether the awareness of the previewed actions is critical to this action priming effect. In the current study, we used a continuous flash suppression (CFS) paradigm to suppress the conscious perception of action primes, and examined whether consciously and unconsciously viewed manual actions resulted in differential priming effects on the performance of the same manual actions. Each trial began with a prime period in which an animation of manual action (power / precision grip) was presented to the participant's non-dominant eye, while the same animation (conscious condition) or a dynamic Mondrian (unconscious condition) was presented to one's dominant eye. A patch of an oblique grating either tilted leftwards or rightwards was then presented and the participant either made predesignated precision or power grips to indicate the grating orientation. We found a congruency effect showing that the response time (RT) was shorter for the congruent condition where the participant observed and executed precision grips than the RT for the incongruent condition where the participant observed a power grip but performed a precision grip. More interestingly, there was a tendency that the congruency effect was greater when participants consciously perceived the action primes than when they unconsciously viewed them. These results suggest that conscious awareness of visual inputs may be crucial for activating the human mirror neuron system.

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The Effects of Anaesthetics on the Cortex as Revealed by Voltage Sensitive Dye Imaging

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June 22, 14:00-16:00: Concurrent Session 3.3

This presentation consists of an introduction to voltage sensitive dye imaging (VSDI) and anaesthetics as well as a short digression on why the in vitro mouse brain slice is an excellent tool for the scientific investigation of consciousness. This is followed by a methods and a results section concluding with a look at how the study of anaesthetics in general and our findings specifically may contribute to the science of consciousness.

As a result of technical limitations neuroscience today is split into two main areas of investigation. On the one side there is the microscopic world of cellular interactions in the realm of micrometers and milliseconds. On the other side there are macroscopic investigations in the form of MRI and PET studies with a maximum resolution of millimetres and seconds. However, many people believe that consciousness is realized somewhere in between, at the level of large networks of neurons interacting with each other on a sub-second timeframe. With the help of VSDI we now have a tool at hand, which allows us to start exploring this realm and thus slowly close the gap between the very large and the very small and the very fast.

The aim of the study presented here was to better understand how anaesthetics interact with the brain at the level of large network dynamics. In a mouse brain slice containing the thalamocortical connections electrical stimulation of the relevant nucleus in the thalamus results in activation of the primary somatosensory cortex. We recorded this activity with VSDI over a large area of cortex with a temporal resolution of 1000 Hz over 850 ms. In order to determine the effects of general anaesthetics on these large scale neuronal network dynamics we added the anaesthetics Ketamine, Propofol, Thiopental and Etomidate to the bath solution respectively. The obtained data was analyzed separately for each layer of cortical activity as to be able to precisely localize the positive and negative correlations between the various conditions. Our data thus gives insight into the general way anaesthetics, with often very different chemical and biological properties, affect the circuitry upon which consciousness supervenes.

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Explicit vs. Implicit Perception and Working Memory Processes

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June 20, 10:30-12:30: Symposium 1

When encountering someone on the street, we can often say whether his or her face is familiar, though it may be difficult to identify the same person. Familiarity memory may differ essentially from identification memory, which includes contextual and episodic information and may require conscious scrutiny. We tested macaque monkeys on a delayed-match-to-multiple-sample task, with limited sets of well-trained images or never-before-seen images. They performed better with novel images, detecting familiarity vs. novelty, rather than recency of presentation. This implies extremely effective one-shot learning of familiarity, resembling Standing's (1973) finding that people detect familiarity for 10,000 once-seen pictures. We suggest that with conscious scrutiny delay-activity working memory is used for identifying well-trained stimuli. Novel stimuli do not induce delay-activity, so a different strategy is used, based on modulated responses to repeated images. We present a generic neural network model, quantitatively simulating these behaviors, based on conservative Hebbian synaptic plasticity. Familiarity becomes the first step toward establishing identification.

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The Automatic Synchronization of Walking Phase of Two Persons when They See Each Other

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June 21, 16:30-18:30: Poster Session 2

Previous researches have found contagion in behaviors linked to social communication: mutual nodding for agreement, facial expresion triggerd by others' one. The current research investigated the relation between social communication and synchronization in non-social behavior, or walking on the spot (stepping).
Sixteen typically-developed people (eight pairs) participated in this experiment. In the face condition two persons faced each other, and in the back condition one person faced the others' back. In the first half of each trial, there was a curtain between the persons such that one could not see the other. In the second half, the curtain was removed and they could see the other. We assumed that two persons had a chance to socially communicate without a curtain, or the second half of a trial, in the face condition. The distance between two persons was 120 cm. The height of the right ankle was recorded in 60 Hz. We did not give any instruction to participants except for just walking during a trial. They wore headphones and heard loud white noise sound to avoid hearing the other's stepping sound that could serve as a potential cue to synchronization of walking.
Based on the ankle height of two persons we calculated the phase difference in their walking cycles. In the face condition, the phase difference periodically increased and decreased with a curtain, but was close to zero without a curtain. Zero phase difference means perfect synchronization in walking. However, in the back condition, the phase difference continued to periodically increased and decreased without a curtain. We also tested a pair of autistic persons and found that their walking did not synchronize even in the face condition. These results revealed that the synchronization of walking automatically occurred in the face condition only with typically-developed persons. Walking do not seem have any role in social communication, but could be a good estimator for social situations and social skills. We speculated that

automatic, unintentional, and/or unconscious synchronization of movements could be a basis for social interaction and communication, and autistic persons' deficit in movement synchronization could lead to difficulties in social communication.

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Implicit Processing of the Location and Identity Information in Humans

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June 21, 16:30-18:30: Poster Session 2

Remembering and recollecting an object (e.g. foods, nesting places) in the environment is important for the survival of animals. To achieve the recollection of things, it is necessary that two types of information, i.e. one on the identity of things and one on their locations, are correctly retrieved from the stored memory either consciously or unconsciously. While the "what" and "where" pathways (substantiated in the ventral and dorsal areas of the visual cortex, respectively) have been reported in the literature on visuospatial processing, it is at present unknown how the encoded memories for the location and identity are retrieved. A study using the functional magnetic resonance imaging has suggested a dissociation between the spatial and identity recognition in humans (Emrah Duzel et al. (2003)). It was demonstrated that the hippocampal formation was more activated during the recognition of spatial configuration of stimuli compared to their identities, while behaviourally no significant difference was observed between the two conditions.

Here we investigate the dissociation between the location and identity memories in the encoding and/or retrieval process(es). We conducted a series of experiments on the nature of memory for the location and identity of entities under conditions were the subject's attention is controlled. The subjects were instructed to view two objects on a computer screen. After a delay, they answered questions on the locations or identities of the objects presented. In the location task, the subjects answered where the displayed object has been on the screen by pressing the specified button. In the identity task, the subject answered which object has been at the indicated location. Data on the correct rates and reaction times revealed a dissociation between the location and identity memories under controlled attentional states. Based on the results, we discuss the nature of the dissociation and interaction between the location and identity related memories in the conscious and unconscious cognitive processes.

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Oscillation of Conscious Experience and Brain Activity in Motion-Induced Blindness and the Necker Cube

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June 21, 16:30-18:30: Poster Session 2

Perceptual rivalry is an alternation state of conscious experience that occurs with unvarying stimulus over time, which reveals the accessibility of consciousness one at a time. Motion-Induced-Blindness (MIB) is one kind of perceptual rivalry in which perceptually salient targets, when superimposed on a global moving-dots pattern, disappear and reappear alternatively after prolonged viewing (Bonneh, Cooperman, & Sagi, 2001). Despite that MIB has been shown to share similar temporal properties with binocular rivalry (Carter and Pettigrew, 2003) and the Necker cube has also been presumed to share a common form of neural competition between high-level pattern representation with binocular rivalry (Blake & Logothetis, 2002), it remains unknown whether MIB and the Necker cube result from common or separate neural mechanisms. Here, we investigate further to relate MIB to the Necker cube by recording brain activities while the participants reporting their percepts in MIB and the Necker cube. Behavioral results showed that for the same participant the temporal pattern of disappearance and reappearance in MIB is highly correlated with the pattern of oscillation in the Necker cube, and the distribution of dominance periods in both can be approximated by a gamma distribution. Event-related potentials (ERP) showed similar long-latency activities between MIB and the Necker cube over the right parietal lobe after response execution, and the long-latency activities were correlated with subjective reports of the different percepts in the two kinds of perceptual rivalry. Moreover, interhemispheric alternation in accordance with subjective report of perceptual rivalry was observed. Combing behavioral and ERP results, we provide evidence for the similarity in temporal properties for MIB and the Necker Cube, which may be related to a more general mechanism of figural competition.

Can We Close the Gap without a priori Entailment?

Shun-Pin Hsu, National Yang Ming University, Taiwan

June 21, 16:30-18:30: Poster Session 2

Whether reductive explanations require that facts about high-level phenomena can be a priori entailed by facts about low-level phenomena determines the closing or not of the explanatory gap of consciousness. If reductive explanations require a priori entailments, and there are no a priori entailments from low-level brain states to high-level phenomenal states, then consciousness can't have reductive explanations. David Chalmers and Frank Jackson support the position that a priori entailments from low-level to high level are necessary for reductive explanation by stating that information at the microphysical level implies information at the macrophysical level in normal cases, for example, genes VS. DNA, so we can have reductive explanations of macrophysical facts. Because phenomenal states VS. brain states don't have the a priori entailment from low-level descriptions to high-level descriptions due to the conceivability of zombies, there is an explanatory gap. However, I will first argue that even in normal cases, information at the microphysical level can't imply information at the macrophysical level. The illusion that we can deduce information about the structure or organization of macrophysical levels from information at microphysical levels comes from the presupposition of theories at the macrophysical level, such as biology, which provide conceptual tools to distinguish the structure and organization at macrophysical level. These distinctions are wrongly applied to the lower level, importing macrophysical level information. Secondly, I will argue that even without an a priori entailment, biology can have reductive physical explanations, so a priori entailments are not necessary for reductive explanations. Based on this consequence, I argue that even if the conceivability of zombies show that there is no a priori entailment from brain states to phenomenal states, we may still have reductive explanations of consciousness.

Exploring Consciousness via Attention Studies: The Capture Effect of the Angry Faces

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Yu-Chieh Chang, National Chengchi University, Taiwan
Yu-Ju Chen, National Chengchi University, Taiwan

June 20, 17:30-19:30: Poster Session 1

The study of attention is closely related to the issues of consciousness. Some kinds of attentional control can be operated automatically without conscious awareness. In this regard, the capture effect of the emotional stimuli is investigated in the present study. Some previous studies showed that threatening stimuli, such as angry faces, can capture attention automatically. But the evidences were controversial. Therefore, a modified visual search paradigm was used to test the hypothesis in more details. There are two experiments in this study. In the first experiment, three kinds of schematic faces (angry face, happy face, and neutral face) were included as the emotional stimuli. For each trial, there were eight faces presented in a circular layout around the central fixation point. One of the faces having a dot in it was defined as the target face. Target face can be any of the three schematic faces. Participants' task is to discriminate which side (left or right) of the target face the dot was presented in. The results showed that angry face as the target can facilitate participants' response compared to the neutral target condition. And when angry face is not the target but being a distractor, participants respond to the target more slowly. The happy face can not have the same effect. These results support that angry face, but not happy face, can capture attention. In the second experiment, inverted faces were included also for the purpose of eliminating the emotional content. The results showed that the effect of the inverted angry face is not the same as the upright angry face. All the results obtained in the two experiments support that angry face can in some degree capture our attention. The implication of the results was discussed in respect to the attentional control process before or after conscious awareness.

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A Defense of Noë's Vehicle Externalism

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June 21, 16:30-18:30: Poster Session 2

In Action in Perception, Noë proposes a controversial theory of perceptual experiences. He argues for the two theses: (1) the sensory-motor knowledge thesis: perceptual experiences are constituted by the exercise of sensory-motor know-how knowledge, and (2) the vehicle externalism thesis: the physical substrate of the perceptual experience includes the brain, the body, and sometimes the environment. (Noë, 2004) Moreover, Noë intends his theory to account for both aspects of the perceptual experience, the phenomenal character and the representational content.

However, various criticisms have been raised against each of the two theses. Block argues that (1) against the first thesis, there is empirical evidence showing that sensory-motor knowledge is neither necessary nor sufficient for perceptual experiences, and (2) against the second thesis, there is evidence showing that the brain is the only physical substrate for perceptual experiences. (Block, 2005)

I believe both lines of criticisms are wrong-headed. Many of them are based on insufficient understanding of Noë's theory and many of the critics' implicit assumptions would not be accepted by Noë himself. If we can understand Noë's theory and his background assumptions correctly, we will realize that his enactive theory of perception is a lot more defensible than it appears to the critics' eyes.

In this paper, I will focus on defending the vehicle externalism thesis about perceptual content that physical substrate of perceptual content includes the brain, the body, and sometimes the environment. I will argue that this thesis is built on three highly defensible background assumptions of functionalism about perceptual content, distributed representation, and the vehicle of computation, and that the thesis itself is as defensible as the three assumptions. I will not, however, attempt to prove the thesis true.

In the first section, I will briefly review Noë's main theses, and clarify some key concepts in his theory. Then, the criticisms against him will be laid out and discussed. Third, I will discuss the background assumptions of the vehicle externalism thesis and show the criticisms are wrong-headed. Finally, possible objections from the critics are considered and responded,

and the assumptions from the critics are examined and discussed.

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Perception-Motor Integration: Evidence from Event Related Potentials

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June 21, 16:30-18:30: Poster Session 2

Chronometry that combines event related potential (ERP) and reaction time (RT) was used to investigate perceptual-motor processing in the present study. The P300 latency is an index of stimulus evaluation time. RT-minus-P300 indicates the time for action planning. Using additive factors method, two variables (1) stimulus congruence (congruent vs. incongruent arrow arrays) and (2) response compatibility (compatible vs. incompatible) were manipulated in bimanual, two choices reaction time tasks(left-ward vs. right-ward key pressing). According to serial stage model, we hypothesized that stimulus congruence will affect stimulus evaluation time, P300 latency, and response compatibility will affect the time for action planning, that is RT-minus-P300.

Both RT and P300 latency results showed significant congruence and compatibility effect, and interaction was also significant. However, there was an insignificant compatibility effect on RT-minus-P300, the time for motor planning. These results seemed contradict the assumption of serial stage models, and suggested that stages for stimulus evaluation and motor events are not serially organized and their duration are not independent. The lack of compatibility effect on the action planning was worth noting. That may further indicate the stimulus evaluation and motor stage were actually overlapped, and the increased processing time for the incompatible task demands possibly cause decreased motor planning time.

Furthermore, P300 latency results showed that congruent stimuli had greater compatibility effect (352 ms vs. 385 ms), whereas the compatibility effect was less obvious for incongruent stimulus (390 ms vs. 395 ms). The results suggested that perception may be influenced by the action codes, in the present study, the congruent “directional arrows”, which seemed to be more task-relevant features, therefore, more likely to be selected for integration.

The speculation of the existence of an action codes as “directional arrows” was further tested in a verbal code (right vs. left) experiment. There was no significant compatibility effect of verbal code on P300 latency; however, the

motor stage time was significantly lengthened.
It seems that perceptions and motor engrams may share a common code. The common code may lead to perception-motor binding, and affect perception and action planning.

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Selective Attention Modulates the Motion Sensitivity After a Speed Learning Task

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June 20, 17:30-19:30: Poster Session 1

Specificity is a notable feature in many types of perceptual learning. In motion perception, observers gained direction-specific sensitivity improvement after practice in motion detection and discrimination tasks. Here we present a motion speed discrimination task and study (1) whether motion speed discrimination generates direction-specific and eye-specific sensitivity improvements, and (2) if selective attention modulates the sensitivity improvements.
Methods. Participants wore red-blue eyeglasses to receive binocular or monocular stimuli throughout the experiment containing three stages: pre-test, training, and post-test. At the pre-test and post-test stages, participants' 75% motion coherence thresholds for each eye at eight major directions (N, S, W, E, NE, NW, SE, SW) were measured. During the training phase, participants undergo 7 hourly sessions of speed discrimination involving two transparently moving families of dots moving either in opposite or orthogonal directions. Observers' task is to attend to dots in the target direction (always projected to the right eye) and indicate the speed change (faster or slower) in the middle of the trial while ignoring the other (distracter) direction (always projected to the left eye). In the control condition, observers discriminate speed change with single motion direction projected to the right eye only.
Results. In the case of opposite motion, although practice led to an increased sensitivity for both the attended and the neglected motion direction, the sensitivity enhancement was significantly larger for the attended motion direction. The pattern is held in both eyes. Practicing with an orthogonal transparent motion display, however, resulted in an enhanced sensitivity for the attended direction and its opposite direction, and an obvious suppression for the neglected direction. Surprisingly, the modulation is observed only in the right eye, not the left eye. In our control condition – single motion direction during practice - we found no direction-related modulation of the motion direction sensitivity for both eyes. Additionally, the motion sensitivity modulation from learning in both eyes lasted over two weeks, indicating a long-persistent change in neural plasticity.

Conclusion: Our results provide evidence that visual attention can strongly modulate the practice-induced changes in the sensitivity for different motion directions and it lasts for at least two weeks.

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Interactions between Implicit Processing and Working Memory Revealed through Visual Extinction

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June 20, 10:30-12:30: Symposium 1

In the phenomenon of visual extinction, patients are unaware of a stimulus presented on the side of space contralateral to their lesion when a competing stimulus occurs simultaneously on the ipsilesional side. The phenomenon is classically associated with damage to psoterior parietal cortex. The degree of extinction manifested in patients, however, vary on the basis of whether the contralesional and ipsilesional stimuli group. This is consistent with there being implicit processing of contralesional stimuli, which enables them to enter into grouping relations with ipsilesional events. Recently we have shown that extinction can also be modulated by matches between the contralesional stimulus and items held in working memory, indicating that working memory interacts with implicit processing of items to enable stimuli to enter into awareness. We have examined the neural basis of this interaction using fMRI, with the data revealing that it is dependent on a fronto-thalamic-visual circuit, by- passing posterior parietal cortex. This suggests that deficits in realising awareness can be overcome by recruiting cortical-subcortical circuits that route information to frontal cortex.

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Weak Signal or No Signal? How Imaging and Firing Rate Signals Missed a Robust Functional Circuit for Brightness Perception

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Anna Wang Roe, Vanderbilt University, United States

June 20, 14:00-16:00: Concurrent Session 1.3

Understanding the neuronal codes underlying perception and cognition is a fundamental challenge in neuroscience. Population codes based on imaging and neuronal firing rates have been shown to contain extraordinarily rich information about visual representations. However, in response to the Cornsweet edge-induced illusory brightness stimulus (a weaker stimulus input), we have detected only weak modulations in firing rate (Hung et al 2001, 2002; Roe et al 2005), typically much weaker than the firing rate modulation in response to perceptually-comparable real luminance modulation. In contrast to firing rate changes, we measured robust three-fold increases in the coincidence of neuronal spike times recorded from pairs of neurons. This change in spike coincidence was cell- and condition-specific and suggests a functional circuit which may underlie the phenomenon of edge-induced brightness perception (Hung et al. 2007).
Remarkably, with respect to temporal coding, we also observed a border-to-surface shift in the temporal coincidence of spike times consistent with perceptual filling-in. The observed shift was absent when borders were absent and could be reversed with relocation of the stimulus border, indicating that the direction of information flow is highly dependent on stimulus conditions. Furthermore, this effect was area-specific and was seen predominantly in 17–18, and not 17–17, interactions. These results demonstrate a border-to-surface mechanism at early stages of visual processing and emphasize the importance of interareal circuitry in vision.

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Internal Model Theory of Visual Awareness: Convergent Evidence from Studies of Monkeys with Blindsight

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Masatoshi Yoshida, National Institute for Physiological Sciences, Japan
Kana Takaura, National Institute for Physiological Sciences, Japan

June 20, 17:30-19:30: Poster Session 1

In the accompanying paper, we reported neurophysiological findings about monkeys with unilateral V1 lesions. Here we provide evidence, based on behavioral data, that V1 lesion may affect neuronal mechanisms required for control or maintenance of internal models of the environment and the body. 1) Two monkeys with unilateral V1 lesions were tested with a forced-choice (FC) task. Trajectories of saccades to the ipsilateral ('normal') hemifield were curved, suggesting that errors in the initial direction are compensated in the course of eye movements, so that the accuracy of the end points is attained. On the other hand, those of the saccades to the contralateral ('affected') hemifield were straight. The effect was not entirely due to deficits in vision, since even when the luminance contrast of the stimuli in the normal hemifield was near-threshold, their saccades were also curved. These results suggest that V1 lesions affect not only vision but also saccadic control. One of possible explanations for the effects is that V1 lesions affect internal monitoring of saccadic commands. 2) The distribution of saccadic reaction times during the FC task was modeled by the diffusion model. The modeling revealed that the decision criteria were lower when the stimulus was presented in the affected hemifield than in the normal hemifield. These results suggest that V1 lesions affect decision process for initiation of saccades in the FC task. 3) The monkeys were also tested with a yes-no (YN) task, in which the monkeys were required either to make saccades to the targets when the targets were presented or to maintain fixation when the targets were absent. Analysis based on signal detection theory revealed that the decision criteria were deviated positively from zero. The results 2) and 3) suggest that the observed dissociation between the performance of the FC task and that of the YN task is, at least partly, due to the difference between the decision criteria in the two tasks (Lau, 2007). The difference may arise from deficits in availability of the probability distribution of internal representation in the YN task. Based on convergent evidence, we propose an internal model

theory of visual awareness, in which offline control and maintenance of internal models require visual awareness. This is consistent with the view that motor control and visual awareness share similar machinery that act as models of the environment based on internal monitoring (Kawato, 1997; Grush, 2004).

Choice Blindness and Consumer Decision Making

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Lars Hall, Harvard University, United States
Yuko Yamaguchi, University of Tokyo, Japan
Hirokazu Ogawa, University of Tokyo, Japan
Katsumi Watanabe, University of Tokyo; ERATO-JST; AIST, Japan

June 21, 14:00-16:00: Concurrent Session 2.1

There is a great tension in current research on consumer choice. Convincing evidence can be mustered that people are either largely unaware of the factors influencing their choices, or that they know both what they want and why they want it. The psychologists focus on the non conscious influences, both as a general framework and with new discoveries of various implicit effects. The world of marketing and consumer behavior relies to a large extent on explicit measures of consumer attitudes and post-choice explanations, collected through questionnaires and surveys. We introduce the choice blindness methodology as a new kind of dissociation that cuts across the explicit/implicit divide.
In a recent study, we let participants choose which of two consumer goods they would rather buy. The alternatives were presented two at a time on a single slide, each represented by a simple drawing and 12 attributes, six of which were positive and six negative (e.g. for laptops: low price, short battery-life, etc). If an attribute was positive for the first alternative (i.e. low price), it was negative for the second alternative (high price). The pairs were presented for 50s, and after the participants had indicated their choice the original slide was immediately presented again. The participants now had to rate how important they thought each attribute had been for their decision.

On some of the trials, a manipulation was introduced. When the choice slide was presented the second time, two of the most important attributes were switched between the alternatives: if the first laptop originally had low price and short battery-life it now had high price and long battery-life. The great majority of these manipulations remained undetected. The post-choice rating was also affected by the manipulation, as the originally negative attributes were rated as being significantly more influential when they were turned positive, with a reversed pattern for the attributes changed from positive to

negative. In fact, this response pattern was so strong it mirrored the result from the non-manipulated trials.

The overall conclusion from this data is that the post-choice rating of the influence of an attribute was determined by the perceived positive or negative value of that attribute after the choice, rather than an accurate introspective awareness of the actual importance of the attribute when the decision was made.

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Neural and Chemical Substrates of Consciousness across Waking and Sleeping

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June 21, 10:30-12:30: Symposium 2

Waking and sleeping are actively generated by neuronal systems distributed through the brainstem and forebrain with different projections, discharge patterns, neurotransmitters and receptors. Waking is maintained by systems with ascending projections, which by their discharge stimulate cortical activation, necessary for consciousness. It is also stimulated by neurons with descending projections, which by their discharge stimulate behavioral arousal and responsiveness with muscle tone. Together with predominantly glutamatergic and GABAergic long or locally projecting neurons of the central reticular core, other neurons serve to modulate cortical activity and behavior through diffuse projections, state-regulated discharge and use of modulatory neurotransmitters, including acetylcholine, noradrenaline, and orexin (hypocretin). Cholinergic neurons stimulate cortical activation but not behavioral arousal or muscle tone and discharge in association with cortical activation during both Wake and REM sleep. In contrast, many other modulatory systems stimulate both cortical activation and behavioral arousal and discharge selectively during waking. The modulatory neurotransmitters act upon postsynaptic neurons in different manners according to specific receptors associated with excitatory or inhibitory actions and accordingly recruitment or silencing of other wake or sleep neuronal systems. Sleeping is initiated by inhibition of the activating and arousal systems. This inhibition is effected at multiple levels through particular GABAergic neurons that discharge maximally during sleep. Sleep-active GABAergic neurons are inhibited during waking by noradrenaline through α2 adrenergic receptors. Some such GABAergic neurons in the preoptic area and basal forebrain discharge with slow wave activity during slow wave sleep (SWS). Such cortical activity is not consonant with conscious perception or cognitive activity. Other GABAergic neurons discharge at progressively increasing rates during SWS and REM sleep potentially promoting behavioral quiescence and inhibition of responsiveness along with diminishing muscle tone. Such GABAergic neurons likely inhibit noradrenergic and orexinergic neurons. During REM sleep, cholinergic systems become active and stimulate cortical

activation, while the noradrenergic and orexinergic systems along with other reticular and motor neurons are held under inhibition such as to prevent responsiveness, motor activity and muscle tone during this ‘paradoxical’ state of sleep, when dreaming and thus a particular state of consciousness occur.

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TMS on Intraparietal Sulcus Triggers Perceptual Disappearance

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June 22, 14:00-16:00: Concurrent Session 3.2

During a prolonged fixation, visual objects presented in the periphery of visual field often fade from awareness. This phenomenon has been largely attributed to adaptation of neurons responding to peripheral targets. However, it has been found that even without a prolonged adaptation, a brief presentation of transient stimuli is effective for inducing the perceptual disappearance.
We hypothesized that perceptual disappearance might result from degeneration of feedback from attention-related cortical areas to early visual areas, and visual transients disrupt the feedback loop to sustain low-level signals and thereby trigger perceptual fading. We examined this hypothesis by briefly disrupting the functions of attention-related regions in the intraparietal sulcus (IPS) using transcranial magnetic stimulation (TMS). The hypothesis predicted that a brief disruption of IPS would trigger perceptual disappearances, as does a visual transient.
We measured perceptual disappearance by asking participants to discriminate the presence or absence (fading) of a peripheral green target immediately after a TMS pulse. On half of trials the target remained on the screen until the end of a trial, and on the other half of trials it gradually faded. On trials where the target physically remained on the display, "present" and "absent" responses were counted as hit and miss, respectively. Likewise, on trials where the target physically faded, "present" and "absent" responses were counted as and false alarm and correct rejection, respectively.
The results of a no-TMS condition showed that presentation of a flash reduced the hit rate without affecting the false alarm rate, and correspondingly a decrease in sensitivity (d') and a shift of decision bias (c and β) was observed. Consistent with the effect of visual flash, TMS on IPS decreased the hit rate but the false alarm rate was unaffected compared with the control conditions with TMS on vertex. This suggests that TMS on IPS had a similar pattern of effect on the visibility of the peripheral target. In particular, the decrease in the hit rate shows that observers reported disappearance of the target more frequently when their IPS was interfered with TMS. These results suggest

that IPS is involved in sustaining perception in continuous viewing.

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The Limits of Attentional Blink

Cheng-Fen Kao, National Chung Cheng University, Taiwan
Shulan Hsieh, National Chung Cheng University, Taiwan

June 21, 16:30-18:30: Poster Session 2

In a rapid serial visual presentation (RSVP) paradigm, it is often found that if a second target appears within 200~600ms of a correctly identified first target, the accuracy on the second target is decreased (known as "attentional blink"). A number of theories have been proposed and most of them assume resource limitation is the primary cause for the attentional blink. The present study argues against this assumption by showing that the attentional blink on the second target is not time-locked to the completion of a single item of the first target, but instead, is time-locked to the completion of a set of multiple items of the first target (Experiment 1). The second experiment of the present study further shows that such a target task-set can be even generalized to contain more than one stimulus category. Therefore, the current findings are difficult to be reconciled with the resource limitation theory. The results of the present study also provide important information about how one's intentional concept of the task-set plays a critical role in determining the limits of attention.

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The Effect of Presentation Timing of Subliminal Information in Insight Problem Solving

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June 21, 16:30-18:30: Poster Session 2

Many human behaviors are supported by unconscious processing. Understanding is essential in problem solving, and is subserved by unconscious processing. In an insight problem solving, an idea would come into the solver's mind in a flash, while the cognitive processes leading to the solution are difficult to report. Evidences suggest that subliminal information influences the following cognitive processes. When a hint unrelated to the solution is presented after seeing an insight problem, the solution time is typically long. On the contrary, when the hint is presented too briefly to identify, the solution time is not prolonged. Subliminal information does not inhibit problem solving, whether it is related to the problem or not (Bowden et al 1997).

Comparison of the manner in which insight problem solving is facilitated or inhibited by the presentation of the hint provides information on the contribution of miscellaneous cognitive processes leading to the problem solving. Conscious cognitive processes are known in some cases to inhibit, rather than promote, the problem solving by insight. Taking some time away from the problem is helpful to in an impasse, suggesting the importance of unconscious cognitive processes.

Here we investigate the effects of a hint (unrelated, related, or the solution itself) in insight problem solving by changing the manner (conscious or unconscious) and the timing (before or after the problem) of presentation. Linguistic insight problem were prepared as tasks. Each hint was presented with a variable duration followed by the mask. Participants were instructed to press the key when they felt they had the correct solution. We examined the effect of hints facilitating conscious perception or otherwise presented with variable intervals before and after seeing a problem. Based on the result, we discuss the effectiveness of a hint in insight problem solving and the relative contributions of unconscious and conscious cognition in the process leading to the solution.

Unconscious Motion Processing Contributes to Simultaneous Motion Contrast

Takahiro Kawabe, Kyushu University, Japan
Yuki Yamada, Kyushu University, Japan

June 21, 16:30-18:30: Poster Session 2

Simultaneous motion contrast refers to a perceptual phenomenon where a counter-phase grating (target) is perceived as moving in the opposite motion direction of drifted grating (inducer) surrounding the target. Although previous studies have clarified precise mechanisms underlying the simultaneous motion contrast, it was to be examined as to whether such mechanisms work even in the absence of consciousness for motion. Here we show that unconscious inducer's motion strongly biased perceived motion direction of the target. We used a circular patch (2.83 deg diameter) as the target. The target was surrounded by a thick ring containing a grating moving upward or downward. The target consisted of the compound of two oppositely drifted luminance gratings, and the relative contrast of the gratings was systematically varied. The gratings of both target and inducer had a spatial frequency of 2.1 cpd, and Michelson contrast of 0.1. Employing a continuous flash suppression paradigm invented by Tsuchiya & Koch (2005), the inducer's motion was perceptually removed from consciousness. We conducted two conditions to examine the effect of the visibility of the inducer on motion contrast: In the invisible condition, we presented continuous flashes of Mondrian images at 10 Hz to the left (or right) eye while target and inducer to the right (or left) eye. Meanwhile, in the visible condition, continuous flashes were not presented. The observers' task was to judge whether motion direction of the target was downward or upward. In the invisible condition, observers also reported when the inducer was explicitly perceived: The data of trials with the report of visible inducer was excluded from the analysis. To calculate the PSE for perceptually-balanced motion direction, we used the method of constant stimuli with the relative contrast of oppositely moving gratings of the target as an independent variable. Three naive people and two authors served as the observers. Consequently the results showed that unconscious inducers' motion significantly caused simultaneous motion contrast. On the other hand, the magnitude of simultaneous motion contrast was smaller in invisible than visible conditions. These results indicate a possibility that although weak,

spatial interaction in visual motion can occur unconsciously.

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Computational Advantages of Internal Models as Self-Consciousness

Mitsuo Kawato, Advanced Telecommunications Research Institute International, Japan

June 22, 9:00-10:00: Keynote Lecture

Internal models are neural networks that can simulate dynamic behaviors of some processes inside or outside of the brain. 10 years ago, I postulated that self-consciousness could be an internal model that roughly approximates dynamic behavior of the brain. An internal model is doomed to be approximate, superficial and erroneous, as recently demonstrated by many experiments. In this talk, I discuss computational advantages of internal models as self-consciousness. They could involve fast computation, long-term planning, generating internal rewards and intrinsic motivations.

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A Model of Consciousness and Self Based on Simple Abstracted Brain-Like Neural Network System

Yasuo Kinouchi, Tokyo University of Information Sciences, Japan
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June 21, 16:30-18:30: Poster Session 2

A model of consciousness and self that functions corresponding to global workspace theory (GWT) is proposed after investigating a neural network system with a simple abstracted brain-like structure that autonomously adapts to its environment. In this model, the operation of recursive self, nonconscious homunculus, and working memory are explained comprehensively. The system basically learns by trying to avoid unpleasant experiences and repeat pleasant experiences. As a top-level function, a self feels these experiences and consciously decides on actions on the basis of past experiences. The system does these actions faster and more adequately through learning.

The system is mainly composed of four functional modules: a concept module, an associative memory module, a core control module corresponding to "self", and an integration module that connects these modules. The integration module selects the most important combination of concepts in the system at the time on the basis of a mutual vote from the many concepts. The selection result is then sent to the other modules. This function corresponds to GWT.

The core control module only has an active control function and decides whether to act as a system. Additionally, it feels the state of the environment at the time, past experiences, and intentional emotion. In our model, "to feel" is executed by only two methods. One is that a core control module perceives "the state of selected micro features in a concept module", and the other is that a core control module directly perceives "the own state of emotion." The former corresponds to our daily perception of environment or recall of memories. As direct perception of the own state of the core control module is restricted to emotion, then perception of the declarative content of the own state of the core control module has to go around the other modules. This means that the core control module can only see itself through a mirror and so experiences a recursive self. In addition, the operation of working memories is described as a memory control method applied by the core control module. This model leads us to clear understanding for consciousness and self.

An Examination of No-Concept Reply to Frank Jackson's Knowledge Argument

Yasuko Kitano, Hosei University, Japan

June 22, 14:00-16:00: Concurrent Session 3.1

In recent years, one of the most widely debated questions in the philosophy of mind has been whether consciousness is physical or nonphysical. Frank Jackson's Knowledge Argument, which argues that there are truths about consciousness that cannot be deduced from physical truths and draws the conclusion that physicalism is false, has attracted much interest since its appearance in 1982. In this paper, I examine Benj Hellie's No-Concept Reply (hereafter NCR) to the argument, and present another version of NCR.

The power of the knowledge argument as an argument derives from the intuition that no amount of non-phenomenal knowledge suffices for phenomenal knowledge (empiricism about phenomenal knowledge). The major physicalist explanations of the alleged physical-phenomenal gap that have been presented so far, in regard to what the object of the phenomenal knowledge in question is, tend to fall into two camps: (A) those which regard it as a fact of the instantiation of phenomenal redness, and (B) those which regard it as something other than facts (such as the acquisition of ability or acquaintance). NCR is classified as (A). According to David Chalmers, NCR holds that a truth stating that phenomenal redness is instantiated can be deduced from a physical megatruth a priori in that it is knowable a priori by anyone who possesses the concepts involved in those truths. To this reply, Chalmers has presented the objection that it is not clear that the relevant concepts alone can close all relevant epistemic gaps. I point out that there is another option which may be adopted. If, as I believe, the object of the phenomenal knowledge in question is not a fact of the instantiation of phenomenal redness as an occurrent property, but a fact of the exercise of the capacity, or 'power,' to see red, then it is less clear that the physical-phenomenal gaps blocking the deduction still remain because a capacity is to be infallibly exercised if certain conditions for its exercise are met. Furthermore it does not seem to me that the knowledge argument as it is rules out such a dispositional account of phenomenal knowledge.

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Adaptive Anomalies in Conscious Time Perception

Shigeru Kitazawa, Juntendo University, Japan
Shin'ya Nishida, NTT Communication Science Laboratories, Japan

June 19, 13:30-16:30: Tutorial

An ideal observer in physics is able to read his watch on the occurrence of each event no matter how small the intervals of neighboring events are. The brain is no way an ideal observer. Temporal order judgments of sensory signals are sometimes inverted by crossing the arms, visual distractors and saccadic eye movements. Perception of simultaneity is subject to changes in various ways, for example, after repeated exposures to a pair of stimuli with a constant interval. Subjective duration may be expanded or shrinked by a number of factors like the size and number of visual stimuli. We review these and other anomalies in conscious time perception and try to find adaptive reasons why the non-physical time perceptions are constructed from sensory signals by the brain.

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Self-representationalism's Aristotelian Troubles

Michal Walerian Klincewicz, CUNY Graduate Center, United States

June 21, 16:30-18:30: Poster Session 2

Among the most widely discussed theories of consciousness today are self-representationalist theories such as those of Uriah Kriegel (2006) and Amie Thomasson (2000). These theories find inspiration in Franz Brentano and through Brentano in Aristotle. On Brentano's theory of consciousness, a mental state is conscious if, and only if, it contains as a part of it a judgment about the mental state itself. On Kriegel-Thomasson's model, a mental state is conscious if, and only if, a part of that state represents itself in some appropriate way. Still, these two approaches differ in an important way: The Kriegel-Thomasson model requires there to be a complex representational state the parts of which refer to the same object. By contrast, Brentano denies that judgments are attitudes towards a propositional content. Brentano argues explicitly that we find no such representational complexity in experience, and he took his theory to do justice to and explain the phenomenological absence of such complexity.

On Brentano's theory, judgments are not analyzed propositionally, but rather as modes of referring to objects, characterized by the simple affirmation or denial of an object's existence. In consciousness, judgments affirm the existence of the object that the mental state refers to unlike on the Kriegel-Thomasson conception, where they represent the mental state. Brentano observes that a conscious perception of a sound, for example, does not present the sound once as the content of a perception and a second time as a content of a representation of that perception.

Brentano concludes that a single intentional object figures in two distinct intentional relations: the relation that is about the object itself, and a judgment, which is relevant to the state's being conscious. The contents of awareness are immediately present because that judgment is immediate and they are simple because there is only a single intentional object. I argue that the Kriegel-Thomasson self-representationalist programme, which does not implement Brentano's theory of judgment, is not equipped to provide a phenomenologically accurate account. As a result, the self-representationalist theory of consciousness is best implemented in its original Aristotelian-Brentanian form, and stands and falls with that.

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Pedunculopontine Tegmental Nucleus Neurons Signal Predicted and Actual Reward for Reinforcement Learning

Yasushi Kobayashi, Osaka University, Japan

June 20, 17:30-19:30: Poster Session 1

Behavioral learning is accomplished by choosing the behaviors expected to give maximum reward and revising those predictions to minimize 'reward prediction error', the difference between predicted and actual rewards. Evidence has accumulated suggesting that midbrain dopamine (DA) neurons encode "reward prediction error" and that the striatum uses this signal to perform reinforcement learning. However, the question of how this reward prediction error is computed remains elusive.

The pedunculopontine tegmental nucleus (PPTN) of the brainstem supplies strong excitatory inputs to the DA neurons, and we were interested in the possibility that PPTN supplies the information for this computation. This hypothesis was tested by studying the activity of PPTN neurons in monkeys performing a visually guided saccade task for a juice reward. The magnitude of the reward could have one of two values (randomly selected each trial) cued by the shape of the initial fixation target. Two groups of PPTN neurons that were selectively responsive to the fixation target and the reward delivery, respectively, the former encoding the magnitude of the predicted reward and the latter the magnitude of the actual reward, which are the two essential pieces of information required to compute the reward prediction error.

Thus, rather than the striatum, as has been hypothesized by reinforcement learning models, the PPTN appears to be the key structure for computing reward prediction error. Moreover, this is the first demonstration that past structural memory in the striatum is decoded into dynamic neural activity and compared with that of a current experience, the PPTN being the site where both signals are simultaneously represented.

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Attention and Consciousness: Two Independent Processes

Christof Koch, California Institute of Technology, United States

June 22, 16:30-18:30: Symposium 4

I shall discuss recent psychophysical and functional imaging evidence for the independence of selective attention and consciousness. In particular, a subject can attend to an object or event without being conscious of it or of any of its attributes. Furthermore, a subject can also be conscious of an object or event without directing top-down attention to it. Finally, I shall argue that Block's hypothesized "phenomenal consciousness without cognitive access" correspond to the latter case. Its neuronal correlate may be a coalition of neurons that are consigned to the back of cortex, without access to working memory and planning in frontal cortex.

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Perceived Object Size Depends on the Relative Size of Background Elements

Ansgar Roald Koene, National Taiwan University, Taiwan
Chien-Chung Chen, National Taiwan University, Taiwan

June 20, 17:30-19:30: Poster Session 1

The purpose of this study was to determine the relations between perceived and physical size of an object. Early visual areas encode visual information in retinotopic coordinates, signaling retinotopic size and orientation properties. Distance and orientation invariant object recognition however requires stimulus processing based on relative stimulus dimensions (e.g. relative lengths and orientation of edges with respect to each other) independent of absolute retinotopic size or orientation. Thus we investigated how relative size of an object, with respect to its surroundings, affects the perceived size of said object.

The test stimulus was a variant of the Ebbinghaus illusion and consisted of a test disk superimposed on a texture background whose circle elements were varied in size. We used a two interval forced choice task to measure how perceived size of the test disk was affected by the size of background texture elements. For background texture with uniform element sizes, the perceived size of an object decreased linearly with the size of the background texture elements. When the size of the background elements was randomly distributed, the perceived size of the object is a function of the range of element sizes with little to no effect of the skewedness of the distribution.

The experiment was performed in normal room light conditions with the monitor at 90cm distance from the subject such that subjects were perfectly able to use disparity (and other) depth cues to judge the distance to the stimuli. In the context of the size distance invariance hypothesis (SDIH) our results suggests that the observers would have to perceive the stimuli (and thus the screen) to move by about 10cm, or about 10% change, in depth between trials with small or large background textures. This suggests that perceived size is not simply a function of the subtended angle at the eye and the perceived distance. Instead we suggest that perceived size of an object is directly modulated by the ratio of the retinal object size to the retinal size of stimulus elements around it.

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Unattended and Unaccessible Consciousness: Puzzle or Illusion?

Sid Kouider, Ecole Normale Superieure, France

June 22, 16:30-18:30: Symposium 4

Dissociative approaches to consciousness (phenomenal vs access consciousness; consciousness with vs. without attention) capture much of our intuition about subjective experience. However, such dissociations raise a major methodological puzzle: they are difficult, if not impossible, to demonstrate experimentally. In addition, the empirical evidence "pointing towards" these dissociations does not unequivocally support them. I will provide an overview of several alternative theories, including workspace models and compare them with dissociative approaches. In particular, I will focus on alternative accounts positing that the intuition of a rich phenomenal experience is actually a mere retrospective illusion. I will argue that although dissociative approaches offer a promising way to tackle the hard problem, parsimonious (i.e., non-dissociative) interpretations relying on partial awareness and accessible levels of representation still have as much explanatory power.

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Study of Inhibition of Return on the Directed Forgetting Task

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Hsuan-Fu Chao, Chung Yuan Christian University, Taiwan
Hsiao-Ling Wang, Chung Yuan Christian University, Taiwan

June 21, 16:30-18:30: Poster Session 2

Inhibition of return (IOR) refers to a difficulty to put attention back to the attended location or object. IOR impairs the access of episodic memory has been documented. Therefore, the study aims to examine the effect of IOR on the memory recognition performance. We used the list-method directed forgetting paradigm consisted of two phases. In the learning phase, participants learn 56 nouns and half of the nouns were instructed to memorize and the others are to forget. Each instruction was present 2000 ms following the noun which was presented 3000 ms. In the subsequent test phase, a cross as a fixation and two peripheral boxes are displayed on the monitor for 1100 ms, and then one of two boxes had an asteriated cue inside for 300 ms. After the asterisk appeared, one noun was subsequently presented in the left or right box, which noun could be the old one in learning phase or a new one. Participants were instructed to press the right bottom if the noun is new, and the left bottom if old quickly and correctly. The target noun appeared in the cued box is called IOR condition, and it appeared on the different box called no-IOR condition. Both the result of reaction time and error rate reveal the effect of directed forgetting. There is a significant interaction between word type (remember, forget, new) and IOR (IOR, no-IOR)($p < .05$).The simple main effect indicates that the recognition performance to the instructed to remember nouns, participants had a higher error rate on the no-IOR condition than on the IOR condition. The d' performance data results in a significant interaction between memory type (remember, forget) and IOR condition (IOR, no-IOR)($p < .05$). The result suggests that the effect of IOR would affect the recognition performance of the directed forgetting task.

How Neuroscience Should Attack the Hard Problem

Victor A. F. Lamme, University of Amsterdam, The Netherlands

June 22, 16:30-18:30: Symposium 4

Behavior is considered the gold standard of consciousness: when someone says he is conscious, he is, and when he says not, he isn't. However, this makes it impossible to find the neural mechanism of conscious experience per se. We will always conflate consciousness with cognition. Therefore, arguments from neuroscience should be allowed to shape a definition of consciousness, together with, yet in some cases overruling behavioral evidence. I will show how such a neuro-behavioral definition of consciousness makes it possible to dissociate consciousness from cognition, explains the key features of conscious experience, and opens up a path towards solving the hard problem.

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Dissociative Identity Disorder, Somnambulism, and the Higher-Order Thought Theory of Consciousness

Timothy Joseph Lane, National Chengchi University, Taiwan
Caleb Liang, National Taiwan University, Taiwan

June 20, 17:30-19:30: Poster Session 1

Previously we (Lane and Liang, forthcoming) argued that phenomena such as Anton's Syndrome and phantom pain show Rosenthal's higher-order thought (HOT) theory of consciousness to be inadequate as an explanation of phenomenal consciousness (p-consciousness), because p-consciousness can occur when no sensory state is available to be targeted by the HOT and (pace Rosenthal) HOTs are insufficient for p-consciousness. Failings of that type we refer to as radical confabulation. In this paper, we argue that the HOT theory suffers from two other problems: the problem of alternative selves and the problem of enervated HOTs.

First, on Rosenthal's account, HOTs make us conscious not only of target states, but also of the self to which those targets are attributed. Rosenthal (2005: 342) claims that: "being conscious of a state as present is being conscious of it as belonging to somebody. But to be conscious of a state as belonging to somebody other than oneself would plainly not make it a conscious state." We argue that sometimes p-consciousness occurs even though target states are being attributed to somebody other than oneself. In some instances of Dissociative Identity Disorder p-consciousness occurs even though the targeted state is attributed to an alter, not to oneself. Second, as for the problem of enervated HOTs, we argue that sometimes p-consciousness fails to occur even when we have good reason to believe that HOTs are targeting self's sensory states. Some instances of sleepwalking, other forms of non-insane automatisms, and epileptic fugues provide evidence that counts against the HOT theory.

In other words, based upon our previous research, we (1) have good reason to believe that p-consciousness can occur when no sensory state is available for targeting by the HOT. Here we argue that (2) p-consciousness can occur even when HOTs are not being attributed to oneself; moreover, (3) even when we have reason to believe that HOTs are targeting self's sensory states, p-consciousness can fail to occur. These problems suggest that the HOT theory is not able to explain why p-consciousness occurs, not able to explain

why it fails to occur, and not able to explain its relationship to self.

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The Role of Conscious Experience Differentiates between Received and Reflective Delusions

Robyn Langdon, Macquarie University, Australia

June 22, 10:30-12:30: Symposium 3

Maher conceived of delusions as rational explanations of aberrant experience. Two-factor theorists started with and departed from Maher to argue for an additional impairment of belief formation. This was necessary, it was argued, to account for the uncritical adoption of an implausible belief. Maher's thinking nevertheless continues to impact upon theorizing about the additional impairment of belief evaluation. This is because of the intuitive appeal of his explanationist account of delusion formation. This explanationist account runs into difficulties, however, with explaining the incorrigibility of delusions. The expression, or endorsement, approach fares better and conceives instead of perceptual experience as delivering the delusional content directly to consciousness as the naturally compelling misperceived reality. Neither approach, I suggest, satisfactorily accounts for all delusions. I argue instead for different classes of delusion - received versus reflective – and illustrate with reference to two delusional patients.

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Eyes Open, Brain Shut: Consciousness in the Vegetative State

Haibo Di, University of Liège, Belgium
Steven Laureys, University of Liège, Belgium

June 21, 10:30-12:30: Symposium 2

Patients in a vegetative state (VS) and minimally conscious state (MCS) continue to pose problems in terms of their diagnosis, prognosis and treatment. Consciousness is a subjective first-person experience which study has remained the field of philosophy for the past millennia. That time has finally changed and empirical evidence from functional neuroimaging is offering a genuine glimpse on the solution to the infamous mind-body conundrum. New technological and scientific advances offer the neurological community unique ways to improve our understanding and management of severely brain damaged patients.

Good medical management starts by making a correct diagnosis. There is an irreducible limitation in knowing for certain whether any other being is conscious. Vegetative patients can move extensively and clinical studies have shown how difficult it is to differentiate reflex or 'automatic' from voluntary or 'willed' movements. This results in an underestimation of behavioural signs of consciousness and hence a misdiagnosis, estimated to occur in about one third to nearly half of chronically vegetative patients.

PET and fMRI studies have not yet shown to be reliable markers of recovery of consciousness. However, they have permitted to reject the ancient view that vegetative patients are neocortically dead or a-pallic. A succession of neuroimaging data has shown cerebral activation in isolated and disconnected islands of "lower level" cortices or "pallium" in response to auditory, visual, somatosensory and noxious stimuli. Functional neuroimaging studies have also provided scientific evidence that residual brain function in VS is very different from the brain's integrative capacity in MCS. These studies have confirmed that VS and MCS truly are different physiological entities. However, in the absence of a full understanding of the neural correlates of consciousness, even a normal activation in response to passive sensory stimulation cannot be taken as incontestable proof of consciousness. In contrast, repeated and prolonged activation in response to the instruction to perform a mental imagery task would provide undeniable evidence of voluntary task-dependent brain activity, and hence of consciousness. This

ground-breaking approach was recently validated in healthy controls and has been successfully applied to identify conscious perception in a – so far unique - patient behaviourally diagnosed as being in a post-traumatic VS.
Brain computer interfaces (BCI) permit communication via voluntary EEG control, without any motor involvement. Technological improvements in such devices now enable locked-in patients to control their surroundings in ways never possible before. BCI can not only be employed as a communication instrument in LIS but also as a diagnostic tool in disorders of consciousness. It is thrilling to witness the use of this powerful approach in the assessment of possible residual consciousness in patients clinically diagnosed as "VS" or "MCS". The question of what it feels like to be minimally conscious has not yet been solved but the technology to at least try to answer the issue is now existing.

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Nonlinear Functional Connectivity in Visual Awareness: A Small-World Study

Hung-Wei Lee, Hsuan-Chuang University, Taiwan
Shwu-Lih Huang, National Chengchi University, Taiwan
Yu-Chieh Chang, National Chengchi University, Taiwan

June 21, 14:00-16:00: Concurrent Session 2.3

In this electroencephalogram study, we modified the "Mooney face" recognition experiment of Rodriguez et al. (1999) to differentiate patterns of functional connectivity which correlated to the participant's states of visual awareness. We first used an index of generalized synchrony proposed by Arnhold et al. (1999) to define the strength of connections between pairs of EEG channels. Then we followed Watts and Strogatz (1998) to calculate several parameters of small-world theory to reveal different network structures of the moments on which the participant perceived a stable face or not. The results showed that a small-world topology of brain network did correlate to visual awareness. That is, when the participant recognized a face, the functional connectivity was characterized by a decreased number of connections, an increased density of local clustering and shortened path lengths between pairs of connecting channels. In addition, we also divided the whole brain network into either left/right hemispheres or front/hind parts. And we found that only left/right sub-networks could represent the states of visual awareness, but they were not as reliable as the whole brain network.

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Aspects of Conscious Volitional Processes: Computational Modelling

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June 21, 16:30-18:30: Poster Session 2

Consciousness is recognised as important for biological volitional action selection, and this principle can be extended to robots and artificial systems. This work provides a concrete experimental scenario to test and elaborate upon previously published but untested research on digital neural architectures which model the dynamic process of conscious volitional processes.

This work uses the kernel model of will, as proposed by Aleksander, as a starting point. The model proposes a hypothesis that there are four distinct interacting neural regions which are necessary for action selection – regions for the tasks of depiction, spatial and episodic memory, affective evaluation of choices, and motor activity. In the kernel model, the perceptive and episodic memory neural modules fall within conscious awareness; the emotionally evaluative and motor control neural modules function largely unconsciously.

Preliminary experiments focus on instantiating the model in the connectionist software NRM. Later experiments use a virtual robot coupled to NRM, and initially focus exclusively on reactive behaviour, moving on to modelling contemplative processes, in which the robot consciously deliberates over each action trajectory before committing to action. Body needs are then incorporated in the virtual robot by implementing elementary models of appetitive mood states. The final core architecture includes spatial learning and memory, to provide the entity with a topographical cognitive map of the location of salient objects in the environment. This has the potential to contribute to agent adaptability and efficient action choice in a dynamic environment. This concluding work also models the parallel processing of affect and desire as a development of earlier work, where action choices were evaluated serially.

For each of the three preliminary and four core architectures, systems level analysis has been provided, and the neural architecture's internal connectivity and arborization patterns are compared with those of the original kernel model. In particular, a demarcation and analysis is provided of the systems within the scheme of the parent theory of action choice including experimental

work simulating and supporting the original theory.

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Bottom-Up Information is Sufficient to Impair or Facilitate Visual Search

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June 21, 16:30-18:30: Poster Session 2

According to some selective attention models (e.g., the guided search model), items that are salient or are relevant to current task should receive more attentional resource than the other items. Hence, a salient target should be processed faster in visual search. Here we report a case that a salient target actually have disadvantage in visual search. In our experiments, participants viewed a texture that was composite of oriented bars and extended all over the screen. The target was a small oblique line on top of one of the texture element bars in the central region, and the task was to discriminate the target's orientation. To test how bottom-up information affects visual search, a vertical string of texture bars were designed to have orthogonal orientation to the other bars (termed the salient line). In Experiment 1, the target was on the salient line (termed the salient target) for 20% of trials, which was a probability that the salient line did not predict target location, or, was irrelevant. Surprisingly, we found that the RTs were longer for salient targets. In Experiment 2, the proportion of salient target increased to 60%, and RTs to salient target were then shorter, showing that the salient line could facilitate search if it is relevant. In Experiment 3, participants received an irrelevant block (20%) after a predictive block (60%). Again, longer RTs for salient target were obtained in the irrelevant block, suggesting that the impairment caused by salient line was robust and cannot be overwritten by experience. In Experiment 4, the length of the salient line was shortening while its location kept irrelevant. In this case, shorter RTs to salient targets were observed. Given that shrinking length did not increase predictability of the salient line, our findings therefore revealed that bottom-up information per se is enough to modulate performance in both facilitatory and inhibitory manner.

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Transcranial Magnetic Stimulation (TMS) Consolidates and Retrieves a Percept from Short Term Memory

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Hsiu-Yu Yeh, National Taiwan University, Taiwan
Shinsuke Shimojo, California Institute of Technology, United States

June 21, 16:30-18:30: Poster Session 2

Transcranial magnetic stimulation (TMS) to visual cortex dynamically interacts with retinal input and thus alters conscious perceptual experience. When a visual stimulus is presented and followed by a dual-pulse TMS, an "instant replay" of the visual stimulus is observed (Halelamien, et al., VSS '07; Wu et al., VSS '01, '02, '04). While following this finding, we found that repeatedly pairing the same visual stimulus with TMS can lead to a state where the replay percept can be retrieved by TMS alone without any visual stimulus presentation.

The experiment consisted of two phases, the training phase and the test phase. In the training phase, a geometric pattern (a disk or a line) was presented for 100 ms, followed by a dual-pulse TMS (50 ms inter-pulse interval) with 300 ms delay. After repeated trials (10 trials or more), TMS alone was delivered without any visual stimulus presentation (the test phase). The replay percept was often retrieved in the area of TMS-triggered phosphene. Among 18 subjects we have tested, 5 reported no replay percept either in the training phase or in the test phase; another 4 reported a replay percept only in the training phase; the remaining 9 reported a replay percept both in the training phase AND in the test phase. Increasing the delay between visual stimulus and TMS during the training phase substantially weakened the vividness of the replay percept, with complete abolition at 3 sec. in most subjects. In such cases, no replay was seen in the test phase, either.

That the replay precept can be entrained and then retrieved by TMS alone not only provides evidence for the existence of a neural representation for the "replay," but also implies a Hebbian-like associative learning mechanism that can be a basis of conscious perceptual experience.

Improve Your Coordination in Movement to Be More Creative in Thinking -- The Enhancing Effect of Practicing Ya-Yue-Wu on Mind and Body

Yunn-Wen Lien, National Taiwan University, Taiwan
Chun-Hui Jen, National Taiwan University, Taiwan
Theresa Chyi, Chinese Culture University, Taiwan

June 21, 16:30-18:30: Poster Session 2

Ya-Yue-Wu is a type of ancient Chinese dance dated back to three thousand years ago and some versions have still been preserved in Taiwan, Japan (as a part of Gagaku ensemble) and Korea. The principles of the dance could be characterized as: 1) being relaxed but always keeps the central axis of body vertically, 2) initiating the movements through the reaction force of the ground, 3) keeping attention inward. It is believed that ancient Chinese achieved the balance between body and mind through following these principles in their daily life. In present study, we investigated how the exercising of these principles would enhance performers' creativity measured by a divergent thinking task as well as body coordination measured by Movement Assessment Battery for Children (MABC). Seventeen fifth graders who were team members of Yi-Wu (a version of Ya-Yue-Wu) of an elementary school voluntarily joined the training program. Significant pre-post performance differences were found in both tasks for the training group. On the contrary, the control group made less progress and scored significantly lower than the training group in the post-test of both task. Interestingly, the extent of progress on divergent thinking task and MABC were positively correlated with each other in the training group. How the improvement of body performance is related to the improvement of mental performance through practicing Ya-Yue-Wu and the possible relations between body and mind will be discussed.

Reexamining the Effect of Long-Term Outcome and Gain-Loss Frequency: From Unconsciousness to Consciousness

Ching-Hung Lin, National Yang Ming University, Taiwan
Yao-Chu Chiu, Soochow University, Taiwan
Jong-Tsun Huang, China Medical University & Hospital, Taiwan

June 21, 14:00-16:00: Concurrent Session 2.1

A large body of research on the well-known Iowa gambling task (IGT) tend to suggest that normal decision-makers can acquire a hunch of the long-term outcome (or, expected value, EV) through the help of somatic markers or the implicitly induced emotional indicators like GSR under the uncertainty decision context. In the original IGT, bad decks A and B resulted with a negative EV ($ -250) and good decks C and D the positive EV ($ +250) across every ten trials. Internal game structure was not revealed to the subjects through the end of the play. Subjects were supposed to be unknown to the probability structure that is designed in the IGT. Somatic markers would then be induced unconsciously to facilitate the decision process. However, the Soochow gambling task (SGT) demonstrated a very different observation from IGT (Chiu et al. 2005). The results of SGT found no indications that decision makers can really acquire a hunch of the EV in these uncertain situations with the help of unconscious somatic markers. Even by providing the gain-loss structure (probability and value of gain and loss in the game) of each deck in the second run, most subjects can not acquire the EV hunch immediately (Chiu et al. 2006; Peterson 2007). In this study, we directly provided the gain-loss structure and EV (decks A, B $ -250; decks C, D $ +250) together to subjects in the second stage to verify the possible effect of rule consciousness. The study enrolled 18 adults to perform the two-stage SGT. Each subject played the first stage (the first 100 trials) without knowledge of EV and then the second stage (the next 100 trials) by providing the gain-loss structure and EV together. The result showed that subjects still preferred the bad EV decks (A, B) to the good EV decks (C, D) in the first stage as shown in the previous studies. While in the second stage, the behavioral profile is basically the same as in the first stage. Subjects did manifest a small shift of their preference by the end of the second stage to the good EV decks (C, D), however, the barely noticeable shift is still around the chance level. This study reinforces the original finding of SGT,

namely, normal decision makers can not be benefited even by providing consciously-clear game structure information, not to mention the possible effect of unconscious facilitators.

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Syncronized Oscillations as the Neural Correlate of Consciousness

John Lin, Prometheus Press, United States

June 20, 17:30-19:30: Poster Session 1

Modularization and hierarchical processing appear to be general features of all cortical processing. Using the processing of visual information as an example, this paper proposes a general model of hierarchical processing to explain how information from specialized visual areas--those processing lines, colors, motion, and so on--is integrated (and, in many instances, combined with information from other modalities, such as auditory, tactile, and semantic perceptions) to decipher the identity of an object. In the model, specialized modules are organized by hierarchical levels stacked together in a pyramidal configuration. A specialized module processes information received from subordinates at lower levels and passes the result to its superior at the next higher level. Information becomes progressively more concise, and meaningful, as it flows from the bottom of the pyramid toward the top. In the visual system, information from the retina enters the bottom level (area V1) of the pyramid, and the processed result emerges at the top (the visual association cortex). The resultant high-level representation then becomes available in conscious awareness (or the imaginary thinking theater of the mind) to interact and correlate with data from other modalities to achieve perceptual unity and understanding. In the hierarchy, feedforward pathways are frequently accompanied by reciprocal feedback pathways. Feedback pathways also exist among many levels of the hierarchy. These feedback circuits are used to provide mental predictions from higher-level representations and to exert top-down influence. Their presence sets up circular loops of feedforward and feedback circuits in the hierarchy, which create synchronized oscillations at the moment of perceptual recognition. This occurs because, in a steady state, when the perceptual result is correct--that is, when the perceptual result corresponds to the mental image in conscious awareness, as corroborated by results from other cortical modalities--predictions (feedback signals) will match input signals to the modules at all levels of the hierarchy, and the entire circuitry will oscillate in synchrony. The syncrony is broken when conscious attention is disengaged to attend to other matters.

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A Re-evaluation of the Contribution of Buddhist Philosophy to the Study of Consciousness

Kent Lin, Buddhist Tzu Chi University, Taiwan

June 20, 17:30-19:30: Poster Session 1

The main goal of this proposal is to re-evaluate the possible contribution of Buddhist Philosophy to the general study of consciousness. Currently, the study of consciousness is a popular and controversial topic in contemporary Western academic circles. However, this topic has been an important issue in Buddhist philosophy for a long time. Some Western researchers, therefore, do not confine their viewpoints to their own traditional understandings but widely incorporate Buddhist thoughts. They blend with the ideas of Buddhism and develop the subjects such as Neurophenomenology and Contemplative Science.

The central idea of this endeavor is to turn the attention back to the Buddhist problem-setting of consciousness and re-examine its inspiration to the study of consciousness. This discussion would come in three parts. Firstly, the Buddhist Philosophy's focuses on consciousness that are very different from that of Western research would be presented. Modern scientists or philosophers are used to solving the issue of consciousness from the physiological aspect, and thus, consciousness is viewed as merely a physical or biological problem. By contrast, under the framework of Asian thought, e.g. Indian and Chinese Buddhism, consciousness would be mostly an ethical topic which is relevant to one's cultivation of personality to pursue a happy life.

Secondly, due to the view of consciousness as a key point to realize ethical goal, Buddhist study of consciousness is not merely theoretical but mainly for practical application. We could say that Buddhist study of consciousness is not just a kind of propositional knowledge but would also require skill gaining. That is, from the viewpoint of Buddhist Philosophy, knowing how to refine our consciousness and make good use of it is not less important than knowing what it is.

Lastly, once we are aware of different approaches to the study of consciousness, we can expect the reforming or redirecting of the problem of consciousness and look forward to the integration of Western and Eastern views. By doing so, we might find a way which not only reduces the suffering of disease as consciousness disorder but also increases our virtue and happiness by the skillful training of consciousness.

Überbewusstsein. The Reconstruction of Consciousness-Process and Consciousness in the Postmodern

Shing-Shang Lin, Heinrich-Heine-University Duesseldorf, Germany

June 20, 17:30-19:30: Poster Session 1

According to Virilio and Baudrillard, the human body is expanded and transformed by an optical meta-body in the Postmodern, an era immensely characterized by speed, information technology, multimedia as well as Virtualization. In this way, human beings can live in the tele-reality or exist in hyper-reality.
On the one hand, the physical transformation of the meta-body will be substituted by organs or micro-machines; on the other, it transforms itself into an additional optical body which is bonded with the physical body through a combination with pictures or displays and becomes one part of the meta-body.
In this way human beings possess a dislocalized and reconstructed perception. Therefore, his relation to objects and knowledge about the world as well as his everyday life have been changed.
Thus, it is necessary for the human existence and everyday life to construct research into the reconstruction of perception and consciousness.
This research is grounded in the philosophical aspects within the context of Baudrillard's and Virilios' theories and adopts Kant's perception-theory as parameter of the changes.
Based on the reconstruction of body and reality, this research aims to explore the reconstruction of the consciouness-process and thus to bring the key factor of the central problems in light, such as juvenile violence, rampage, a serial of committing suicides and the fractal.
Framework:
1. Reconstruction of reality through high speed, symbolization, visualization as background of the reconstruction of the consciousness-process.
2. Consciousness-process of Kants perception theory.
3. Mechanization and reconstruction of body based on Virilios' and Baudrillards theories as the reconstruction principle of consiousness-process in the Postmodern
4. Reconstruction of consciousness-process and subjective Self
5. What will be changed due to the reconstruction of consciousness and

consciousness-process?
6. Case Study: The actual phenomena of rampage, a serial of committing suicides

How Real Is the Self?—Considering Its Regulatory Role

Hsi-Wen Daniel Liu, Providence University, Taiwan

June 21, 16:30-18:30: Poster Session 2

How real is the self of the mind? The answer does not depend on how we feel of our selves, but on the architectures of the self. The phenomena of the selves, however, can serve as targets for us to build computer simulations. Clark (2007) raises the notion of `soft selves' for the extended mind thesis, but the role of self–regulation is not addressed. The soft selves are deemed as ecological controllers that exploit internal orders by self-organization to support problem-solving tasks. Clark (2007) understands his notion of soft selves as reconciliation between Ismael's (2007) self-representation model and Dennettian non-reality of selves.

The present project argues that the extended mind can have a regulatory role of the self, a role that help agents to modify several parameters with a view to pursuing better performance; yet, Clark (2007) does not touch this issue. As a supplement of Clark's notion of ecological controllers, the present project accounts for the regulatory role of the self, by resorting to control-theoretic models for simulating self-regulation discussed in the control theory in applied psychology. Several parameters in relation to the self's regulatory role are highlighted, such as assessing task difficulty and reducing discrepancy.

Because of the regulatory role of the self, the present project shows, the extended mind owns pretty much internal devices without internal representations. The regulatory role of the ecological controllers is seen in the various ways in which agents change goals, modify internal parameters, assess the conditions of the encountered tasks, or assess the agents' current capabilities of goal accomplishment; and the regulatory role is also seen in the agents' way of acting on the environment with the direction of approaching to the encountered goal. All aspects of the regulatory role cooperatively endow the agents with capabilities of maintaining better performance. Such a role can be seen as a device to be imposed upon the ecological controllers of the extended mind, as a further aspect of the soft selves.

This account of regulatory self pushes the notion of ecological controllers further away from the Dennettian view of non-real selves.

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Multisensory Stimulus-Response Compatibility Effect Occurs Only When the Stimuli Are Consciously Perceived

Shih-Yu Lo, National Taiwan University, Taiwan
Su-Ling Yeh, National Taiwan University, Taiwan

June 20, 17:30-19:30: Poster Session 1

The relationship between information processing and consciousness has been an important issue in studies of consciousness because it illuminates the nature of consciousness. We modified the inattentional blindness paradigm of Moore, Lleras, Grosjean, and Marrara (2004) and examined the relatively unexplored issue about the relationship between consciousness, within-/cross- modal processing, and a kind of stimulus-response compatibility effect, the Simon effect, which refers to the phenomenon that task-irrelevant spatial information of the stimulus influences the response. Unawareness to the critical stimulus is defined as when participants deny seeing it and their forced-choice responses to the critical stimulus are merely at chance level. We asked the participants to discriminate a visually presented letter (H or S emerged from a placeholder figure eight) by pressing the corresponding left or right key, and task-irrelevant visual and auditory distracters appeared concurrently at the left or right side of the target letter. In the first block, participants were not informed that there were distracters. After the first block, they were inquired about the visual background and the location of sound source, after which another block of trials was conducted. We found that when the participants were aware of the distracter, a typical Simon effect was observed in that when either a visual or an auditory distracter was presented at the contralateral side of the response key, the performance was impeded compared to the condition when the distracter was at the ipsilateral side. When both visual and auditory distracters were at the contralateral side, the magnitude of interference was larger than the sum of uni-modal interference, presumably due to visual-auditory integration. However, when participants were unaware of the distracter, the Simon effect was observed only with auditory distracters. We conclude that at the response selection stage, the external stimuli from two or more modalities are integrated to influence the action execution, and this occurs only when the external stimuli are consciously perceived.

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The Role of Feedback in Visual Masking, Visual Awareness and Attention

Stephen L. Macknik, Barrow Neurological Institute, United States
Susana Martinez-Conde, Barrow Neurological Institute, United States

June 20, 14:00-16:00: Concurrent Session 1.1

We discuss the role of feedback in visual masking, visual awareness and attention. Our analysis reveals constraints for feedback mechanisms that limit their potential role in visual masking, and in other general brain functions. We propose a feedforward model of visual masking, and provide a hypothesis to explain the role of feedback in visual masking and general visual processing. We review the anatomy and physiology of feedback mechanisms, and propose that the massive ratio of feedback versus feedforward connections in the visual system may be explained solely by the critical need for top-down attentional modulation. Finally, we propose a new set of neurophysiological standards needed to establish whether any given neuron or brain circuit may be the neural substrate of awareness.

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Visual Awareness Correlates with Layer-Specific Activity in Visual Cortex

Alexander Maier, NIH, United States

June 22, 14:00-16:00: Concurrent Session 3.2

The role for primary visual cortex (V1) in establishing and maintaining the perceptual outcome of sensory stimulation is a matter of longstanding debate. Part of the reason is that neuroimaging studies in humans and monkeys suggested strong activity changes whenever a stimulus goes unperceived, whereas single neuron recordings in the same area have found only little effect. A possible link between these results has recently been suggested by neurophysiological experiments that demonstrated robust perceptual modulation in V1 in the low frequency range (< 30Hz) of the local field potentials (Wilke et al., 2006).

Here we investigate the nature of these percept-related neuronal signals by means of layer-specific multi-channel recordings in primary visual cortex of trained macaque monkeys during visual suppression. We recorded the laminar profile of V1 local field potentials (LFPs) as well as single and multiunit activity in two animals that either perceived or did not perceive a salient visual target stimulus that was placed in the receptive field region of nearby neurons. This approach permitted us to examine the laminar profile of spiking, evoked potential, voltage power modulation, transient current source density (CSD), and sustained current source power. The latter two quantities are thought to reflect membrane currents that can be localized in cortical depth. Each of these quantities was evaluated using both broadband LFP signals within a restricted range of frequencies.

We found that the local field and current sources varied in their responses to perceptual suppression as a function of their laminar position. The CSD analysis revealed prominent differences in the upper layers related to the transient target disappearance. Sustained power changes in both the field potential and localized currents varied in their laminar profile for the different frequency ranges tested.

The diminished supragranular activity during perceptual suppression, which resembles that of the fMRI signal, may reflect a disruption of synaptic input corresponding to feedback from the extrastriate cortex or a modulatory signal of subcortical origin.

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Different Patterns of Eye Movements between Implicit and Explicit Processes in Visual Search

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Satoshi Shioiri, Tohoku University, Japan
Kazumichi Matsumiya, Tohoku University, Japan
Ichiro Kuriki, Tohoku University, Japan

June 20, 17:30-19:30: Poster Session 1

When some of the layouts are repeated in a visual search task, participants learn the display layout implicitly. They become to be able to detect the target more quickly as the number of repeats increases (contextual cueing effect). In this study, we asked whether the display layouts can also be learned when participants are instructed to memorize layouts explicitly and how the learning differs (if it does) between explicit and implicit learning conditions. We compared learning effect on search time, recognition rate, and eye movements between the two conditions. One was the implicit condition, where no information of repeating presentation of layouts was given. The other was the explicit condition, where the participants were instructed to memorize stimulus layouts for visual search at later trials. Contextual cuing effect was found in both conditions, so that search time became shorter than the novel layouts after learning trials. However, the amount of the effect was larger in the implicit condition when the time for memorizing in the explicit condition was 1s, which is approximately the same as the search time for implicit learning trial. With 3s of display time for memorizing in the explicit condition, the contextual cuing effect was equivalent to that in the implicit condition. The recognition test performed after the search experiment showed that better recognition memory in the explicit condition both with 1s and 3s display time. They suggest that there are different functions between explicit and implicit learning. The eye movement patterns are also different between the two conditions. Although the reaction time is similar in the two conditions with the 3s learning time eye movement patterns are different. The number of fixations is less in the explicit condition than in the implicit condition, while the average fixation duration was longer less in the explicit condition. Based on the two different factors, similar reaction time was obtained in the two conditions. The longer fixation duration in the explicit condition may be explained by the time required to access in the memory in the explicit

condition, where explicit accesses to memory could play an important role.

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Microsaccades: Windows on the Mind

Susana Martinez-Conde, Barrow Neurological Institute, United States

June 20, 16:30-17:30: Keynote Lecture

Our visual system contains a built-in contradiction: when we fixate our gaze on an object of interest, our eyes are never still. Instead we produce, several times each second, small eye movements of which we are unaware, called “microsaccades”, “drifts” and “tremor”. If we eliminate all these eye movements in the laboratory, our visual perception of stationary objects fades, due to neural adaptation. When our eyes move across the image once again, visual perception reappears. Due to their role in counteracting adaptation, fixational eye movements are an important tool to understand how the brain makes our environment visible. Moreover, because we are not aware of these eye movements, they can also help us understand the underpinnings of visual awareness. For the last decade, my laboratory and others have recorded the neural activity generated by microsaccades –the largest and fastest fixational eye movement- at different stages of the visual pathway. This presentation will review these discoveries and their implications for visual awareness. I will also discuss the contribution of microsaccades to bistable perception, and the role of microsaccades as indicators of the spatial location of covert attention.

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Influence of Awareness on Adaptation to Visuomotor Distortions

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Hironori Nagata, Tohoku University, Japan
Satoshi Shioiri, Tohoku University, Japan
Ichiro Kuriki, Tohoku University, Japan

June 20, 17:30-19:30: Poster Session 1

With the visual feedback that does not coincide with arm movements, the visuomotor mapping is disrupted but can be adapted with practice. For this type of adaptation, there are at least two cases: in one case, the subject tries to adjust the arm movements to the given movements being aware of the distortion of visual feedback, and in the other case, the subject simply repeats the arm movements with a distorted visual feedback without the awareness of the distortion. It is important to know such the effect of the awareness of the change in visuomotor map. We investigated whether the awareness of the distortion of visual feedback affects the updating of visuomotor mapping. Participants were instructed to track a visual target moving along a circular path on a display using a visual cursor controlled by a forced feedback pen-shaped device. They held the device in the right hand. We changed the relationship between the position of the cursor and the position of the pen: the cursor was shifted by a certain degree of rotation around the center of the display. The change was made in one of three types of time courses. In the continuous condition, very small shift continuously embedded until it reached a given amount. In the gradual condition, small shift embedded every cycle of stimulus rotation until it reached the given amount. In the sudden condition, the given amount of shift was embedded at a time. In each condition, the tracking error was measured. The effect of awareness in the visuomotor adaptation was evaluated by error changes as a function of trials. The participants were aware of the distortion of visual feedback in the sudden condition, not in the continuous condition. There were individual differences in the gradual condition. The results showed larger adaptation effect in the conditions where the participants were aware of the distortion than the other conditions. An additional experiment confirmed that presenting an indicator of the actual hand position removed the differences in adaptation-effects among the three conditions. These results suggest that the awareness of visuomotor distortion influences the updating of visuomotor mapping.

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Comparative Cognitive Science: Trade-off Theory of Memory and Symbolization in Humans and Chimpanzees

Tetsuro Matsuzawa, Kyoto University, Japan

June 21, 9:00-10:00: Keynote Lecture

The present study is an effort to know the evolutionary basis of human mind. Human mind does not remain in the fossils. To know the evolution of intelligence, emotion, and consciousness, we have to compare those of humans and other living organisms. Three mother-offspring pairs learned the sequence of Arabic numerals from 1 to 9, using a touch-screen monitor connected to a computer. A memory task was then introduced at around the time when the young became 5 years old. In this test, after touching the first numeral, all other numerals were replaced by white squares. In general, the performance of the three young chimpanzees was better than that of the three mothers and human adults: Young chimpanzees were good at memorizing details at a glance. A symbolic matching task was then introduced at around the time when the young became 6 years old. In this test, the subjects learned to match a Color (red, yellow, or green) to the corresponding two visual symbols (Kanji and Lexigram). All of the six possible combinations of Color, Kanji, and Lexigram were simultaneously introduced. The results showed that the establishment of the stimulus equivalence or the symmetry rule was difficult in chimpanzees. Our data can be interpreted according to a "trade-off hypothesis of memory and symbolization" from both developmental and evolutionary perspectives. Developmental trade-off would mean that young individuals can perform better in immediate memory tasks but may not be as able at other cognitive tasks such as those involving symbolic relationships. This may be due to the difference in the speed of myelinaization of neurons in each part of the brain. Evolutionary trade-off suggests that the common ancestor of humans and chimpanzees may have possessed an extraordinary memory capability. At a certain point in evolution, because of limitations on brain capacity, the human brain may have acquired new functions of symbolization in parallel with losing immediate memory.

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Conscious and Unconscious Processes in Persecutory Delusions - Evidence for a Defense Account

Ryan McKay, University of Zurich, Switzerland

June 22, 10:30-12:30: Symposium 3

Of all delusional themes, delusions of persecution are the most commonly observed clinically and the most vigorously researched empirically. Bentall and colleagues (Bentall & Kaney, 1996; Kinderman & Bentall, 1996, 1997) claim that persecutory delusions are constructed defensively, for the maintenance of self-esteem. A central prediction of their model is that paranoid individuals will demonstrate normal or high self-esteem on overt measures, whereas covert measures will reveal hidden feelings of low self-esteem. Although it is a rather formidable methodological challenge to elicit implicit self-esteem, there have been a number of efforts to empirically test this prediction. I will review these studies, focusing in particular on two recent experiments (McKay, Langdon, & Coltheart, 2007; Moritz, Werner, & von Collani, in press) that have employed a novel and highly influential methodology for eliciting implicit effects, the Implicit Association Test (IAT; Greenwald, McGhee & Schwartz, 1998).

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Evolution as Connecting First-Person and Third-Person Perspectives of Consciousness

Christophe Menant, IBM France (non active employee), France

June 21, 16:30-18:30: Poster Session 2

First-person and third-person perspectives are different items of human consciousness.

Feeling the taste of a fruit or being consciously part of a group eating fruits call for different perspectives of consciousness. The latter is about objective reality (third-person data). The former is about subjective experience (first-person data) and cannot be described entirely by objective reality.

We propose to look at how these two perspectives could be rooted in an evolutionary origin of human consciousness, and somehow be connected.

Our starting point is a scenario describing how evolution could have transformed a non self-conscious auto-representation into a conscious self-representation (Menant, 2006). The scenario is based on the performance of intersubjectivity existing among non human primates (Gardenfors, 2006). A key item of the scenario is the identification of the auto-representation of a subject with the representations that the subject has of her conspecifics, the latter feeding the former with the meaning: 'existing in the environment'. So during evolution, pre-human primates were brought to perceive their auto-representation as existing in the environment. Such process could have generated the initial elements of a conscious self-representation.

We take this scenario as providing a possible rooting of human consciousness in evolution.

We develop here a part of this scenario by expliciting the inward and outward components of the non self-conscious auto-representation. Inward components are about proprioception and interoception (thirst, pain, …). Outward components cover the sensory information relative to the perception of the body (seen feet, …) and of its effects on the environment.

We consider that the initial elements of a conscious self-representation have been applied to both inward and outward components of the auto-representation. We show that the application to inward components made possible some first-person information, and that the application to outward components brought up third-person information. Relations between the two perspectives are highlighted.

Such approach can root first-person and third-person perspectives in the same slot of human evolution.
We conclude by a summary of the above and introduce a possible application of this approach to the concepts of bodily self and of pre-reflexive self-consciousness (Legrand, 2006).

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It's Not All in Your Head: An Externalist-Process Approach to Consciousness

Michele C. Merritt, University of South Florida, United States

June 20, 17:30-19:30: Poster Session 1

The intent behind this paper is to suggest that the 'hard problem' of qualia might not be a problem at all. I argue for this 'not-so-hard-not-such-a-problem' concerning conscious experience on two grounds: First, whether reductive, dualistic, emergent or otherwise, attempts at explaining qualitative experience share in common a reliance on an internalist picture of mental content. This, I argue, is a mistake. Although the idea that consciousness remains wholly within a 'skin and skull' boundary is intuitively appealing, this intuition in no way warrants asserting internalsim as absolute truth. The fact that neurophysiological accounts have so far failed to provide a comprehensive map of the mind should indicate a shortcoming on the part of internalism. As Clark and Chalmers (1998) have famously shown, it is quite probable that mental content is the result of a coupling between the mind-brain of the person and the tools he or she uses. Thus, conscious experience, I argue, is not all 'in the head,' but is rather the result of dynamic interactions between brains, bodies, and world. This leads to the second part of the paper, wherein I claim that by insisting that there is a 'what' it is like to be conscious, a reversion to substance is implicit, thereby committing what I take to be a category mistake in classifying phenomenal experience. Like Nagel, I agree that any objective understanding of consciousness will fail to account for the actual experience of it, but moreover, any substance account of mental experience whatsoever will always already miss a crucial element of consciousness, namely, its dynamicism. Thus, Kim's psychophysical reduction laws and Cartesian dualism alike suffer from lack of attention paid to processes. If conscious experience is an emergent process, arising from other processes, none of which are 'things,' then it can be explained quite simply by referring to those processes that tend to bring about qualitative experience. While this might indeed usher in an entirely new problem of consciousness, I think the original 'hard problem' should be abandoned in favor of the 'problem of process,' one which, unlike its predecessor, seems immanently solvable.

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The Phenomenal Self and the First-Person Perspective

Thomas Metzinger, The Johannes Gutenberg-Universitat, Germany

June 20, 9:00-10:00: Keynote Lecture

How can a conscious self emerge from the physical dynamics unfolding within an embodied brain? And how exactly is the appearance of such a conscious self related to the subjectivity of our target phenomenon – to the fact that it seems to be tied to individual first-person perspectives? Self-consciousness is not just another form phenomenal content, and the conscious experience of selfhood is not just one detail problem among many others. If we aim at a comprehensive theory of consciousness which is conceptually coherent and firmly grounded in empirical data, then the phenomenal self will have to be right at the center of our efforts. Why?

Many anti-reductionist arguments take the epistemical asymmetry between first-person and third-person access to consciousness as their starting point. Philosophically, I will argue that it is a mistake to accept the vague metaphor of a "first-person perspective" as a conceptual primitive, and offer a naturalistic successor concept. I will also show that, metaphysically, no such things as selves actually exist and briefly sketch a theory of the phenomenal self. In support of this claim I will also present new empirical data from an interdisciplinary project in which we try to experimentally generate whole-body illusions and artificial out-of-body experiences in a virtual reality setting. Empirically, I will propose a scientific research program for "minimal phenomenal selfhood", i.e., a strategy that attempts to isolate the neurofunctional correlates of the simplest form of self-awareness.

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On the Common Representation between Physical and Mental Causations

Hidemichi Mitsumatsu, Nagoya University, Japan

June 20, 17:30-19:30: Poster Session 1

There are two types of causation: physical and mental causations. Physical causation is an occurrence of something the origin of which is force of an object. The collision of objects is the typical example of physical causation. Mental causation is self-attribution of a change of an environment. The sameness between the perceptual processes of physical and mental causations has long been pointed out by psychological researchers. Because the two have been studied independently of each other, the empirical evidence directly showing the connection between the two was scarce. The present study investigated how experience of mental causation was affected by observing a task-irrelevant collision event. The stimuli display included three motion objects of the same speed each of which started in a different timing. The participants observed the entraining effect where one object collided with and carried another one along. One object was not involved in the collision. The participants started the motion display by the initial mouse movement and had to keep moving the mouse to continue the replay of the movie. The task was to indicate which disk among the three they felt they had caused to move. Thus, the collision event was irrelevant to the task at hand. The results showed that the participants tended to self-attribute the colliding object as action effect compared to the case where the object of the same start-timing was not involved in the collision. The context effect of the collision on the judgment of mental causation seemed to be explained by assuming the common representation of causality between the physical and mental causations. That is, the collision event automatically evoked the representation of the mental causation, resulting in the mental causation of the collision event. The subsequent experiments showed that the visual attention and perception of the entraining effect which were considered mediating factors could not account for the context effect. The context effect would be the first direct evidence for the traditional belief of the common process between the two types of causation.

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The Role of Semantic Representations in Grapheme-Colour Synaesthesia

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June 20, 17:30-19:30: Poster Session 1

In synaesthesia, a certain stimulus (inducer) is associated reliably and automatically with a phenomenal experience, mostly from the perceptual domain (concurrent). Grapheme-colour synaesthesia is triggered by linguistic entities like letters and numerals, and generates perception-like phenomenal experience of colours - e.g. for some people the letter 'A' induces the perception of a red colour. These associations are acquired in early childhood and remain robust throughout the lifetime. Our study examined the relationship between inducer and concurrent showing how this relation can be extended by creating new semantic associations in the course of a short learning process. There is evidence that synaesthetic associations can be adopted by novel inducers in adulthood as one learns a second language with another writing system. We found that grapheme-colour associations were transferred to novel forms of graphemes after completing only a short writing exercise of less than 10 minutes. Five synaesthetes learned an ancient Slavic writing system, Glagolitic (orthographically largely unrelated to Latin, Greek, Cyrillic or Arabic) and were asked to handwrite 20 familiar words (or, alternatively, sequences of numbers) such that they substituted one Latin letter (or one Arabic digit) with a single Glagolitic letter (or digit). After the exercise, all subjects reported experiencing synaesthetic associations to these newly learnt graphemes, the qualia of concurrent colours being preserved from the original synaesthetic colours. Due to the short duration, the learning process relied on the formation of new semantic associations rather than on the mechanisms of perceptual learning. Unlike old synaesthetic associations, the new ones were font-specific and did not affect colour naming in an adapted Stroop task. This indicates that associations in grapheme-colour

synaesthesia begin at the semantic level of processing (where the inducer is represented) and result in a phenomenal experience at the perceptual level (where the concurrent is represented); they connect the semantic, conceptual content associated with each grapheme with the sensory content, namely an involuntarily triggered conscious colour experience.

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Self-Consciousness and Non-Conceptual Content

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June 21, 16:30-18:30: Poster Session 2

Self-consciousness is often defined as the ability to think of oneself as oneself, an ability that is thought to require highly demanding conceptual (and linguistic) abilities and to be a uniquely human capacity (e.g. Rödl 2007). In contrast to this, it has (following the phenomenological tradition) recently been suggested that self-consciousness is a much more basic phenomenon and that there are primitive forms of self-consciousness that are pre-reflexive, non-conceptual and may be shared by non-human animals (e.g. Frank 1995/2002; Hurley 1997; Bermúdez 1998). Some (Kriegel 2004; Zahavi 2000) even argue that self-consciousness is ubiquitous, i.e., that it accompanies all states of consciousness. Candidates for non-conceptual self-consciousness include proprioception, self-specifying information that is implicit in perception, and agency.

Here, I argue that while there are good reasons to believe that non-conceptual content plays an important role in the development and constitution of self-consciousness, we have to distinguish between the subjectivity of conscious experience and genuine self-consciousness. The latter involves more than the implicit presence of self-specifying information in the contents of experience – it requires that these self-specifying contents also be recognized as such. What is required for genuine self-consciousness is not just that the subject be provided with information that is in fact about itself, but an awareness of itself as itself. Self-referential information must be an explicit, not just an implicit part of the content of the subject's experience.

I suggest that genuine self-consciousness is essentially a contrastive notion that has its roots in inter-subjectivity. I need the ability to contrast my own mental states with those of others in order to realize that they are my own. In other words, I need a (at least rudimentary) theory of mind. While the self-specifying information that is implicit in interoceptive and exteroceptive perception is part of the subjective nature of conscious experience and provides a necessary condition for self-consciousness, it is not sufficient for genuine self-consciousness.

I will show that this proposal fits well with empirical data from developmental psychology and cognitive neuroscience.

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Critical Theory Meets Cognitive Science

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Jan Slaby, Institute of Cognitive Science, Germany
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June 20, 17:30-19:30: Poster Session 1

The scientific study of consciousness is a crucial part of the interdisciplinary endeavour of cognitive science. As research in all participating disciplines progresses, prospects of significant impacts on the future of human experience and even human nature appear on the horizon.
That is why we see the need for a 'critical cognitive science': a self-reflexive, context-sensitive and socially conscious scientific practice that responds to the social, cultural, legal and political challenges posed by present and future advances in the behavioural and brain sciences, and in the affiliated fields of AI, robotics and computer science. Against the background of a re-assessment of the philosophical project of critical theory we distinguish external critique of science from a critical engagement of scientific practice from within. This leads to a sketch of a sensitive self-reflective stance that can be adopted by scientific practitioners and external commentators alike. Ideally, the integration of critical theorizing into cognitive science initiates a process of attaining a more thorough self-understanding and awareness of the social implications of scientific procedures and results. Ultimately, this can contribute to beneficial social transformations which help to create and sustain the conditions that enable a 'good life' for a maximum number of people. In order to illustrate this, we discuss five areas of application that call for critical reflection and engagement: (1) the increasing possibilities of neuropharmacological interventions, which can have profound impacts on experience; (2) biological psychiatry as the principle psychiatric paradigm; (3) the role of AI and computer science in the development of a system of control and surveillance that begins to reach out to many parts of society; (4) the increasing interaction between cognitive science and popular media/culture as exemplified by the recent trend towards a "science of happiness" and its key branch "positive psychology", which promotes a distorted view of emotional experience and well-being; (5) the public portrayal and perception of imaging data from neuroscience as evidence about 'human nature', even in the absence of a theory of how imaging data can be systematically

related to conscious experience. In discussing these five areas of concern, we demonstrate the shape of our critical agenda in practice and begin to sketch models for critical engagement of scientific practice from within cognitive science.

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Diversity of Conscious Experiences During General Anaesthesia

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June 22, 14:00-16:00: Concurrent Session 3.3

It seems that the anaesthesiological definition of consciousness as behavioural responsiveness to external stimuli does not fully match the neurophilosophical concept of consciousness as the presence of subjective experiences. Apparently, the loss of responsiveness is dissociated from continuation of subjective experiences. Several studies have confirmed dreaming during anaesthesia, which is a paradoxical but definite sign of subjective contents of consciousness in a state when conscious experiences are typically believed to be absent. In the present study, we aimed to describe the diversity of conscious experiences occurring during general anaesthesia. 58 experimental sessions were conducted during which subjects were anaesthetized with either dexmedetomidine, propofol, sevoflurane or xenon. After awakening, reports of subjective experiences were collected in a structured interview. 59 % of anaesthesia sessions resulted in reports of conscious experiences, which were further analyzed with the Scale for Conscious Experiences during Anaesthesia: experiences ranged from simple bodily sensations to visual and auditory imagery, and from elements of anaesthesia awareness to complex dreams. Further, several EEG measures, such as spectral entropy and BIS Index, were used to contrast the presence and the absence of conscious experiences during anaesthesia. Results confirm that the presence of subjective experiences is compatible with clinically defined anaesthesia as a loss of behavioural responsiveness. Thus, studies aiming to investigate the loss of consciousness should additionally control whether it is really phenomenal consciousness that is lost, or merely behavioural responsiveness. Further theoretical and methodological implications will be discussed, such as the difficulties of relying on first-person reports in studies investigating the neural mechanisms of anaesthesia and consciousness, as well as the status of anaesthesia awareness, a condition when patients report remaining aware during the operation. This raises the hypothesis that in at least some of these cases, what appear to be reports of anaesthesia awareness may actually be the result of hallucinatory anaesthesia dreaming.

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Effects of Feedback Valence on Implicit Learning of Attentional Guidance

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June 21, 16:30-18:30: Poster Session 2

The repetition of the same spatial configurations of the search display facilitates performance of visual search task. This improvement of performance is referred to as contextual cuing and indicates that the invariant structure of a display that predicts relevant information in the display can be implicitly learned to facilitate task performance by efficiently guiding visual attention. In the present study, we investigated effects of feedback valence on the contextual cuing effect. In a typical contextual cuing experiment, subjects are asked to make a response to a search target in each trial in order to finish the experimental session. Therefore, finding or responding to the target itself can be rewarding because it will unbound them from the experiment. Our questions are whether the implicit contextual learning can be facilitated by a positive feedback (reward) and whether it occurs even when a response to a target is accompanied by a negative feedback signal (punishment).
In a normal contextual cuing experiment, subjects were given a positive feedback or a negative feedback immediately after their response to a target. They were told that their response speeds would be compared with those of other subjects and the feedback signal would assess whether their responses were quicker or slower than the average response speed. In addition, they were told that the number of trials would decrease when the positive feedback was presented and increase when they received the negative feedback. However, in the actual experimental session, the negative or positive feedback signals were randomly assigned to repeated layouts and therefore they were uninformative as to subject's performance.
The results showed that the positive feedback facilitated the amount of the contextual cuing effect when subjects were not aware of the uninformative nature of the feedback signals, namely, when they believed that their performance was assessed by the feedback signals. On the other hand, the negative feedback signal did not affect the amount of the cuing effect for both groups. These results suggest that motivational and reward process can modulate implicit learning processes of contextual cuing.

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Crossmodal Temporal Memory Averaging

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June 21, 16:30-18:30: Poster Session 2

Previously, we examined how a visual change (color change) in a continuously moving object would influence the remembered timing of another event (visual flash) (Ohyama & Watanabe, 2007). The result demonstrated that an unpredictable visual change distorts the temporal memory of another visual event, such that the remembered event timing is attracted to the unpredictable visual change. Similar temporal effects have been reported in relation to crossmodal interaction (Fendrich and Corballis, 2001) and saccadic eye movement (Morrone et al., 2005). For example, Morrone et al. (2005) reported that time compression did not occur for auditory clicks presented just before saccades, namely, time compression is specific to vision and saccade. In this regard, it would be informative to examine whether our previous finding of temporal memory averaging is observed crossmodally. In the present study, a brief auditory stimulus was presented instead of the visual flash to examine whether temporal memory averaging occurs crossmodally. In each trial, subjects saw a green or red disk rotate clockwise or counterclockwise and a brief sound (1kHz, 10ms) was presented at random timing. After the stimulus presentation, they were asked to report the sound timing by adjusting the clock position of the disk. In the no-change condition, the rotating disk did not change its color. In the unpredictable condition, the disk color changed at unpredictable timing. In the predictable condition, the color change occurred at the fixed timing relative to the stimulus sequence. In the predictable condition, the memory of timing of the sound was relatively accurate. In the unpredictable condition, however, subjects reported that the sound occurred closer in time to the color change. These results shows that the temporal memory of an auditory stimulus is also modified by the unpredictable visual change and suggests that temporal memory averaging occurs crossmodally and therefore the underlying mechanism may differ from that of time compression by saccades.

Effects of Motion in Depth on Perceived Duration of Visual Stimuli

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Shigeru Kitazawa, Juntendo University School of Medicine, Japan

June 21, 16:30-18:30: Poster Session 2

There is much evidence to show that our subjective time perception is influenced by the motion of visual stimuli that should be independent of the physical duration. For example, perceived duration of moving stimuli increases as their speed increase (Mashour, 1964; Rachlin, 1966). Whereas previous studies examined effects of two-dimensional motion on the display surface, this study examined whether the perceived duration is influenced by the three-dimensional visual motion in depth. To examine this, we required subjects to judge the length of an empty-interval between two successive visual stimuli that generated perception of apparent motion in depth. We required participants to estimate the length of a short empty interval (e.g., 150 ms) that started from the offset of the first marker and ended at the onset of the second marker. We changed the size of the markers so that a single visual object was perceived as approaching or receding. The empty interval was perceived as shorter when the object was approaching than when it was receding. By breaking the shape continuity between the first and the second marker, we excluded a possibility that the depth effect was due to the size of the first or the second marker. The results clearly show that the time perception was influenced by the visual motion in depth. By adjusting the lateral position of two stimuli, we further found that the depth motion effect is observed only when our face is located on the course of the approach but not when it is just out of the course. We conclude that an anticipated collision decreased the perceived duration of the moving object.

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Anatolian Interaction on Antique and Medieval Roots of Modern Cognitive Science

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June 20, 17:30-19:30: Poster Session 1

This study is aimed at historical approach to Anatolia and its impact on the evolvement of cognitive sciences. The modern science has recently started gaining insight to this theme, finding surprising facts about valuable ideas and concepts that the past scientists might have had. Anatolia envelops the first line of positive-science movements. These Ionic schools include Anaxagoras, Hippocrates, Heraphilus and Galen. These early thinkers supported the brain as the "cognitive organ". The works of Galen in the 14th century Sabuncuoglu are among the scientists who diligently kept the records of their experiments, remedies, the effects, their observations on the human body. This is also the line of modern evidence based approach of the modern science. The Asclepions were the large organized medical facilities of the ancient world. The Pergamon Asclepion is acknowledged for the basis of group psychotherapy, with present day annual international conventions being held within the complex. Furthermore, the incubation was applied, which is a very different approach, aiming to make use of the subconscious recollection of the patients. The projection of this institution in the medieval period was Gevher Nesibe Shifahane which became the first medical faculty (1261) and Cifte Medrese as the first medieval school of anatomy, as well as Bursa and Edirne Madrasas which were large size medical faculties. These and similar faculties had teachings of the ancient scientists and their concepts on the brain, mind etc. The lineage of the scientists from Galen and Hippocrates is enriched by Avicenna and later by Serefeddin Sabuncuoglu (1385-1470), who was a Turkish surgeon, lived in the 15th century in Amasya. The status of the scientists and doctors in the society are telltale marks of the periods and the related societies. The early fifteenth century also marks an interesting event that there were female neurosurgeons in the Ottoman medical fields. The modern cognitive sciences and related applications including the neuropsychiatry concepts have been influenced and rooted through the continuum of remarkable achievements in the past. The increase of research in this area can result in more evidence and facts, presenting the course of development of modern cognitive science.

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Concepts, Consciousness and Self-Reference

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June 21, 16:30-18:30: Poster Session 2

This paper argues that the best candidate for the "hard problem" of consciousness is one that seems often curiously overlooked, involving self-reference. Consciousness studies take empirical study of the external world and turn it around, to focus attention on ourselves: for consciousness is intimately our own consciousness. Furthermore understanding consciousness may be seen as a recursively defined exercise, where what is being specified becomes part of the specification.

Concepts share a similar form of self reference, which theories of concepts must address. It is difficult if not impossible to specify what a concept is in general without employing particular concepts in the specification. If, as this paper argues, getting one's theory of concepts right is critical to getting one's theory of consciousness right, then an examination of the one sort of self-reference may give insight into the other.

Self-reference need not be vicious self-reference. But any sufficiently self-referential system will raise certain paradoxes, and our success at understanding them may well depend on our ability to derive some meaning from the paradoxes before they collapse into simple contradictions. So, for example, a theory of concepts that itself relies on concepts can be shown to be susceptible to a version of Grelling's Paradox, itself a variation on Russell's Paradox.

Russell's solution to the paradox in set theory was, of course, the theory of types, which effectively bans self-reference. But as others have argued, it is not clear that a solution we may be willing to accept in the relatively austere domain of set theory will be one we can, or should, accept in other domains. Rather than avoid the problem, or deny it, perhaps the solution is to embrace it, allowing that two apparently contradictory perspectives may yield a more complete overall understanding. What we lose -- which may not be worth saving anyway -- is the conviction that things must be either one way or the other in some universal, non-context-dependent sense. Note I'm not arguing against bivalence but rather in favor of e.g. annotating the truth function of a proposition with its context.

Chunking in Serial Reaction Time Tasks: An Objective Measure of Conscious Learning

Antoine Pasquali, Université Libre de Bruxelles, Belgium
Luis Jimenez, Universidad de Santiago, Spain
Axel Cleeremans, Université Libre de Bruxelles, Belgium

June 20, 17:30-19:30: Poster Session 1

What is the difference between learning with and without awareness? Here, we propose that while both unconscious and conscious learners may become sensitive to the statistical structure of the environment within which they interact, only the conscious learner will chunk this information, that is, segment it in an intentional, conscious manner so as to form memory representations that can be accessed and manipulated independently of any context. Such chunking, which is constrained by the agent's memory limitations, allows one to integrate information in a goal-consistent and reliable manner. To address this issue, we examined performance in the serial reaction time (SRT) task, an implicit learning task in which people's responses to successive visual stimuli can be shown to be highly sensitive to the sequential structure of the material despite the fact that they often remain unaware of the existence of these sequential relationships. Chunking in such a task is characterized by the occurrence of groups of consecutive responses for which associated reaction times (RT) are successively shorter. Such group may reflect the fact that a single representation (a chunk) drives responding to every internal event within the group. Crucially, by examining the manner in which RT variability changes over training, we can track the emergence of chunks over long time periods. We identified a pattern of RT variability that uniquely characterizes intentional, but not incidental learning in this situation. Such a pattern can therefore be taken as an objective correlate of conscious learning. This interpretation is supported by the further findings that (1) chunk learners perform better when reporting the sequence in post-test generation tasks, and that (2) they tend to use the chunks they had learned in such direct tasks.

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A Trope-Ontological Ground for Psychoessentialist Cognition

Eric M. Peng, Soochow University, Taiwan

June 21, 16:30-18:30: Poster Session 2

Psychological essentialism (or simply "psychoessentialism") holds that the folk cognize kinds as if things had kind essences. The doctrine becomes weird when it is added the denial of kind essences. It is unfortunate that advocates of psychoessentialism direct their objection to the notion of "individual essence" instead of "kind essence". Barring this confusion, there is some plausibility of psychoessentialism. In this essay, I propose a revised version of psychoessentialism grounded on trope ontology. The version of trope ontology holds that an object is a bundle of compresent tropes (particularized properties) and that two objects are of the same kind only if they exhibit a similar pattern of trope compresence. The revised psychoessentialism, then, is the idea that we are born with the power to detect similarities of trope compresence patterns.

Generalized CNS Arousal in Animal and Human Brains

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Isabel Arrieta-Cruz, The Rockefeller University, United States

June 21, 10:30-12:30: Symposium 2

Generalized CNS arousal has been given an operational definition ("Brain Arousal", Harvard Univ. Press, 2006) that is intended to apply to all vertebrate brains. Using a computer-controlled assay that measures the motoric, sensory and emotional components of generalized CNS arousal in mice, we have detected behavioral deficits due to anoxia that did not appear in a 28 point neurological screen (Experimental Neurology, 2007). Inspired by the success of Schiff et al (Nature, 2007) in using deep brain to improve the functional ability of a patient who had been in a minimally conscious state, we are now using stimulation of the medial thalamus and/or the basal forebrain to elevate arousal-related behaviors in mice. Included in this effort are mathematically defined trains of pulses designed to conform to the likely non-linear character of CNS arousal systems.

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Consciousness and Perceptual Organization: the Illusion of Meaning

Baingio Pinna, University of Sassari, Italy

June 20, 17:30-19:30: Poster Session 1

The relationship between consciousness and the ability and distinctiveness of human visual system to perceive meanings is the main topic of this work. Human perception goes beyond the perception of objects or shapes. It is mostly perception of meanings. Each perceptual object has a shape that conveys and signifies one or more meanings that are related to other meanings creating a whole complex net of perceptual meanings that is the world we perceive in everyday life and where consciousness plays a basic role. The questions are: What is a perceptual meaning? Can the problem of perception of meanings be reduced to a process of perceptual organization? What are the main phenomenal rules governing the formation of meanings? Can consciousness be reduced to the problem of meaning? The answers to these questions help to understand how the brain creates meanings and the consciousness. We have shown through phenomenal and psychophysical experiments that vision is mostly perception of meanings. Briefly, the results showed that a perceptual meaning (i) is an emergent result normally and spontaneously conveyed by vision, (ii) is the extreme reduction of information load and of the algorithmic complexity, i.e. many disparate components are reduced to a minimum number, (iii) is the result of a special organization process that complement Gestalt principles of grouping and where at least two levels (modal and amodal) are hierarchically structured in a part-whole organization, (iv) is the atom of the primitive language of vision used before spoken language (it contains at least a subject, a predicate and a complement), (v) creates other meanings placed at the same and at different perceptual levels where one is included and is the raw materials of the other – this process creates a hierarchy of meanings and works recursively. We suggest a new theory of perceptual organization and a possible neural scenario for both perceptual meanings and consciousness based on the primitive language of vision where consciousness plays the role of the subject.

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Intuition Improves Accuracy of Complex Choices... Sometimes

Grzegorz Konrad Pochwatko, Polish Academy of Sciences, Poland
Joanna Sweklej, Warsaw School of Social Psychology, Poland
Robert Balas, Polish Academy of Sciences; Warsaw School of Social Psychology, Poland
Małgorzata Godlewska, Warsaw School of Social Psychology, Poland

June 21, 16:30-18:30: Poster Session 2

The influence of the level of cognitive processing and implicit goal activation on choice making is examined. Contrary to previous findings (Dijksterhuis et al. 2004, 2006), conscious analysis in general is more effective, i.e. leads to more accurate choices than intuition and immediate choice. Accessibility of information during implicit or deliberate thinking phase also improves accuracy. Effectiveness of intuition is visible only when the information about choice options is complex (12 information about each option) compared to simple (4 information). Implicit goal activation (introduced as an additional independent variable in study 2) influences choice without affecting explicit attitudes toward options (goal related vs. goal unrelated options are rated equally good). In "no goal" (i.e. control, identical to the study 1 design) condition the pattern of results from the first study was replicated. Similarly to the general tendency observed in the first line, activation of implicit goal leads to more accurate choices when ppts engage in conscious analysis of options. In general, results of both studies show that in intuitive choice condition something more than simple automatic responses can be observed.

Analyzing Conscious Visual Experience

Ulrike Susanne Pompe, Ruhr-Universität Bochum, Germany

June 21, 16:30-18:30: Poster Session 2

What characterizes and constitutes conscious visual experience? I aim to analyze these points by showing that the content of visual experience is not only determined by its underlying neurophysiological and neuropsychological processes and mechanisms, but that there is another important component which works in a top-down manner and which shapes our visual experience, that is the way things are given to us. I will do this by first distinguishing closer three different components of perception: 1) the underlying and mediating processes and mechanisms that lead to perceptual experience; 2) the level of conscious visual experience; 3) the level of judgments on the content of this visual experience. To exemplify why such as distinction is worth being drawn I will present evidence from the cognitive neuroscience and models on object recognition that result from the study of diverse pathological cases (e.g., different kinds of visual agnosia). Second, I wish to show that visual system does not only serve the constitution of conscious visual experience, but also allows for the guidance of behavior on a subpersonal level – think of blindsight, for example and further, that information supplied by the visual system can also be used to preconsciously elicit certain expectations about the upcoming visual input, and that this kind of "cognitive priming", or let's say sensitivation of context information in turn allows for the direction of attention, or the setting of a certain focus, and thereby influences what we perceive.

Conscious visual experience is therefore influenced and shaped by a bottom-up component, namely, its underlying processes, and secondly by a top-down component, that is responsible for the typical "aboutness-structure" of the phenomenal character of any visual experience. It can be shown how these "components" influence each other and how they interact. The phenomenon of visual experience can thus be analyzed in its phenomenological richness and at the same time be analyzed with empirical means. The three-fold model of perception defended here represents therefore a combination of philosophical, (neuro-)psychological and cognitive theoretical methods and paradigms.

Implicit Learning - the Role of Prevention and Promotion Motivation and Cognitive Style

Agnieszka Popławska, Warsaw School of Social Psychology, Poland
Alina Kolanczyk, Warsaw School of Social Psychology, Poland

June 21, 16:30-18:30: Poster Session 2

The aim of the study was to assess the role of motivation and cognitive style (global vs. analytic) in implicit learning process measured by the artificial grammar learning task. The previous studies did not take into account the necessity of the motivation and the role of cognitive style in this paradigm.
In the experiment participants were instructed to memorize letter strings ranging from two to eight elements each. In the learning phase experimental group was memorizing grammatical strings which were generated by Markovian automata. Control group did not learn anything. Next, both groups did classification task with new grammatical and ungrammatical strings. Both groups made the Navon test which defined the cognitive style of participants – global or analytic. There were additional instructions in motivated groups. First one suggested that results of the experiment are connected with the level of intelligence (preventive motivation), the second one - that this task improves participant`s ability to learn (promotion motivation).
Participants in experimental group classified new letter strings well above chance level and better than control group whereas the latter group performed the task on a chance level.
The results indicate that motivation has influence on implicit learning process, especially in interaction with cognitive style. The global cognitive style is more effective in condition without motivation, only in experimental group. The analytic cognitive style is more effective in condition with prevention motivation in control group and more effective in condition with promotion motivation condition in experimental group.

The Role of Orientation Processing in Scintillating Grid Illusion

Kun Qian, Kyushu University, Japan
Yuki Yamada, Kyushu University, Japan
Takahiro Kawabe, Kyushu University, Japan
Kayo Miura, Kyushu University, Japan

June 21, 16:30-18:30: Poster Session 2

The scintillating grid illusion refers to an illusion of black spots on the luminance increments at the intersections of gray grids on a black background. In this study, we examined the role of orientation processing in this illusion. In Experiment 1, we controlled the size and shape of luminance increments, and found that the illusion became weak on the square, compared with circle and diamond, in the largest size condition. In Experiment 2, we controlled overall orientation of squared luminance increments, and confirmed that the illusion became weak when the orientation of luminance increments changed from 45 deg to 0 deg. In Experiment 3, we changed the orientation of the grids, and found either the orientation of the luminance increments or the relative edge orientation of luminance increments and grid was 0 deg, the illusion became weak. This indicates that orientation processing is one of the determining factors of this illusion.

Conscious Control of Perceptual States Differs from Spontaneous Control Both in Behavior and in Brain Activity

Eugenio Fernando Rodriguez, U. Catolica de Chile, Chile
Paula Lacerna, U. Catolica de Chile, Chile

June 20, 14:00-16:00: Concurrent Session 1.1

In bistable perception the brain transform ambiguous stimulation into two mutually exclusive percepts, one of which is consciously perceived while the other is suppressed. This selection can occur either spontaneously or by the conscious decision of the viewer. Here we take profit of this fact to search for the neural correlates of the conscious control of mental states. We record electroencephalographic signals of subjects viewing a Stroboscopic Apparent Motion (SAM) ambiguous stimulus, which elicits mutually exclusive perceptions of either vertical or horizontal motion. The task involved two conditions: In the 'Spontaneous Condition' subjects were asked to report by a button press whenever perception spontaneously changed from vertical to horizontal movement or vice versa. In 'Voluntary Condition' the subjects were asked to voluntarily change from one perception to the other and report the change by a button press. A control experiment with unambiguous vertical and horizontal stimuli allowed us to estimate the window for perceptual reversion as 630 +/- 214 ms before button press. The behavioral results show that perceptual switches occur significantly faster during the 'voluntary' than during the 'spontaneous' condition (t test, $p < 0.0001$). A preliminary analysis of the electroencephalographic results shows: a) that beta and alpha oscillations are both significantly stronger (t test, $p < 0.05$) in the 'spontaneous' as compared to the 'voluntary' condition. This difference holds during a 300 ms time window preceding the perceptual reversion window. b) that delta and theta oscillations are significantly more synchronous (t test, $p < 0.05$) in the 'voluntary' as compared to the 'spontaneous' condition during a time window starting 800 ms before perceptual switching and ending abruptly at the time perceptual reversal was resolved. Taken together these result shows that spontaneous control and conscious voluntary control of perceptual states can be differentiated both on behavioral grounds and also on the basis of their electroencephalographic signatures.

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Why Are Mental States Ever Consciousness?

David Rosenthal, City University of New York, United States

June 19, 17:30-18:20: Presidential Address

Theories of consciousness typically seek to say either what it is for a mental state to be conscious or what the neural correlate is of a state's being conscious. But not all mental states are conscious. So there is a third question, which has received little attention: Why is it that mental states are ever conscious? Answers to the first two questions, I'll argue, do not by themselves provide an answer to the third, and several theories actually preclude giving any informative answer.

Some have urged that states are sometimes conscious because their being conscious has utility for the organism. I'll argue, however, that the utility of thoughts, desires, and perceptions is almost entirely independent of whether those states are conscious.

I'll advance two explanations of why many mental states are conscious, one for perceptions and another for intentional states such as thoughts and volitions. In both cases, the process that leads to states' becoming conscious is beneficial, but the consciousness of the states itself adds little or no utility.

In brief, perceptions come to be conscious when an organism detects its own erroneous perceiving, thereby becoming conscious of itself as being in perceptual states. By contrast, thoughts, which lack qualitative character, become conscious only in creatures with relatively sophisticated linguistic abilities. Many states of nonlinguistic creatures are presumably conscious, but arguably thoughts are not among them. Thoughts come to be conscious when saying something becomes virtually interchangeable with saying that one thinks that thing, as it is in humans. Because saying that one thinks something expresses an awareness of that very thought, such habituated interchangeability brings with it consciousness of many of one's thoughts.

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Quantifying the Limits of Introspection

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Guido Corallo, University of Buenos Aires, Argentina
Mariano Sigman, University of Buenos Aires, Argentina
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June 20, 14:00-16:00: Concurrent Session 1.2

Ever since Wundt, the introspective method and the study of mental chronometry have followed distinct paths. While introspection has led to the flourishing field of meta-cognitive studies, chronometric studies have been most useful in dissecting elementary cognitive processes. However, mental chronometry largely left aside the link between cognitive processes and conscious experience. To address this issue, we designed a new methodology: "quantified introspection" (QI). We engaged participants in a standard response time (RT) experiment, but after each trial we also asked them to give a quantitative subjective estimate of the time it took them to respond (introspective RT). This enabled us to study the relation between objective times and introspective estimates, and thus to determine, amongst the processes contributing to response time, which are accessible to introspection and which are opaque. In a series of experiments we demonstrate that IRT can be a sensitive measure, tightly correlated with objective RT in a single-task context. In stark contrast, however, in a psychological refractory period task, the objective processing delay resulting from interference with a second concurrent task is totally absent from introspective estimates. Those results suggest that our subjective introspection of time spent on a task tightly correlates with the period of availability of central processing resources. It thus appears that there might be some stringent limits on what parameters of a task are consciously available. If one follows the classical distinction between early effortless parallel processing and late effortful central processing, our studies suggest that subjects are mostly sensitive to factors that affect central processing stages. In follow-up experiments, we extend the methodology to other parameters of cognitive tasks: the sense of effort, ease of access and confidence. We believe that quantified introspection may be a new and important tool in the study of conscious and non-conscious cognitive processing. The robustness of our results suggests that quantified introspection provides a powerful methodology to map the contents of

conscious experience within what we currently understand of participants' cognitive architecture.

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Three Different Continuous Awareness Scales Predict Performance in A Visual Identification Task and Support the View that Consciousness Is a Gradual Phenomenon

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June 20, 14:00-16:00: Concurrent Session 1.3

We examined three measures of awareness both using dichotomous and continuous scales, in order to test their correlation with subject performance in a visual identification task. Geometric figures were presented for a number of milliseconds ranging from 16 to 192, followed by a mask. On each trial, subjects had to identify the presented figure and use one of three awareness scales, either in a dichotomous or a continuous (4-point) response format. 12 subjects used the PAS (Overgaard et al, 2006) to rate the clarity of their perceptual experience, 12 subjects rated their confidence (Dienes & Scott, 2005) in having identified the figure correctly, and 12 subjects reported how much they would wager (post-decision) (Persaud, McLeod & Cowey, 2007) that they had identified the figure correctly. All continuous measures were transformed to 4-point scales in order to make results comparable.
Results were twofold. First, dichotomous measures suggested a large degree of above chance performance without awareness, while continuous scales did not, or to a much lesser degree. Second, we found no significant systematic differences between the three measures of awareness. For all three measures, increased performance accuracy was followed by increased awareness, with performance accuracy increasing more steeply than awareness. Both awareness ratings and accuracy can be expressed as sigmoid functions of stimulus duration. Differences in tangents of each awareness function and its corresponding accuracy function was examined in order to determine whether conscious experience is best viewed as dichotomous or gradual in the context of the present experiment. Our analyses support the latter view. Differences in adjustments along the x-axis were also analysed in order to find support for subliminal processing. So far, data suggest that awareness indeed does lag performance slightly.

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Concept of "Consciousness" in the Context of Russian Psychophysiological Theories: Philosophical and Methodological Analysis

Aleksandr Nikolaevich Savostyanov, Academia Sinica, Taiwan

June 20, 17:30-19:30: Poster Session 1

Despite numerous attempts to define the meaning of the term "consciousness", there is as yet no definition accepted by majority of researchers. In addition, the interrelations of this term with other terms applied to the specification of such phenomena as thinking, reason, mind and mentality are also unclear. The aim of study is to compare alternative definitions of the "consciousness" concept in classical Russian psychophysiology of the twentieth century. The terminological system of I.P.Pavlov's conditioned reflexes theory is accepted as an initial point for comparison. In this system, the term "consciousness" is defined as a system of uncompleted reflexes of the second signal systemor as internal speech, which does not have a motor component. The main critics of I.P.Pavlov were V.M.Bekhterev and P.K.Anokhin, who showed the incompleteness of such a definition. According to the V.M.Bekhterev's theory, "consciousness" is defined as an ability to generate a self-report concerning external events and internal experiences. In his categorical system, the term "consciousness" is connected with two concepts - structure (stable, anatomically predetermined properties of the brain) and energy (measure of interactions of the organism with the environment). Consciousness comprises an ability to control energy, i.e. the management of the interaction between the organism and the environment. In P.K.Anokhin's theory - consciousness is a form of information processing, i.e. a set of rules on the basis of which a person perceives the external world. According to this theory, consciousness arises on the basis of congenital personal aims. Further, consciousness carries out the function of goal setting, i.e. it generates new aims for behavior.
The comparison of alternative categorical systems shows that the main reason for divergence is various interpretations of the concept of "law", in relation to designation of mental phenomena. Pavlov's theory interprets law as the set of stable properties of the World, reflected in brain processes. Bekhterev's theory considers law as a constant property of the brain. Anokhin's theory considers law as being the internal factor of the organism defining a system of vital aims. Distinctions in interpretations of the "law"

concept influence understanding of all psychophysiological terms, including the term “consciousness”.

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Bridging the Gap? A Neurophilosophical Assessment of "Mind Reading" Technology

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June 20, 14:00-16:00: Concurrent Session 1.3

Neuroscientists have been able to predict subjective experiences with a high accuracy from brain imaging data recently. Using multivariate pattern analysis or algorithms of machine learning, they could infer perceived visual objects as well as hidden intentions, to name just a few examples. These successes have led some researchers to refer to the new methods as "brain interpretation" or "mind reading" technology.

These results are immediately relevant to questions of philosophy of mind and consciousness. Considering classical essays discussing the "hard problem of consciousness" (Chalmers, 1995) or the "explanatory gap" (Levine, 1983), it remains controversial whether subjective experience can be explained by investigating their underlying mechanisms. Thus, the new findings raise several questions that should be analyzed from an empirically informed philosophical perspective.

First, a conceptual analysis of the notion of "mind reading" yields a set of constraints that allow to assess how close these methods really get to a subject's experience. Is it really warranted to speak about "mind reading" or is it better understood as a metaphor – at least for the time being? Are there experiences that are easier to predict (e.g. from the visual domain) than others? Which are the main factors limiting the empirical progress to develop a "universal mind reading machine"?

Second, the idea of "mind reading" technology addresses arguments concerning the externalism of mental content as well as the possibility of psychophysical laws, which have a long tradition in philosophy of mind. For example, if mental content can be individuated by investigating a subject's brain, then Putnam's Twin Earth thought experiment (1973, 1975) appears to be refuted on empirical grounds; and if brain researchers can predict subjective experiences reliably from their data, Davidson's Anomalism of the Mental (1980) appears to be wrong.

Considering both, the empirical and philosophical issues concerning "mind reading", I will present my conceptual scheme which implies answers to these questions. The conclusion of my talk will be that the empirical findings

have to be taken seriously from the philosophical point of view but that there is still more research to be done in order to “bridge the gap”.

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Phenomenal Consciousness and Accessibility

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June 20, 14:00-16:00: Concurrent Session 1.2

Block (2008) argues that phenomenology "overflows" cognitive accessibility, i.e. that we can be conscious of contents without being able to cognitively access them. This claim rests on experiments (Sperling 1960, Landman et al. 2003) in which subjects insist that they consciously perceive a whole array of characters although they can only report (access) a few. When instructed to focus attention on only a few, they can give an accurate partial report. According to Block, subjects are phenomenally (yet not access) conscious of all specific characters. Block's claim is – unless qualified – not supported by the evidence:

(1) His claim that there can be something it is like for subject S to experience X without S being able to know about it does not accord with his adherence to the 'same-order-theory' stating that being phenomenally conscious of X consists in part in S's awareness of having the experience.

(2) Just because subject S is access conscious of X on the basis of an attentional act, S need not have been phenomenally (yet not access) conscious of X earlier.

(3) For Block's conclusion that subjects are phenomenally (yet not access) conscious of each single item to be justified, subjects would have to report not only having a continuing "visual representation of the whole array" (p.17ms), but that with respect to each single item they saw either what letter it is (Sperling) or the shape's orientation (Landman). But the reports are compatible with the considerably weaker interpretation that subjects are phenomenally conscious of a 'generic' content – a 'whole array of characters', say – being unable to name all characters specifically; only a few details of this percept are 'poised' for use in reasoning or flexible action.

This interpretation accords well with the same-order view and the observations (a) that one and the same content can be either conscious or unconscious (blindsight, split brains etc.); (b) that we can be conscious of X without attending to X, e.g. "gist" perception (Koch, Tsuchiya 2006); and (c) that shifting or focusing attention may even make formerly unconscious contents conscious (Carrasco 2004).

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Using an Active Event Related Paradigm to Detect Consciousness in Coma Survivors

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June 20, 17:30-19:30: Poster Session 1

Objectives. Detecting signs of consciousness in severely brain injured patients recovering from coma is often difficult when relying only on behavioral observation. Previous electrophysiological studies exclusively used passive paradigms to assess residual cognitive functioning. However, these paradigms do not necessarily imply conscious processing. In this context, using an active paradigm where the patient has to perform actively a task could be a surrogate marker of consciousness. In this study, we explored a new "active" event related potential (ERP) paradigm as an alternative method for the detection of voluntary brain activity.
Methods. The participants were twenty-two right-handed patients (10 traumatic) diagnosed as being in a vegetative (VS) (n=8) or in a minimally conscious state (MCS) (n=14). They were presented sequences of names containing the patient's own name or other names, in both passive and active conditions. In the active condition, the patients were instructed to count (i) her/his own name or (ii) to count another target name.
Results. Like controls, MCS patients presented a larger P3 response to the patient's own name, in the passive and in the active conditions. Moreover, the P3 to target stimuli was higher in the active than in the passive condition, suggesting voluntary compliance to task instructions like controls. These ERP task related changes were even found in patients presenting few signs of consciousness such as visual fixation or pursuit. In contrast, no P3 differences between passive and active conditions were observed for VS patients.

Conclusion. The present results suggest that “active” ERP paradigms may permit detection of voluntary brain function and, therefore, conscious processing in severely brain damaged patients, and this in cases with very limited external behavioral responses. Further studies should investigate the residual cognitive functions which are preserved in case of minimally conscious state in order to define exactly which cognitive component is needed for conscious processing (e.g., intervention of working memory).

Mapping the Transition from Unconscious to Conscious Knowledge

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June 20, 14:00-16:00: Concurrent Session 1.3

In various implicit learning paradigms, initial unconscious knowledge can precede the emergence of conscious knowledge (e.g. Fu, Fu, & Dienes, in press). Adopting higher order thought theory and exploiting subjective measures of consciousness we examine this transition in an artificial grammar learning (AGL) paradigm. In the standard AGL task participants are initially exposed to strings of letters, which unbeknown to them conform to a complex set of grammar rules. Subsequently participants are informed of the rules and required to distinguish the grammaticality of each of a new set of test strings. Participants reliably distinguish grammaticality while apparently unaware that they are able to do so.

Simple claims that the knowledge is conscious or unconscious ignore the range of experiences and mental states involved in AGL decisions. Thus, we employed a range of subjective reports to tease apart the unconscious and conscious states of knowledge which support those accurate responses. Participants rated the familiarity of each test string, reported their confidence in each grammaticality judgment, and indicated the perceived basis for each decision e.g. random choice, intuition, familiarity, rules, or recollection. Participants classified the test strings twice, enabling us to map the transition between the reported bases for judgments and examine how the relationship between confidence, familiarity, and the decision bases changed over time. Responses revealed both unconscious and conscious knowledge from the outset but with a clear transition between them.

Differences in the subjective familiarity of test strings accounted for almost all the grammaticality knowledge. Familiarity could initially influence responses without awareness, predicting grammaticality judgments that were reportedly selected at random. Over time participants realised that their choices reflected differences in feelings of intuition and subsequently familiarity, but often continued to lack confidence in their judgments indicating the absence of meta-knowledge that these feelings distinguish grammaticality. Meta-knowledge supporting confidence, and hence conscious judgment knowledge, was shown to emerge through a process of calibration, as the

assessed reliability of knowledge relating to the distribution of familiarity increased. We argue that in general higher order thoughts may arise through converting objective probability estimates into subjective probabilities.

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When Fear is in My Voice but not My Brain: Feedback Effects of Emotional Voice Transformation on Self-Rated Emotion Experience

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June 20, 14:00-16:00: Concurrent Session 1.1

One of the most vexing questions in the history of empirical research on consciousness concerns the relationship between the phenomenology of emotional states and peripheral physiological feedback. Psychologists like James, Festinger, Bem, Schachter and Zajonc have shown great ingenuity in disentangling the influences on emotional states from different potential sources. But an Achilles heel of this type of research has always been the difficulty to conceal the true purpose of the often peculiar manipulations that had to be used (like watching cartoons with a perpetual forced smile from a pencil stuck in your mouth, see Strack, Martin & Stepper 1988), and to conclusively rule out all manifestations of suggestion and demand effects on the results. This is particularly true within the field of voice expressivity, where currently no demand-free technique exists to induce emotionality, and measure the phenomenological and physiological effects of voice feedback.
For this purpose, we have adapted techniques from the field of machine voice synthesis to create a platform that can alter the emotional quality of the participants' speech in real-time (e.g. in the direction of sadness, fear, happiness, etc.). In our first study, participants were given the task of reading a story out loud while wearing a headset with a microphone. The voice of each participant was then transformed and fed back in his/her headphones with a specific emotional tone. Afterwards, the participants were asked to rate the emotionality of the story and their own experience during the reading. The results show that while participants often fail to notice the manipulation, it can significantly influence their emotional experience, thus demonstrating a feedback effect on emotion from the qualities of voice expression.
At ASSC12 we intend to report on our ongoing studies of emotional voice feedback transformation, both with respect to the current results, and the wider methodological implications of having an unobtrusive non-transparent

technique to unravel the complex relationship between emotional expressivity and emotion processing in the voice domain.

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Measuring Consciousness

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June 21, 16:30-18:30: Poster Session 2

How can we measure whether a particular sensory, motor, or cognitive event is consciously experienced or remains unconscious? Such measurements provide the essential data on which the current and future science of consciousness depends, yet there is little consensus on how they should be made. Having dependable measures of consciousness is essential both for mapping experimental evidence to theory and for designing perspicuous experiments. Importantly, measuring consciousness requires establishing the absence of unconsciousness and saying something about conscious level and conscious content of consciousness beyond the zero-point of unconsciousness. Advances in measuring consciousness have implications for basic cognitive science and neuroscience, for comparative studies of consciousness, and for clinical applications.

Here, we review current approaches to measuring consciousness, covering both behavioral measures and measures based on neurophysiological data. Among the former we cover discrimination, confidence ratings, introspection, and post-decision wagering. Among the latter we analyze widespread brain activity, synchrony, and various measures of dynamical complexity. We emphasize that measures of consciousness are intrinsically interlinked with theories of consciousness. Only by behaving sensibly in a theoretical context do proposed measures pick themselves up by their bootstraps, validating both themselves as measures of what they say they measure and also validating the theories involved.

Just as theoretical positions conflict with one another, conflicts among measures can be expected and in many cases have been observed. We provide a comprehensive assessment of these cases and also highlight promising experimental avenues for exploring other potential conflicts. Given these conflicts, measuring consciousness is best undertaken by combining in single studies multiple measures, both behavioral and brain-based. Presently,

behavioral and brain-based measures tend to pick up on different aspects of consciousness: Brain-based measures are especially suited for measuring conscious level, whereas behavioral measures are mostly used for assessing which contents are conscious. Therefore, an integrative approach combining in single studies both types of measures encourages a virtuous circularity in which putative measures and theoretical advances mutually inform, validate, and refine one another.

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Does the Brain Implement Some Form of Delay Coordinate Embedding?

Vikas Shah, Banner Good Samaritan Medical Center, United States

June 21, 14:00-16:00: Concurrent Session 2.3

A fundamental question about how the brain works is how it is able to perform a wide variety of tasks with high degrees of accuracy, reproducibility, adaptability, and plasticity. Apart from characterization of how some fairly simple visual processing tasks are implemented, very little is known about how neuronal firing translates into the processing of information. I develop here a hypothesis that neuronal circuitry implements some form of delay coordinate embedding (DCE) to process information. DCE is a relatively recent mathematical advancement that allows prediction of the behavior of chaotic systems. Though there is no hard evidence supporting this hypothesis, there are several reasons to pursue it. First, predictions based on DCE are essentially heuristic in nature, and increasing amounts of previously collected data about the behavior of a chaotic system allows progressively better prediction of the future behavior of the system; such tasks are performed commonly and easily by the brain. Second, DCE based predictions only require that DCE be performed in an appropriately high number of dimensions and may be performed with data from a single state variable. Thus, for relatively simple systems such an approach provides a highly efficient method for developing accurate predictions about the behavior of a system based only on limited information. One possible advantage of neuronal modules performing DCE is that the approach is generic and reproducible; such modules could be copied across several different systems to provide analysis of sound, motion, arithmetic/mathematics, language, proprioception, muscular movement and coordination, possibly even psychological analysis/prediction of the behavior of other actors. Additionally, such a approach would allow (teleologically speaking) neuronal systems to quickly learn "the rules of reality" without positing the need for centrally hardwired rules and the accompanying difficulties in positing a mechanism for genetic specification of the ontogenetic configuration required to implement these rules. Finally, re-entrant processing has recently become a focus of attention as an important mechanism underlying information processing and possibly consciousness itself; it is possible to envision that re-entrant firing could

represent information transfer necessary for DCE analysis as implemented by the brain.

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Is the Mind Equal to the Brain?

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June 21, 16:30-18:30: Poster Session 2

Philosophers who studied consciousness generally may be divided into two groups: one is to claim that the conscious experiences can be totally explained in terms of the processing of neural patterns. The other is to claim that the objective explanations in terms of brain processing fundamentally leave out the subjective experience. The gap between subjective experience and the physiological processing of brain is still there. If the mind is equal to the brain, then studying the brain inevitably get the experience in mental states. But the situation is not like this.

The main stream in brain sciences suggests that the occurrence of our subjective experience such as sensation and cognition is all owing to the variation of our brain state. And it is irreversible. However, is our thought really impossibly to influence our brain state conversely?

In recent years, some of scientists use the method of meditation to cure the obsessive-compulsive disorder. The study finds that the concentrative "will" change the path of this kind of patient's brain state and the will create a new path of neural connection to halt the neural path of obsessive-compulsive behavior. And some of experiments such as Davidson's did some stunning study on meditative practitioners. The study finds the meditator can use his mind to change the brain state or to activate some parts of brain. There are evident data from the fMRI or PET. It is fit to the hard science although we don't want to accept this result.

I thought that the mind can causally influence our brain, although I don't want to give up the principle of causal closure. The quantum physics offer us an all new view to our world. If the subjective cognition is one of the factors to constitute our world reality, we really need to re-think the principle of causal closure and re-think the reality.

In short, the force of mind need the brain to present, and we need mindfully to experience "The mind is not only the brain."

Boredom and the Experience of Time

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June 20, 17:30-19:30: Poster Session 1

In a state of severe boredom, elements of the existential predicament of being human come to the fore, although the unpleasantness of boredom usually prevents an explicit appreciation of them. Sense and meaning drain away, motivation ceases, and the experience of time is altered in a peculiar way: Time literally seems to stand still, and in this it becomes strangely obtrusive.

In a remarkable analysis, Martin Heidegger drew a number of important conclusions from a consideration of boredom. His main claim is that boredom is a specific form of experiencing time that points to the basic structure and constitution of the temporal nature of human existence. Ultimately, boredom as the experience of an all-encompassing emptiness and meaningless, which manifests itself in a strange slowing or even stopping of the experience of time, is said to reveal the fact that human beings are the free and responsible creators of any kind of sense and meaning in their lives. While philosophers interpreting Heidegger have so far been mostly concerned with these existentialist conclusions and their consequences, some other insights can be gleaned from his analysis that are much more important to current research on conscious experience. First, Heidegger describes the very nature of moods or background feelings in a way that can help correct current thinking on the nature of emotions and feelings. According to Heidegger, moods are not subjective states of feeling, but rather existential orientations which affect the entire being of a person, i.e. her behaviour, demeanour, and the stance and posture a person adopts towards the world. The most important insight to be "hidden" in experiences of boredom, however, concerns the peculiar alteration of the temporal structure of conscious experience. In my talk I will focus on this seldomly considered fact and show in how far subjectively experienced time is the key to understanding conscious experience in general. In a peculiar way, subjective time is created in experience, and this process, in turn, depends crucially on action and action's being framed in sets of future-oriented intentions. My analysis of boredom's relation to time experience lends support to enactivist approaches to consciousness and to the "action in cognition" paradigm.

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The Division of Labor for Internal-External Information Processing-An Extended Theory of Global Workspace

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June 20, 17:30-19:30: Poster Session 1

Global Workspace Theory and Global Neuronal Workspace Hypothesis are two theories about the mechanism of consciousness. The former, proposed by Bernard J. Baars, constructed a structure named "Global workspace". It actualized the function of integrating and coordinating of specialized networks which otherwise operated autonomously. The latter, raised by Stanislas Dehaene, advanced a neuronal model of the global workspace and made a successful computer simulation. Both of them were supported by many experimental results.

The Default Mode Network Hypothesis was proposed based on the findings that a relatively steady brain network decrease it's activity in attention and working memory tasks comparing with that in resting state, and that the spontaneous activities in these areas are highly correlated. These findings indicated that an organized brain network is active when the information from environment is not processed consciously. As evidence, the experiences of mind wandering also remind us that our brain is never at rest even during resting state.

Although there are internal elements such as inner speech or visual imagery in Global Workspace Theory, Baars and Dehaene haven't distinguished the internal and external information. Considering the phenomenon that we drop into daydreaming, mind wandering or popping out of other mental events constantly, and that there exists an relatively steady brain network which is active in resting state whereas prohibitive in external tasks, we here combine Global (Neuronal) Workspace Theory and Default Mode Network Hypothesis, and put forward an Extended Theory of Global Workspace about consciousness. We suggest that the brain processes information from external environment and internal representations in an organized way. We propose that, 1) The attention resource can be devoted into processing internal as well as external ; 2) The processing of external and internal information are two states of an unified system of consciousness, and the ongoing internal processing such as mind wandering has its adaptive meaning; 3) The brain is

a self-organized system that guarantee the division of labor between external and internal information processing; 4) The Default Mode Network can be integrated into the Global Workspace, and so the Global workspace is extended.

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Unconscious Formation of Free Intentions: Functional Dissociation of Different Regions in Prefrontal Cortex

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June 21, 14:00-16:00: Concurrent Session 2.1

Rather than just passive reactions to external stimulation, much of human behavior is self-initiated, often involving free choice between alternative possibilities. However, the functional neuroanatomy underlying the formation of intentions for self-initiated behavior is still poorly understood. Here, we present two studies showing that different prefrontal regions contain predictive information about the content and timing of such an intention long before it reaches awareness.

Experiment 1

In a novel variant of Libet's clock task (Libet et al., 1983), subjects freely chose to make a button press with either left or right index finger immediately when they felt the spontaneous "urge" to do so. Concurrently, they monitored a letter stream, noting the letter presented when the choice first became conscious. Previously, we showed that this choice was already encoded in the spatial pattern of activation in frontopolar cortex up to ten seconds before the decision reached awareness. In a new decoding analysis, we show that preSMA and SMA contained early predictive information about when the conscious decision will be formed, but not what the decision outcome will be. In contrast, the timing of the decision could not be predicted from frontopolar cortex.

Experiment 2

To verify whether the findings in Experiment 1 related to covert intentions per se, or unconscious preparation of motor output, a second experiment was conducted involving abstract intentions rather than motor intentions. Subjects monitored a letter stream, and remembered the letter presented when they first felt the spontaneous urge to perform either addition or subtraction. A number stream was presented concurrently above the letter stream, and the chosen arithmetic operation was performed on the two subsequent numbers presented after the conscious decision was made.

Preliminary findings similarly suggest a double dissociation: early cortical

activity patterns in frontopolar cortex encoded decision content, addition or subtraction, while preSMA encoded the decision timing, but not vice versa. This suggests that our earlier findings related to covert intentions rather than motor preparation.

Taken together, our results reveal a functional dichotomy between different prefrontal regions in the pre-conscious formation of intentions for self-initiated behavior.

The Colavita Effect: An Example of Crossmodal Extinction in Normal Participants?

Charles Spence, University of Oxford, United Kingdom

June 20, 10:30-12:30: Symposium 1

Colavita (1974) first reported that presenting a light at the same time as a clearly suprathreshold auditory target resulted in many people simply failing to respond to (or be aware of) the sound (a sound that participants were always aware of when presented in isolation). I will describe a number of recent studies on this little-studied, but fascinating, crossmodal phenomenon. I will highlight the spatiotemporal constraints on the Colavita effect and its sensitivity to manipulations of attention/perceptual load. I will also describe the latest research demonstrating that the presentation of a visual stimulus leads to a significant decrease in people's sensitivity to a simultaneously-presented auditory or tactile stimulus. These results, which contrast with the commonly-held view that multisensory integration always leads to perceptual/performance enhancement, have led us to argue that the Colavita effect can be thought of as a form of crossmodal extinction (experienced by stroke patients) in normal participants.

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Subjective Experiences during Sleep Onset

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Hui-Ya Han, National Cheng-Chi University, Taiwan
Chien-Ming Yang, National Cheng-Chi University, Taiwan

June 20, 17:30-19:30: Poster Session 1

A. Introduction: Sleep onset process is characterized by progressive changes of consciousness state, as shown by various physiological and psychological indices. However, previous studies focused more on objective measures of physiological changes. The current study aimed to investigate the consciousness changes during sleep onset, by waking subjects up at different points of sleep onset period and assessing their subjective experiences.
B. Method: Twenty students, averaged 24.5 years old, participated in the study. They were asked to take a nap in the sleep laboratory during daytime. They were waked up, according to polysomnography, at four different points of sleep onset process: the emerge of a slow eye movement (SEM), entering stage 1 sleep (S1), after the emerge of a sleep spindle or a K-complex (S2), entering stage 2 for 5 minutes (S2+5m). They were then asked to answered questions of a semi-structured questionnaire immediately upon awakening. The questionnaire consists of items regarding thinking processes and perception of external stimuli. Items on thinking processes included control over thinking processes (THCO), continuity of thoughts (THCONT), logic of thoughts (THLOG); items regarding external experiences included perception of external stimuli (EXST), feeling of control over perceptual experiences (EXCO), feeling of reality over perceptual experiences (EXRE), orientation (EXORI), and extend of participation in the perceptual experiences (EXPA).
C. Result: EXST decreased significantly from SEM to S1, and from S1 to S2+5m. EXCO showed no significant changes between consecutive points of awakening, but with significant differences between SEM and S2, and between S1 and S2+5m. EXRE showed significant reduction from S1 to S2; EXPA demonstrated no significant differences between consecutive awakenings, but reduced significantly from SEM to S2 and S1 to S2+5m. In EXORI, there were two significant reductions, from S1 to S2, and from S2 to S2+5m. There were significant differences among all the awakenings in

THCO, from SEM to S1, from S1 to S2, and from S2 to S2+5m. THCONT showed significant changes from S1 to S2 only. THLOG reduced significantly from SEM to S1, and from S1 to S2+5m.

D.Conclusion: In summary, the results indicated that the transition of consciousness experience during sleep onset process does not change as a whole, like turning a switch. Rather, the perception of external stimuli, control over thinking processes, as well as logic of thoughts decrease first, after falling into stage 1 sleep. The thinking processes then become fragmented subsequently, after getting into stage 2 sleep. Finally, the consciousness enters into sound sleep.

There is No One-Way but Complex Dynamic Feedback Relation between Perception and Action: Two-Level Interdependence View

Yu-Shin Su, National Chung Cheng University, Taiwan

June 21, 16:30-18:30: Poster Session 2

In her ingenious book, Hurley (1998) proposes a ninety-degree shift from traditional Input-Output Picture of perception and action. The Input-Output Picture conflates the vehicle/content distinction. It confuses the personal-level distinction between perception and action with the subpersonal-level distinction between causal input and causal output. We should not suppose that the subpersonal-level properties or relations of vehicles must be projected into the personal-level contents they carry, or vice versa. They need not be isomorphic. The ninety-degree shift offers a new angle for thinking about perception and action, helps us to focus on relations between input and output rather than on relations between internal and external states. Two-Level Interdependence View sees perception and action is interdependent. The Interdependence of perception and action can be explained in terms of their codependence on a subpersonal complex dynamic feedback system of relationships between inputs and outputs. Some feedback loops might go external. They may loop dynamically through internal sensory processes and motor processes as well as through the environment. The environment is part of the complex dynamic feedback system. Complex dynamic feedback systems knit nervous systems causally into their environment.

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What the Gist?

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June 20, 17:30-19:30: Poster Session 1

Perceptual gist is the first conscious perceptual phenomenon that takes place in any given perceptual experience. Within 100 milliseconds of being exposed to a visual display, for example, a normally functioning human being can recognize a scene's structure, its category or type, and certain eye-catching details. After this gist perception, the subject can use top-down attentional mechanisms to search within the scene for further details. Some neuroscientists, psychologists, and philosophers claim that gist perception serves as evidence that conscious perception can occur without attention. If this were true, gist perception would fuel the conjecture that vegetative patients have phenomenal, if not access, consciousness, as maintained by Ned Block.

However, there are several scientific reasons to reject the claim that gist perception evinces conscious perception without attention. For one, as Aude Oliva points out in her experiments on gist, the subject "chooses" between low and high frequency versions of an image depending on the visual task. Additionally, Geoffrey Loftus and David Irwin show that subjects perform better in their fast rate visual tasks when they look at the scene in one of two possible ways. Finally, what is seen in gist perception varies significantly from high to low-level visual features, which suggests that the subject is using attention to focus on different features in varying situations.

Furthermore, there are philosophical reasons to consider gist as part of, rather than different from, normal visual perception. Namely, as with George Sperling's experiments on iconic memory, we have no reason to assume that attention is absent so we should not assert it. Thus, for reasons of coherence and simplicity, as well as the evidence from the above experiments, gist perception is best understood as the first stage of normal visual perception, likewise benefiting from top-down attention.

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Delay in Action Affected by Spatial Relationship in Goal Directed Imitation

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June 21, 16:30-18:30: Poster Session 2

Humans are able to imitate many complex skills. Imitation based on visual information is a special case of the translation of sensory information into action. Considering other's mental state by means of taking other's perspective plays an important part in social communication. In earlier findings, understanding other's mind through imitation has been suggested to be realized in the course of comparison between the representations of the self and others, involving a transformation of the egocentric perspective to the allocentric one (Rogers and Pennington 1991). In the process of transformation between the representation of the self and others, one possible scenario is that the imitator estimates the demonstrator's action through a mental rotation process. Alternatively, the imitator can perceive and imitate others in a mirror translation process. Prior research on a goal directed imitation shows that although young children imitate the demonstrator's action in the mirror translation process, older children and adult gradually learn to follow the mental rotation process (Bekkering et al 2000).
Here we report that a certain number of adult subjects show various strategies using both the mirror translation and the mental rotation processes as the situation demands. In many daily tasks (e.g. putting sugar into a cup with a spoon), handedness is important and is observed to produce a certain type of asymmetry in the delay of action and frequency of errors. On the other hand, the subjects exhibit differential modes of action in a "symmetric imitation", where there is less influence of handedness in imitating actions such as tapping or pushing a button. Based on the results, we discuss the significance of perspective taking and the sense of bodily ownership in the fundamental aspects of conscious experience supported by the mirror system.

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The Effect of Generation on Output Monitoring and the Sense of Agency in Speech

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June 20, 17:30-19:30: Poster Session 1

The sense of agency is the feeling that "I am the one who causes an action". It may be related to action output monitoring. We examined output monitoring using the effects of word generation. In the self-generated condition, we asked participants to generate a word from an anagram; in the other-offered condition, the experimenter presented words to participants who then read aloud, lip-synched, or imagined reading them. We investigated whether generation effects occur for output recognition by asking whether each word had been read aloud, lip-synched, or reading had been imagined. We also investigated whether the integration of the information by the participant is "richer" under the self-generated condition than under the other-offered condition by asking whether each word had been read aloud or not. The rates of both correct responses to "read aloud" for read words and misattribution to "read aloud" for words that were not read were higher in the self-generated condition than in the other-offered condition. The encoding of motor information did not differ between the conditions, and the integration of the information of a word and the act of the participant generating that word caused the participant to regard the word as having been read aloud.

Complexity of Non-Conscious Processes in Decision-Making

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June 21, 16:30-18:30: Poster Session 2

The presented studies were aimed at determining whether complex processes typically associated with overt thinking can occur without conscious awareness. In Study 1 participants were presented with 4-word sets in which 3 words converged in a commonly associated concept. Participants task was to find a common associate (a solution) to those words and indicate the word in a set that was not associated with a solution. This was done either under working memory load or with no distraction. The data showed above-baseline accuracy in excluding the odd-word even if the solution was not reported by participants. No working memory load influence was found. This indicated some degree of cognitive control over the use of implicit knowledge. In Studies 2 and 3 adopted a modified version of implicit learning task in which after learning rule-based stimuli participants are asked to discriminate between rule-based and random test items (Study 2 - visual domain, Study 3 - auditory domain). Participants accurately performed discrimination task not only when it required application of abstract rules governing the learning stimuli but also when a) the rules were transferred to new set of stimuli, and b) test items conformed to the rules extending from original ones. Above findings are discussed relative to the complexity of non-conscious processes involved in decision making and choice.

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Can People Estimate the Memory Accuracy from the Self-Rated Confidence?: Confidence-Accuracy Relations in an Eyewitness Memory and a General Memory Test

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June 20, 17:30-19:30: Poster Session 1

Can we monitor our memory skills? Can we estimate the accuracy of our memory from the confidence judgment? Many psychologists have been researching on this topic, and they concluded that in general we can predict the accuracy of memory from the self rated confidence. Now, the main topic in the confidence-accuracy relation (C-A relation) researches is to justify whether we trust the self rated confidence for recollection to predict accuracy of eyewitness memory. In this research, we will give further empirical data to discuss the confidence-accuracy relations in free recall tests on general knowledge (GM) and eyewitness memory (EM). We conducted an experiment where participants answered to the free recall questions in an EM and a GK tests giving confidence ratings for each answer. And we examined the relationship between the test performance (accuracy) and confidence judgment in these tests. Within-subject analysis revealed that the significant C-A relations for both of the EM and GK tests indicating that more confident answer tended to be more correct. While, between-subject analysis showed the significant C-A relation in the EM test but not in the GK test indicating that participants with higher confidence tended to answer more correctly in the EM test. Our results suggest that confidence judgment might be useful to predict the accuracy of memory in general memory and eyewitness testimony, and also that people can monitor their memory skills, under some conditions.

Emotional Contagion in Communication

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June 21, 16:30-18:30: Poster Session 2

Understanding the emotional states of people is important for communication in various social situations, where one's mood is often affected by those of others. Emotional contagion is a complex process involving conscious perceptions as well as the automatic, unintentional mechanism largely inaccessible to awareness (Hatfield et al.,1994). For example, presenting photographs of emotionally expressive faces alters the subject's conscious emotional states, influencing the unconscious cognitive processes reflected in one's bodily states such as the facial EMG (Dimberg 1997). A similar effect can be observed when emotionally expressive vocal short words are presented.

Cognitive processes which are emotion independent on the surface are also affected by one's emotional states. One way to manipulate the emotional states is to configure the bodily state physically. Embodiments of emotion, when induced in subjects by the manipulation of facial expression, is known to influence their cognitive abilities.

Here we investigate the cognitive implications of emotional contagion. The subjects were exposed to visual and auditory stimuli which would facilitate emotional contagion. During the exposure, the subjects were required to conduct a series of cognitive tasks. The performance for the tasks as well as the bodily reactions were measured for analysis. In addition, the subjects were put under various constraints on the body posture, including the facial expression.

Based on the results, we investigate the nature of emotional contagion as it expands to cognitive and phenomenological domains though the embodiment and interaction with the environment. We discuss the relative contributions of unconscious and conscious cognitions in our communication, with a particular emphasis on the mirror system. Finally, we raise some salient points towards understanding consciousness in the interactive domain.

Implicit Auditory Modulation on Visual Transition of a Bistable Motion Stimulus

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June 21, 16:30-18:30: Poster Session 2

While accumulative evidence has shown that visual perception (e.g., position estimation) is modulated by explicit auditory information, it is much less known whether implicit auditory information influences visual perception. We investigated how explicit and implicit auditory information would affect the transition between visual appearances of a bistable motion stimulus.
The participants' task was to report the direction of visual motion in three sessions; pre-adaptation, adaptation, and post-adaptation sessions. In the pre-adaptation and post-adaptation sessions, a bistable visual motion stimulus, wherein the direction of motion could be perceived as vertical or horizontal, was presented (Leopold et al., 2002, Nat Neurosci, Fig.1b). During the presentation of visual stimuli, two task-irrelevant auditory stimuli was alternatively presented with durations randomly determined from 4-12 sec. In the adaptation session, unambiguous vertical and horizontal visual motions were alternatively presented in synchronization with the changes of the auditory stimuli. The changes of auditory stimuli were easily detectable in Experiment 1 and not detectable in Experiment 2.
We found two distinctive auditory effects on the visual transition of the bistable motion stimulus. First, when the auditory changes were easily detectable (Experiment 1), the visual transition tended to occur immediately after the auditory changes, as if the explicit auditory changes disrupted the stability of visual perception (disruption effect). The disruption effect did not differ between pre- and post- adaptation sessions. Second, the mean intervals from the auditory changes to the visual transitions became shorter in the post-adaptation session than the pre-adaptation session (association effect). Detailed analyses of temporal dynamics indicated that after the adaptation of synchronized audiovisual changes, the visual transition tended to be inhibited for 2-6 sec. after each auditory change. Interestingly, unlike the disruption effect, the association effect did not depend on whether the auditory changes was explicit (Experiment 1) or implicit (Experiment 2).
These results suggest that auditory information influence the transition of

ambiguous visual perception at both explicit and implicit levels; explicit auditory information disrupts the stability of visual perception and implicit auditory information (or auditory-visual association) changes the temporal dynamics of visual transition.

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Perceptual Ambiguity Does Not Increase Perceptual Latency of Bistable Visual Stimuli

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June 20, 17:30-19:30: Poster Session 1

Previous study suggests that response latency, a useful measure to infer the time course of visual awareness, is shorter for unambiguous perceptual decisions than for ambiguous decisions (Ratcliff & Rouder, 1998; Shadlen & Newsome, 1996). For instance, in detection of a signal, a reduction of signal strength makes detection response more ambiguous and response latency longer, as predicted from integrator (diffusion) models that assume that a perceptual decision is reached when temporal integration of sensory evidence exceeds a threshold (for reviews, see Bogacz et al., 2006). However, it is not known whether perceptual decision is generally delayed for ambiguous perceptual decisions, because previous study has not tested multistable stimuli that allow more than one perceptual interpretations, but each interpretation is clear and compelling when it is dominant. We therefore examined the relationship between perceptual ambiguity and reaction time using a bistable apparent motion display. Four Gaussian blobs located at the corners of a virtual square were rotated around the centre in two-frame apparent motion. The rotation angle was variable between 0 and 90 deg. Subjects had to report the perceived direction of rotation as quick as possible by pressing one of two buttons. Data analysis excluded trials in which subjects indicated response errors. Preferred perceived rotation was the smaller angle direction, being most ambiguous (50%) at around 0 (90) deg and 45 deg. In the former case where response ambiguity is caused by motion signal weakness, response latency was elongated as expected from previous reports. On the other hand, in the latter case where response ambiguity is caused by perceptual bistability, response latency was as fast as that for rotations with unambiguous angles, indicating that perceptual ambiguity does not delay perceptual decision. We obtained a similar result for another bistable stimulus, Rubin's vase.

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Coding of Cognitive Control Demand in the Medial Prefrontal Neurons

Keiji Tanaka, RIKEN Brain Science Institute, Japan

June 20, 10:30-12:30: Symposium 1

Resources for top-down attention are limited and therefore allocated to cognitive processes according to demand. While the anterior cingulate cortex is thought to represent such demand for attention allocation, it is unclear what determines the demand represented there. Here we report that neurons in the anterior cingulate cortex showed prominent activities between action completion and visual feedback in an action-learning task. The activities had properties of top-down attention control signals. Their magnitude correlated with the expected size of prediction errors of action values along the action learning in each block. These findings suggest that in the context of action learning the anterior cingulate cortex represents the expected size of prediction errors to indicate how much attention to pay to the action outcome.

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Antinomy of Identity- The Self and Self-Consciousness

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June 20, 17:30-19:30: Poster Session 1

Personal identity, the self, has long been a topic for discussion in both rational and empirical philosophies. Arguments from both positions inevitably find themselves discussing the nature and possibility of consciousness. Upon scrutiny, classical arguments for personal identity and self-consciousness, the rationalist and empiricist, are predicated upon fundamental assumptions that, when exposed, undermine the arguments themselves. Following the antinomic structure, in my paper I first demonstrate the possibility and inevitable reductio of both arguments. The thesis, the rationalist/transcendental theory of identity/self posits an absolute, unified, formal consciousness in order to assert identity, but inevitably relies upon an empirical assumption—that of a series of changing, particular data which is collated by the formal unified self. The antithesis, the empiricist account, argues for no identity of self, citing contingency both at the material level and at the level of consciousness, yet ultimately depends upon a transcendental position from which to make such a claim. By demonstrating that both thesis and antithesis are prima facie plausible and also dependant upon a reductio ad absurdum argument, the antinomy provides a context for further critical understanding and highlights the classical dispute, with a solution to the antinomy in view.

Following the dynamic-antinomic structure, I argue for the truth of both thesis and antithesis, but in modified format. It is only by placing the perceiving "self" in context, an existential context, that both the particularity of experience and the sense of unified self necessary to recognize contingency can obtain. Following Maurice Merleau-Ponty and his critique of both rationalist and empiricist traditions, I argue for an existential understanding of consciousness that can provide a plausible sense of self and identity, one that is indeed a self, and yet celebrates the particularity of individuals.

Unconscious Priming Effect of Word and Object on Object Recognition: an ERP Study

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Li-Chuan Hsu, China Medical University, Taiwan
Chia-Yao Lin, China Medical University, Taiwan

June 21, 16:30-18:30: Poster Session 2

This study focuses on the unconscious priming effect of word and object on the object recognition. We investigate the unconscious priming by combining the masked repetition priming technique with the recording of event-related potentials (ERPs). ERPs were recorded to repeated target(R) and unrelated target(UR) pictures of common objects that were immediately preceded by briefly presented pattern- masked prime word or prime object while participants conducted a semantic categorization task. In the UR condition, compared to the R condition, the unconscious prime object elicited an N150 effect that was suggested to reflect early visual processing, while the unconscious prime word elicited a widely distributed negativity (N400) that was argued to reflect more general semantic processing. It is suggested that unconscious words were processed to the semantic level but the unconscious objects can only be processed to early visual level. The results differentiate the unconscious priming effects between word and object to different levels of processing. Whether or not, the results were limited to the unconscious repetition priming paradigm will be discussed.

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Influence of Subliminal Stimuli on Implicit Learning of a Supraliminal Sequence

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June 21, 16:30-18:30: Poster Session 2

This research brings together two important fields in consciousness research: implicit learning and processing of subliminal stimuli.
In a typical implicit learning paradigm - the serial reaction time task - subjects are presented with a sequentially structured series of stimuli and are required, on each trial, to press the key corresponding to one of four possible stimuli. Reaction times decrease progressively during learning, and increase when the pattern of the stimuli changes. Performance in this task has been taken to indicate the existence of dissociations between ability to learn about the sequential contingencies between successive stimuli and awareness of these same contingencies. Typical results, however, systematically indicate some awareness of the relationships between successive stimuli. To address this issue so as to provide a more convincing demonstration of unconscious learning, we explored whether it is possible to learn about sequential contingencies between subliminally presented stimuli. Positive results would indicate (1) that implicit learning can concern not only relationships between visible stimuli, but also between invisible stimuli, and (2) that subliminal material can be processed to the point where second-order sequential contingencies between them can be learned.
Exploratory experiments aimed at influencing implicit learning of a supraliminal sequence through presentation of backward- and forward-masked subliminal primes before the onset of each visible stimulus. Different experiments explored different relationships between primes and visible stimuli (e.g., repetition priming, second-order contingencies between visible and invisible stimuli). While the supraliminal sequence remains the same throughout the experiment, the subliminal sequence of primes changes in a transfer block. Results show substantial decreases in performance when the subliminal sequence is changed, which suggests that the primes were indeed processed and modulated learning of the supraliminal sequence.

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A New Paradigm from the Bedside for Patients in a Vegetative State: Neuroethics ''Toward'' Consciousness

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June 20, 17:30-19:30: Poster Session 1

Persistent vegetative state (PVS) raises various ethical issues in clinical services due to the difficulty in diagnosis and the inability to communicate with patients. Recently, Owen et al. (2006) proposed an experimental paradigm to detect patients' awareness, and, surprisingly, their results indicated that some of the patients diagnosed as PVS could have awareness. Their experimental paradigm, however, does not determine whether the patient actually has awareness in the strict sense. Here we raise two issues in their paradigm that are likely to occur in clinical practice. We then suggest a new paradigm that can overcome those issues. The first issue concerns the temporal aspect of brain activity. When "sustained" task-specific brain activity is observed through fMRI images, the experimenter must distinguish between "sustained" and "transient" activity. Any ambiguous images—not infrequent in medical practice—make such distinction difficult. The second issue concerns the spatial aspect. The paradigm where a patient's brain images are compared with the controls could prohibit the detection of patient-specific brain activities, thus leading to the possibility of chained-false-negatives. To resolve these issues, we propose a new experimental paradigm involving working memory. In this paradigm, the patients are asked to perform three imagery tasks: First, the patients are required to perform an imagery task, followed by a second imagery task. Subsequently, the third task requires the patients to recall the contents of the first task by using their working memory. This experimental design is simple, in that it requires neither the precise location of acquired brain activity nor the precise evaluation of the strength of the BOLD signals. It thus avoids both the temporal and spatial shortcomings aforementioned. Furthermore, using this paradigm could increase the validity of brain-computer interface (BCI), which involves decision-making that requires the working memory. Finally, our paradigm has a clinical advantage, in that it provides more definitive criteria to evaluate patients' awareness by requiring sufficient conditions for consciousness. To conclude, our perspective is considered to be a new methodology to evaluate scientific and ethical problems regarding PVS, which has been difficult

because of the ambiguity in the very definition of consciousness.

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Endogenous and Exogenous Attention Effect on Visual Afterimage

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June 20, 17:30-19:30: Poster Session 1

Afterimage used to be considered a low-level visual phenomenon caused by the bleaching of photochemical pigments; yet, to full account the subjective experience associated with afterimages including attentional modulation, higher level processing beyond photoreceptor is critical. In this study, we investigate whether endogenous and exogenous attention exerts the same mechanisms on visual afterimage.
Methods. (1) Endogenous attention. We used a dot-integration paradigm similar to Suzuki and Grabowecky (2003) which contained 6 randomly positioned color disks among a circular array of 12 possible positions as afterimage inducers with an inner ring in the center. The disks and rings changed colors at 4 Hz (4 times per second) and 2 Hz (twice per second) respectively and lasted for 10 seconds in each trial. Subjects were to detect when the inner ring turned green (attend-to-inner ring condition/ignore the outer disks) or when the outer disks turned the same color (attend-to-outer disks condition). Immediately after the adaptation, subjects performed a dot-integration task in which an opening within the array of 12 positions could be successfully detected only when complete afterimages were visible. (2) Exogenous attention. With identical task, we manipulated exogenous attention by synchronizing auditory beeps with the color disks (directly relevant to the opening detection test), or with the inner ring (irrelevant to the opening detection test).
Results. (1) Endogenous attention. Observers' afterimages were weaker when they attended to the disks on the outer array than when they attended to the central ring during the 10-second adaptation phase. This is consistent with what was observed by Suzuki and Grabowecky (2003) that endogenous attention weakened visual afterimages, with a smaller effect size (33%) in our setting. (2) Exogenous attention. Our results showed that auditory beeps when in synchrony with the color disks enhanced afterimages, opposite to what was discovered in endogenous attention. The size that exogenous attention exerted on afterimage was equivalent to that induced by endogenous attention condition. Our results suggested that exogenous

and endogenous attention might modulate visual afterimages from different neural substrates and supported that afterimage was not a strictly low-level visual phenomenon.

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Novel Paradigms for Studying Subjective Experience in Motion and Object Perception

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June 21, 14:00-16:00: Concurrent Session 2.2

To investigate the connection between perceptual experiences and consciousness, researchers have successfully created scenarios in which observers are not aware of existing physical stimuli by reducing the physical strength of stimuli below their detection threshold (sub-threshold stimuli) or by presenting a different stimulus occupying the same spatial location (binocular rivalry or flash suppression) from the other eye. Here we introduce two novel paradigms, one which presents identical motion images well above threshold level to both eyes, yet observers fail to construct a reliable motion perception and therefore the physically moving object seems to be standing still, another in which a motion is experienced but all the visible objects appear to be standing still.

(1) The novel phenomenon of motion standstill occurs when an object exceeds the limits of the motion systems but remains within the capacity of shape extraction systems. It illustrates that consciousness of shape and consciousness of motion are separable. The shape computation can extract a stable shape from a moving stimulus, but it cannot convey the sense of motion, which arises only from the output of motion systems. (2) In a complementary paradigm, pedestalled motion, a moving sinewave grating is superimposed on a stationary grating of larger amplitude (the pedestal). At low temporal frequencies of the moving sine wave, the pedestal grating seems to wobble back and forth. At high temporal frequencies, the wobble disappears, and only a stationary grating is perceived with an objectless "wind" that seems to move in the direction of the physically moving grating. This shows that the sensation of motion can occur without being attached to an object, the only visible object appears to be stationary. These demonstrations illustrate that consciousness is composed of elements that are joined in normal perception but which can be separated experimentally.

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A Neural Correlate of Object Visibility Modulated by Top-Down Attention: An fMRI Study

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Naoyuki Osaka, Kyoto University, Japan

June 21, 16:30-18:30: Poster Session 2

Visual backward masking leads to the reduced visibility of a target stimulus due to a subsequent masking stimulus. Recent studies report that instructions prior to the presentation of visual stimuli modulate the masking effect; When participants are instructed to attend the target, the masking effect is reduced, whereas, when they are instructed to attend the mask, the masking effect was enhanced. Thus, top-down attention modulates the visibility of physically identical objects under the condition of visual backward masking. However, it remains to be investigated how the change of visibility induced by top-down attention relates to brain activities. To investigate this issue, we measured brain activity with fMRI while participants performed a visual backward masking task. The participants reported the level of visibility of a briefly presented target object (e.g. vehicle) in a 6-point scale (1, invisible to 6, clearly visible). The target stimulus was followed by a number of meaningless mask objects. Before each visual presentation, we instructed the participants to pay attention to the target, the masks, or neither. Our interest was to examine how the masking effect and BOLD signals would change depending on the instructions given. We replicated the previous behavioral studies; Attention to the target enhanced the target visibility whereas attention to the mask reduced it. The fMRI measurements showed that the subjective ratings of target visibility positively correlated with the BOLD signal intensity in the bilateral fusiform gyrus and the right intraparietal sulcus. Since the stimulus presentation conditions were identical, the modulation of brain activity may be attributed to top-down attention caused by instructions. These results suggest that the neural activity in the parieto-occipital cortex represents the visibility of a task-relevant object modulated by top-down attention.

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Decoding Monkey's Conscious Experience During Ambiguous and Unambiguous Motion Percept Reveals Initial Non-conscious Spike Activity and Later Neuronal Correlates of Consciousness in Area MT

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June 21, 14:00-16:00: Concurrent Session 2.2

The class of ambiguous stimuli is a powerful tool to study the neuronal correlates of consciousness; under the constant physical stimulation, the conscious experience of the stimulus spontaneously flips back and forth over time. Previous electrophysiological studies with concurrent behavioral measurements during ambiguous percepts concentrated on the trial-by-trial relationship between the activity of isolated single neurons and monkeys' reports. In these studies, either the stimulus or the recorded neuron was carefully selected so that the two alternative conscious experiences maximally differentiate the spike counts of the recorded neurons. Focusing on single neurons ignores a potentially information-rich signal: the temporal correlation in the spikes of neighboring neurons. We were interested to learn how and when the firing of many neurons began to reflect the conscious perception of an ambiguous stimulus over time. Specifically, we wanted to learn the extent to which we could track the development over time of a neural correlate of consciousness. To address this issue, we trained two monkeys to report their percepts while they were seeing an ambiguous structure-from-motion stimulus. We recorded neuronal activity from the motion sensitive area MT, with 8-10 microelectrodes. We used a decoding approach to quantify how monkeys' reports are correlated with the activity of the simultaneously recorded multiple neurons over time. The time resolved decoding performance was compared between ambiguous and unambiguous conditions. The ambiguity was manipulated via binocular disparity. The decoding performance attained with many neurons in both conditions was very accurate, although a significant difference emerged between the ambiguous and unambiguous conditions over time. For the unambiguous condition the decoding performance was very accurate from shortly after the stimulus onset and remained high throughout the stimulus presentation. In a

stark contrast, the decoding performance for the ambiguous condition built up gradually (almost linearly) over time, and reached at the peak at around.4-.8 sec after the stimulus onset. Our results show that the initial neuronal activity evoked by the onset of a stimulus reflects the physical properties of the input and thus is less correlated with conscious percept, while the later activity is increasingly reflective of the conscious percept of the animal.

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First-Person Utterances of Facial Expressions Are Typically Avowals

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June 20, 17:30-19:30: Poster Session 1

This paper contributes to the philosophy of human facial expression by characterizing reports of facial expressions in the first-person present tense singular as avowals. We claim that they are not 'read-outs' of private mental objects experienced in the mind as previously claimed (Ekman 1994, 1997; Izard 1991), but exclamations or interjections analogous to the function of non-verbal manifestations (Wierzbicka, 1999, 2000). Avowals of facial expressions are expressive in the way in which a smile or frown manifests emotion or an attitude, and are partial substitutes for them (Wittgenstein, 1958). Further, we claim that there is a logical asymmetry between avowals of smiles ('I feel something good now'), and descriptions of smiles ('She feels something good now'). In contrast to descriptions, avowals of facial expressions do not allow of confirmation or misidentification of their subject: since I cannot verify or 'perceive' my experience, neither can I confirm nor doubt the truth of 'I feel something good now', nor indeed fail to mistake myself, or myself for you. At the same time, utterances like 'I feel something bad now' can be used descriptively to make a report or to give an explanation, are also grammatically articulate, and can be true or false. Avowals may be termed descriptive, but they lack conceptual connections that distinguish ordinary descriptions. For example, the truth of avowals of facial expressions is guaranteed by truthfulness, and they are only subject to insincerity, not ignorance or error (Wittgenstein, 1958, 1980). Therefore, it is incorrect to conceive that we 'read-off' descriptions of facial expressions from mental facts.

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Neural Correlates of the Two Dimensions of Awareness: Awareness of Environment and Awareness of Self

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June 20, 17:30-19:30: Poster Session 1

Introduction. Wakefulness and awareness are the two main components of consciousness. Wakefulness is thought to be related to brainstem and thalamic areas and awareness to a global fronto-parietal network. We tested the hypothesis that within this fronto-parietal network, some areas are involved in the awareness of environment and others in awareness of self. We here explored the brain activity during the conscious resting state associated with awareness of the environment versus of self, using fMRI.
Methods. We used a blocked fMRI paradigm in 23 volunteers. We assessed the brain activity linked to thoughts related to the environment, defined as perception of stimuli through sensory modalities which are experienced as part of the external world; and thoughts related to self defined as mental processes that were not related to external stimuli. Subjects were asked to be immobile, to keep their eyes closed and to avoid structured thinking (e.g., counting, singing, etc). Subjects were presented with a beep on average every 20 seconds (range 3 to 30 seconds). They were asked to evaluate by button press whether they were thinking about the environment or themselves during the period preceding the beep. Subjects rated their thoughts on a scale: clearly external, rather external, rather internal and clearly internal. Results of random effects group analyses were thresholded at small-volume corrected $p<.05$.
Results. We observed a significant activation of lateral fronto-parietal cortices when subjects had thoughts related to environmental stimuli, including intra parietal sulcus and middle frontal gyrus. When subjects had thoughts related to self, there was a significant activation of precuneus/posterior cingulate and

anterior cingulate/mesiofrontal cortices.
Discussion and conclusion. Our data shed light on the neural correlates of awareness' two dimensions in the conscious resting state: awareness of environment - linking to activity in dorsolateral prefrontal and posterior parietal cortices (in line with e.g. Boly et al 2007 & Rees et al 2002) - and awareness of self - linking to activation of midline structures (e.g. Northoff et al., 2004 & Perrin et al 2005).

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Conscious Emotion Regulation Suspenses Genetically Determined Differences in Amygdala Reactivity

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June 20, 14:00-16:00: Concurrent Session 1.1

It is increasingly recognized that many of our behavioural and psychological dispositions are determined by genetic factors to a considerable extent, ultimately mediated by influencing brain structure and/or function. Due to the complexity of the brain, however, the effects of single genetic factors rarely can be demonstrated on the behavioural level. However, in functional neuroimaging, effects of small genetic variations have repeatedly been shown to result in different reactivity of brain regions in cognitive neuroscience experiments. For example, it has been shown in several independent studies that a polymorphism in the serotonin transporter gene may influence amygdala reactivity to emotional faces or aversive stimuli. In another line of research it has been shown that human subjects are able to downregulate their emotions by conscious emotion regulation strategies thereby downregulating activity in the amygdala. So the questions arises how conscious volition effectuates the genetically determined differences in amygdala reactivity. Is its activity downregulated, but still different for different genotypes? Or does conscious emotion regulation suspenses genetically determined differences? We will show data from an fMRI study investigating 37 female subjects in order to decide between these two alternatives. We found that conscious emotion regulation indeed does suspense genetically determined differences in amygdala reactivity. We will discuss these findings in the light of another fMRI study from our lab demonstrating that conscious emotion regulation also suspences activity in the ventral striatum during expectation of monetary rewards as well as the error prediction signal. We then will discuss implications of our findings for a neurophilosophical theory of volition.

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Intentional Control in Implicit Learning Based on Familiarity

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June 20, 17:30-19:30: Poster Session 1

The current research investigated whether subjective familiarity could be controlled intentionally when subjects are trained on two artificial grammars. It is commonly held that implicit learning is based largely on familiarity. It is also commonly held that familiarity is not affected by intentions. Indeed, Jacoby (1991) defines familiarity as that memorial process not affected by intentional control. It follows that people should not be able to use familiarity to distinguish strings from two different grammars. However, if familiarity is defined as what feels familiar to the subject, the intention to use one grammar may make strings of that grammar feel more familiar. In two experiments, subjects were either incidentally trained on two artificial grammars equally (experiment 1) or trained twice as long on the to-be-ignored grammar as the target grammar (experiment 2). Training involved asking subjects to memorize strings of letters generated by the grammars. Only then were subjects informed that the strings before and after the short break belonged to two different complex sets of rules. In the test stage, subjects were asked to endorse strings from only one of the two grammars. Additionally, they rated how familiar each string felt on a scale (0-100), and reported how they made their grammaticality judgment using five options (guessing, intuition, familiarity, rules, or recollection). The results indicated that subjects could endorse the strings of just one grammar and ignore the strings from the other. That is, subjects had strategic control over which grammar they used. Nevertheless, subjects most commonly believed they used familiarity (rather than conscious rules or recollection) to do this. Importantly, when subjects said they were using familiarity, the rated familiarity for test strings consistent with their chosen grammar was greater than that for strings from the other grammar even when the target grammar had been trained half as much as the to-be-ignored grammar. In sum, subjective familiarity is sensitive to intentions and can play a key role in strategic control, challenging conventional notions of familiarity amongst psychologists.

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On the Consciousness of Slips of the Tongue

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June 20, 17:30-19:30: Poster Session 1

People's daily speech can be divided into conscious speech acts and unconcsious speech acts. For example, the ordinary speech falls into the former while the balderdash and other senseless talks belong to the latter. In this paper, slips of the tongue are singled out for discussion. So far there is no certain idea whether a tongue slip is a conscious speech act or an unconcsious speech act. David Crystal in his The Cambridge Encyclopedia of Language (2002:264) defines "the slips of thetongue" as "involuntary departure from the speaker's intended production of a sequence of language units, which are very common. Sounds, syllables, morphemes, words, and sometimes larger units of grammar can be affected. Often, the deviant performance is immediately detected by the speaker (though not always consciously) and corrected." Following this definition, it's hard for us to decide whether a tongue slip is a conscious or unconcsious speech act. It seems that one is unconcsious when he/she makes speech errors but often he/she is concsious to know the mistake and correct them immediately. It is argued in the paper that slips of the tongue can occur in both concsious or unconscious states. According to the notion of Parallel Processing in the brain, analyzing the cause of slips of the tongue—"slips" of the brain, and supporting our analysis by ERP data from other research, we propose that slips of the tongue can be categorized into conscious ones and unconscious ones. For the former the speaker more often than not tends to correct his mistake the moment it is spoken out while for the latter the speaker would not do that since he himself does not realize his own speech errors. It is proposed in the paper that the main cause of the slips of the tongue is the contridiction of the parallel processing of the language information in the brain and the linear production of the speech, which leads to the confusion of the concepts in the utterance. Therefore, the speaker can avoid quite a few conscious slips of the tongue as long as he speaks attentively and calmly.

Correlate Visual Motor Control and Alternation of Conscious Experience in Perceptual Rivalry

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Ya-Jung Lin, National Taiwan University, Taiwan
Su-Ling Yeh, National Taiwan University, Taiwan

June 20, 17:30-19:30: Poster Session 1

In clinical settings, patients with symptoms of eye movement disorders tend to have problems of attention and awareness. However, which component in the visual motor control of eye movements is indicative of attentional control has not yet been identified. We aimed at identifying this component for the purpose of developing a diagnostic tool for early detection of possible deficits in attentional control. We used two versions of the Necker Cube Pattern Control (NCPC) test, measuring the alternation of two views with this bistable figure. One version asked the participants to maintain a given view as long as possible whereas the other version asked them to switch between views as quickly as possible. Eye movements were measured with videonystagmography that consisted of two distinct-frequency smooth pursuits and one random-rate saccade while the participant was asked to move his/her eyes when a dot was shown one at a time at a random position. The recorded variables included the number of Necker Cube reversal, pursuit gain, saccade latency, speed, and precision. Results showed median correlation between the maintain version of NCPC and saccade latency, suggesting that the lower the frequency of alternation between the two views in NCPC, the slower the saccade latency from one target to another. Furthermore, high correlation was found between saccade latency and speed, but only on the left side. No other significant correlations were found. These results suggest that the association between alternation in perceptual rivalry and visual motor control explains part of the physiological reasoning behind consciousness. With the knowledge of the physiological factor in consciousness, we expect further study to find the indicator for diagnosing consciousness disorders.

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The Role of Attention in Implicit Sequence Learning. How Do Secondary Tasks Influence Learning?

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June 21, 16:30-18:30: Poster Session 2

It is typically argued that implicit sequence learning require minimal attentional resources. However, recent data suggest that dividing attention during acquisition with a tone-counting (TC) task impairs sequence learning. The three studies presented here are aimed at further exploring the role of attention in sequence learning, by using a more demanding secondary tasks - precisely the random number generation task (RNG – experiment 1 and 2) and the mental arithmetic task (MA – experiment 3). The results of both secondary tasks were compared to those obtained using TC. In all experiments participants performed a serial reaction time task (SRT), either with a secondary task (RNG, MA or TC), or under full attention condition. Subsequently, participants generated either regular (inclusion condition) or irregular (exclusion condition) sequences in the manner of the process dissociation procedure. Results indicate that participants showed sensitivity to the sequential regularities in all experimental groups. However, impaired performance with overall slower reaction times was observed under dual task. Importantly, the strength of transfer effect differed depending on the secondary task involved: RNG and TC tasks yielded smaller transfer effects than a control condition, which was not the case under MA condition. The reinterpretation of the transfer results will be proposed. In the generation task, inclusion scores suffered from the secondary RNG task only. The scores of exclusion task stay intact regardless to the secondary task performed during SRT. The generation task data suggest that TC did not affect both implicit and explicit representations, whereas RNG influences explicit representation.

Supporting Hypothesized Evolutionary Functions of Consciousness

Juliane Charlotte Wilcke, University of Canterbury, New Zealand

June 20, 17:30-19:30: Poster Session 1

Coming up with an idea for why consciousness evolved is not difficult, but turning the initial speculation into a well supported hypothesis is. In this presentation I will report the results of an evaluation of strategies and methods that have been used to generate and develop hypotheses about the current or evolutionary function of consciousness. The aim of this evaluation was to determine the strategies and methods on which we should concentrate our efforts in order to make progress toward a scientifically respectable evolutionary explanation of consciousness. In the first evaluation step, the adequacy of the strategy or method was assessed by analyzing the relation of its aim to the research objective of finding an evolutionary explanation of consciousness. Here it proved useful to group the specific aims of the strategies and methods into five general approaches for studying the evolutionary function of consciousness, which have the following goals respectively: showing that consciousness has a function and identifying its current function, along with the evolutionary equivalents of showing that consciousness is an adaptation and identifying its adaptive significance, and discovering the origin and history of consciousness in evolution. The second evaluation step was concerned with whether the strategy or method actually tends to promote its aim: The validity of the strategy or method was appraised using empirical evidence from its past performance and plausible arguments. In the final evaluation step, the strengths and weaknesses of the strategy or method were examined in relation to, for example, the strategy or method's assumptions, rules, and required resources. The evaluation of the promise of strategies and methods highlighted difficulties with some common forms of reasoning and types of evidence in the present context, but it also identified which strategies and methods are worth pursuing. A multi-method approach that combines specific evolutionary methods (including those used to support consciousness being an adaptation independent of the function it may have) with Baars's contrastive analysis and Flanagan's natural method seems most promising. We now need a concerted effort which uses these strategies and methods and which combines their results to develop well-supported evolutionary explanations of consciousness.

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The Evolutionary Function of Consciousness

Juliane Charlotte Wilcke, University of Canterbury, New Zealand

June 19, 9:30-12:30: Tutorial

Why are we conscious? What is consciousness for? This tutorial will provide an overview of the literature on the evolutionary function of consciousness and raise issues important to an evolutionary explanation of consciousness. Before surveying the hypothesised functions of consciousness, we will consider whether consciousness could have any causal influence on our actions at all. In addition to outlining arguments for and against epiphenomenalism, I will also mention other positions which question the evolutionary approach to consciousness. We will then look at whether consciousness can be shown to be an adaptation independent of the function it may have. In the second section of the tutorial, I will present an overview of commonly advanced evolutionary functions of consciousness. Such functions include intrinsic motivation, integrated representation, selection and organisation of information, access to information, and flexible control. We will have time to examine some prominent hypotheses for functions of consciousness and their support more closely. These hypotheses will help to illustrate critical issues for evolutionary explanations of consciousness, such as how specific the aspects of consciousness are that have a function, what the consciousness-related behaviours are upon which natural selection acted, when the functions of consciousness emerged and how much they have changed since then. The final section of the tutorial will consider strategies and methods available for investigating the evolution of consciousness, and what contribution each of these strategies and methods can be expected to make for generating hypotheses about evolutionary functions of consciousness and finding evidence for them.

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Neurophilosophical Approaches to the Dreaming Mind—a Contrastive Analysis of Dreaming and Wakefulness

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Thomas Metzinger, The Johannes Gutenberg-Universitat, Germany

June 19, 13:30-16:30: Tutorial

The problem of dream consciousness poses many interesting questions for interdisciplinary approaches to mind, consciousness, and cognition. As a second global state of consciousness aside from wakefulness, dreaming presents a natural comparison condition for standard cases of waking consciousness and can open up new theoretical and methodological approaches. There is a wide field of research dedicated both to the empirical analysis of dream reports and the neurophysiological mechanisms of dreaming, and the relevance of dreaming for philosophical theories of consciousness and subjectivity is also increasingly being recognized. Nonetheless, there is currently no consensus on how exactly to pinpoint the differences between dreaming and waking consciousness and how to relate dreaming to broader theories of consciousness and subjectivity.

Following a brief introduction to the most important philosophical questions raised by the problem of dream consciousness, the first part of the tutorial will focus on recent findings from empirical research on sleep and dreaming. The second part will focus on the specific status of subjectivity in the dream state, which will be discussed within the framework of the self-model theory of subjectivity. Here, we will attempt to develop a more fine-grained description for the phenomenological profile. In the third part, we will suggest preliminary solutions to some of the questions addressed at the outset and attempt to sketch the outlines of a neurophilosophical theory of dream consciousness. In an extended final discussion with the participants, we will consider the prospective insights to be gained from a contrastive analysis of dreaming and wakefulness.

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Positional Adaptation without Awareness

Yuki Yamada, Kyushu University, Japan
Takahiro Kawabe, Kyushu University, Japan

June 21, 16:30-18:30: Poster Session 2

Adaptation to luminance- or contrast-defined stationary stimulus produces position shift of a subsequent test stimulus of the same type (positional adaptation). We examined whether the positional adaptation occurred even when the adapting stimuli were presented unconsciously. To remove the adapting stimulus from consciousness, we employed a continuous flash suppression paradigm (Tsuchiya & Koch, 2005). Five observers including two authors participated in the experiment. We presented two vertically aligned adapting stimuli consisting of two gabor patches to one of the observers' eye for 5 seconds. The gabor patches had a odd sinusoidal as well as Gaussian contrast envelope to cause the spatially asymmetrical profile of luminance contrast. The grating patches were counter-phased at 1 Hz so as to reduce afterimage of the adapting stimuli. At the same time, continuous flash of Mondrian images covering the area of the adapting stimuli was presented to the other eye. The adapting stimuli, which presented above and below the fixation mark, shifted from the median line to right or left. After the adaptation, three vertically arranged test stimuli consisting of the Gabor patch with the spatially symmetrical profile of contrast were presented. Although the top and bottom tests were aligned in the median line, horizontal position of the central one was systematically changed trial by trial. The observers were asked to judge whether the central test stimulus was offset towards the left or right of the top and bottom ones. The data of trials in which observers saw the adapting stimuli was excluded from the analysis. As a result, the test stimulus was significantly offset from the high contrast area in the adapting stimuli, suggesting that positional adaptation occurred unconsciously.

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Trouble with Dretske's Accessibility

Karen Yan, The Johns Hopkins University, United States

June 22, 14:00-16:00: Concurrent Session 3.1

Ned Block (2007) argues for the empirical separation of phenomenology and accessibility partly based on the Sperling paradigm and the change blindness paradigm. Block's thesis states that the cognitive accessibility underlying reportability is not a constitutive part of phenomenology. Interestingly, Fred Dretske (2004, 2006) interprets the two paradigms in a similar manner to Block's, though his view of phenomenology is contrary to Block's. Both of them interpret the subjects in the two paradigms as being conscious of more than what they can report. Yet while Block argues for the separation of phenomenology and accessibility, Dretske treats phenomenology as a special kind of accessibility. Block however acknowledges that "there is phenomenology without accessibility in one sense of the term but not another (p.18)." That is, Block leaves open the bare possibility that some sense of accessibility could have necessary relations to phenomenology.

Thus, one may argue that Dretske's special sense of accessibility could be the one intrinsic to phenomenology as Block acknowledges. In this paper, I will argue against the above with the following three claims: First, Dretske's accessibility is inadequate to substantiating the claim that one is conscious of more than one can report. Second, Dretske's accessibility shares a common theoretical commitment with global accessibility. Third, given that the above two claims hold, Dretske's accessibility cannot be intrinsic to phenomenology as Block construes it.

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Turning the Table on the Dual Content Structure of Self-Representationalism

Jerry Yang, National Taipei University of Technology, Taiwan

June 20, 17:30-19:30: Poster Session 1

I point out that Self-representationalism does not need to commit to a dual content structure as its followers suggested. They think that every mental state must involve an object such as a rose, and the content of a representational state is what it represents as being the case, or as about that object. Moreover, if every mental state must require a representation of that state as they insisted, then that representation has to be either a separate mental state or the mental state in question itself. Given that Self-representationalism does not accept any higher-order monitoring thought, its representation hence has to be that mental state itself. Prima facie, Self-representationalism has a case for its dual content structure. I challenge this view by exploring the geographical profile a conscious state is endowed with. I argue that each conscious state should be viewed as a state with a singular content but two different functions. We may first equate a conscious state with some neurophysiological information produced by the brain. The content of each conscious state then plays a role as a space where such information can travel between several places. "Information space" hence could be defined by a (neural) system of places in space between which such information signals can travel. A neural region hence is part of a single information space if such information bearing signals pass from one place to another through that region. The first function of a conscious state thus is to make its content an information space. The second function, on the other hand, may be identified in such a way that to describe a state as representational, or has a representational basis, is to say that it has a function of self-representing. When one is conscious of being in a state, I argue, it is because certain neurophysiological information self-represents itself, meaning such information informs one as to the way things are or shows one how things are. The position I hold here will be strengthened by bringing in an exploration of the transactions of one's body awareness such as one's body image and body schema.

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Troubles with the Representational Theory of the Mind

Yuan-Chieh Yang, National Yang Ming University, Taiwan

June 21, 16:30-18:30: Poster Session 2

Jerry Fodor argues that thought and concept take place in a mental language and this language consists of a system of representations that is physically realized in the brain of thinkers. That is, the concept is a psychological entity in the brain and the basic module of the mental language. This is the representational theory of the mind. Besides, he also argued that all concepts are innate. For replying Fodor's viewpoint, I will argue that concept should be regarded as the ability instead of representation in the brain.

At first, I will discuss Nagel's claim that phenomenal experience is non-representational and non-conceptual raw feelings. According to his point, when we get a color or aesthetic experience from physical objects, we don't need to feel them through our conceptual analysis; in this sense, we use non-conceptual feeling in our brain to acquire some relations in the world. Nonetheless, there is no conflict between Nagel's claim and the language of thought hypothesis.

But I will argue that this so-called acquaintance knowledge will be troubles when the representational theory of the mind completely explained away the possibility that unreportable experience has no relation to the function of consciousness which is mostly required conceptual structures. For example, our aesthetic experience is not merely raw feeling but sometimes the specific response to the world. Moreover, if we try to build the possible relations between things, we have to rely on our conceptual grasp of them. Consequently, it will be more reasonable if we think of concept as a special kind of ability to categorize or recognize our knowledge about the world; meanwhile, this ability is acquired rather than innate for the sake of adapting to the versatile environment.

Compatible Voice Boosts the Conscious Perception of Face

Yung-Hao Yang, National Taiwan University, Taiwan
Su-Ling Yeh, National Taiwan University, Taiwan

June 21, 16:30-18:30: Poster Session 2

The integration of face and voice plays an important role in social context, which is usually rich in verbal communications. In this study we examined whether voice can modulate preconscious facial processing by adopting the continuous flash suppression paradigm (Tsuchiya & Koch, 2005). A continuous stream of flashing Mondrians was presented to one eye and a face to the other eye. The contrast of Mondrians was diminished while that of the face was raised gradually. The face was not detectable in the beginning of a trial due to the dominance of Mondrians in binocular rivalry. Participants were asked to press a key whenever any part of the face was detected. RTs for the face to be released from suppression served as an index of the time needed to bring the face into conscious perception. The face could be either a women or a baby, each was paired with a compatible or incompatible voice. We found shorter RTs for compatible face-voice pairs than for incompatible ones, indicating that the time needed to bring preconscious facial processing into consciousness can be reduced by a compatible voice. We conclude that compatible voice at suprathreshold level has the effect of boosting the otherwise invisible face to reach consciousness, a cross-modal interaction that has not been reported before.

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Implicit and Explicit Processing of Emotional Words

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June 21, 16:30-18:30: Poster Session 2

Emotionally significant stimuli have been shown to either facilitate (e.g., Anderson, & Phelps, 2001) or inhibit (e.g., Most, Chun, Widders, & Zald, 2005) task performance. However, it is unknown whether these studies probed implicit or explicit processing due to the stimuli and tasks used. Clarification of emotional processing that is truly implicit and how it relates to explicit processing is one of the keys to reveal the mechanism of consciousness. We used emotional Chinese words and examined how they are processed under subliminal and superthreshold conditions. The continuous flash suppression paradigm (Tsuchiya & Koch, 2005) was adopted in which emotional Chinese words were presented to one eye, and a series of high-contrast dynamic Mondrians were presented to the other eye. Participants were asked to press a key when they perceived the word, and reaction times needed for them to release from suppression due to binocular rivalry were measured as the time for implicit processing of emotional words. Results showed that emotional words took longer to reach visibility compared to neutral words. However, when the same set of stimuli was tested in a binocular viewing condition, facilitation rather than inhibition was observed. It seems that emotion-laden stimuli have to pass through a more stringent "censorship" even when they are not visible; however, once they pass through it, perceptual enhancement due to feedback from the emotion pathway strengthens the stimuli and boosts the ongoing processing.

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On the Disjunctivist's Account of Hallucination

Bosuk Yoon, Ewha Womans University, Republic of Korea

June 20, 17:30-19:30: Poster Session 1

The core thesis of disjunctivism is that a veridical perception of F and a hallucination of F are two fundamental different kinds of events: they share at most the disjunctive property of "either a veridical perception or a hallucination of F." In denying the common fundamental property of veridical perception and hallucination, disjunctivism distinguishes itself from most other philosophical theories of experience. For example, one of the most divisive issues in the recent philosophical discussion on the nature of consciousness is the question of whether the phenomenal or qualitative character of perceptual experience can be identified as a kind of representational character. Both sides of the debate agree, however, that veridical perception and hallucination shares a fundamental property; the disagreement lies in what the nature of the common property is. Despite its controversial content, there seems to be some good reasons to take disjunctivism seriously. Reflections on one's own experience seems to show that one has direct awareness of external objects and their features. Even when one tries to direct one's attention inwardly to focus on one's own perception of objects, those objects do not disappear from the center of attention. In veridical perceptions at least, we seem to have direct awareness of external objects and their features. Yet, in trying to preserve the essential relationality of perceptual experiences, disjunctivists run into the problem of explaining hallucination. Philosophers such as Siegel and Sturgeon have presented several objections to show that disjunctivists probably don't have sufficient resources to work out a plausible account of hallucination. In this paper, I try to protect the disjunctivist's approach to perceptual experiences from their objections.

Neural Correlate of Reduced Visual Awareness in the Superior Colliculus of Monkeys with Blindsight

Masatoshi Yoshida, National Institute for Physiological Sciences, Japan
Kana Takaura, National Institute for Physiological Sciences, Japan
Tadashi Isa, National Institute for Physiological Sciences, Japan

June 22, 14:00-16:00: Concurrent Session 3.2

It has been reported that macaque monkeys with unilateral lesions in V1 exhibited analogous behavior to the human blindsight patients (Cowey and Stoerig, 1995). Here we examined behavioral report of visual awareness in monkeys with unilateral V1 lesions using saccade tasks and sought neural activity specific to blindsight. First, we examined whether the monkeys are able to maintain short-term memory of the stimuli presented in their contralateral ('affected') hemifield. The monkeys were tested with a memory-guided saccade task with a 2 sec-delay. The success ratio was over 80%, significantly higher than chance. Then we recorded the neuronal activity from the superior colliculus (SC) during the memory-guided saccade task. We found that a majority of the neurons recorded from the ipsilesional SC showed a delay activity selective for spatial locations of targets. On the other hand, the ratio of neurons with a delay activity was lower in the contralesional SC. These results suggest that the monkeys with V1 lesion retain a certain level of visual awareness and that it was represented in the SC. Then we examined their visual awareness more directly using comparison between the performance of a forced-choice (FC) task, in which localization of target positions was required, and that of a yes-no (YN) task, in which detection of the targets was required. The performance of the FC task was better than that of the YN task when stimuli were presented in the affected hemifield. Such a dissociation of performance was not observed when stimuli with low luminance contrasts were presented in the ipsilateral ('normal') hemifield, indicating that the dissociation is specific to the V1 lesion, not a general phenomena occurring in near-threshold vision. Then we examined whether the neural activity of SC during the YN task is dependent on the monkeys' report on visual awareness. We found that, in the ipsilesional SC, the neural response to the visual stimuli in the affected hemifield was larger when the monkeys successfully detect the targets than when the monkeys missed them. Such modulation was not found in the neural response to the near-threshold

stimuli in the normal hemifield when we recorded from the contralesional SC. These results suggest that the modulation of neural activity found in the ipsilesional SC is a neural correlate of reduced visual awareness that specifically induced by V1 lesion.

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Externalized Sense of Balance Using Galvanic Vestibular Stimulation

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Junji Watanabe, Japan Science and Technology Agency, Japan

June 21, 16:30-18:30: Poster Session 2

Although humans normally localize the conscious self within their own bodies, recent tele-presence technologies allow persons to feel as if they were present without constraints of their physical bodily boundaries. The visual images, sounds, and haptic textures in the remote location are sensed, transmitted and presented to the observers, and then the observers perceived the sense of presence at the remote location. The presented sensations have been limited within vision, auditory, haptic, and sometimes smell. However, we have developed a novel sensation interface, which can influence the sense of balance using galvanic vestibular stimulation (GVS). The human vestibular system is stimulated by weak current through the electrodes, placed behind the ears. The GVS causes the feeling of lateral acceleration toward the anode. Based on this GVS technology, we produced a vestibular tele-presence system. In our system, an acceleration sensor is integrated into a small doll, which works as an externalized object of observer's sense of balance, and the obtained data is sent to the GVS interface. The GVS is controlled according to the data from the sensor. Any kind of vibration of the doll affects the balance of the observers. When the doll falls over, they feel big swaying sensation. This GVS interaction makes them feel truly connected to the doll, and achieves the tele-presence of the vestibular sensation. In addition, we put the doll on the water, and the observers hold the tank of the water, in other word, they hold his/her externalized sensation (the doll). In this case, when they shake the doll, they are shaken. While they feel as if they were on the water, they see the doll from the outer perspective. This feedback loop between subject (observer) and object (doll) of the tele-presence strikingly disturbs the bodily self-consciousness, and this experience can be studied for investigating the relationship between tele-sensation and self-consciousness (e.g. Lenggenhager et al., SCIENCE 2007; Ehrsson, SCIENCE 2007). Our vestibular tele-presence system was experienced by more than 1000 people,

and about 200 questionnaires were obtained. Here we report the results of the questionnaire and the typical subjective impressions.

The Phenomenal-Concept Gap

Benjamin Daniel Young, City University of New York Graduate Center, United States

June 20, 14:00-16:00: Concurrent Session 1.2

The Phenomenal-concept approach is a recent attempt to surmount a particular obstacle faced by mind-body physicalism in reducing qualitative mental states to brain states. The epistemological explanatory gap, as this obstacle has been labeled, is said to block the reducing of the qualitative character of experience to physical mechanisms (Levine, 1983, 1993). Phenomenal-concept theorists have argued that we can overcome that apparent obstacle if we construe the concepts we have for qualitative properties, as such, not as ordinary descriptive concepts, which can occur in the absence of their referents, but rather as phenomenal concepts, which represent these states by eliciting some of the experience, thereby requiring that the experience itself be part of the concept.

Central to the phenomenal-concept approach is the Experience Thesis, which holds that to posses such a concept one must have the relevant qualitative experience (Stoljar, 2005). The experience thesis is particularly evident in exemplar theories (Papineau, 2006; Block, 2002, 2006), which claim that the phenomenal concept is partially constituted by the having of an exemplar qualitative experience.

But in requiring the having of experiences as the primary necessary condition for the acquisition and possession of the relevant phenomenal concepts, exemplar theories undermine the plausible constraints of publicity and stability. Publicity holds that we interpersonally share identical concepts. Stability requires that intrapersonal conceptual types be stably generated from multiple tokens of a finite experiential base. The paper focuses upon exemplar theories, because they so clearly fail to conform to these constraints, but the same can be demonstrated for recognitional (Loar, 1997; Tye, 2003), demonstrative (Chalmers 2003, 2006), and quotational-indexical theories (Balog, 2006; Papineau, 2002).

Current phenomenal-concept theories therefore fail as theories of concepts, and so cannot resolve the explanatory gap. Accordingly, I offer an alternative approach, which denies interpersonal publicity but maintains intrapersonal stability. My theory retains the Experience Thesis, but argues that the possession and content of phenomenal experiences is physically determined

by the sensory state, its context, and a theory of object persistence through changes of features (Feldman 2003, 2007; Feldman & Tremoulet, 2006; Tremoulet & Feldman, 2006). In addition to providing an adequate treatment of concepts, my theory of physical qualitative states accounts for why the explanatory gap seems intuitive.

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Incremental Effective Connectivity Is in Response to Differential Working Load Demands of An N-back Working Memory Network: A DCM Study

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June 20, 17:30-19:30: Poster Session 1

The central executive system in an n-back working memory network played an essential role in initiating a strategic control of cognition for differential task difficulty. The information transmission in the subsidiary phonological loop was then manipulated depending on the system's capability. The task difficulty in our experiment was parameterized as 1-back and 2-back. The control of cognition for on-line manipulation of task-relevant information was hypothesized to have representative influences in effective connectivity of the network. In this study, we investigated the connectivity of the generic network, which initially included neural correlates of phonological store, subvocal rehearsal processing, and central executive system, using dynamic causal modeling (DCM). Dynamic causal modeling is a nonlinear system identification technique which incorporates the neuronal kinetics and hemodynamic nature of brain activities. DCM estimates sets of parameters describing intrinsic and induced connectivities of a priori functional architecture based on the assumption that the architecture is perturbed by the context and stimuli in the experiment. We set up the analysis using 2 contextual and 1 stimulus inputs. The selection of task-relevant ROIs was based on 11 normal subjects of n-back fMRI data using independent component analysis (ICA). A Bayesian-averaged result revealed that the transition of context from 1-back to 2-back made the system more dependent upon dorsolateral prefrontal (DLPFC, around BA-46) relay and intuitively on more frequent subvocal rehearsal. In regard to the hypothesis that has already been strengthen by current result, we sought extensions in central executive representations to incorporate more elaborate functional architecture.

Can Machines Have Free Will?

Jing Zhu, Sun Yat-Sen University, China

June 21, 16:30-18:30: Poster Session 2

The traditional philosophical issue about free will concerns whether the freedom of will is compatible with determinism and whether human beings have free will. Contemporary research in artificial intelligence aims to build intelligent machines that can be regarded as rational, autonomous agents. The question "Can Machines Have Free Will?" is becoming pertinent and significant as we need to understand the fundamental issues such as the nature of rational agency and autonomy. It is also relevant to the discussions of machine morality. On the other hand, extending various philosophical theories of human free will and moral responsibility to machines is by itself theoretical interesting and profitable for examining the plausibility and merits of these philosophical doctrines.

This essay examines the bearing of some major philosophical doctrines of human free will on the issue "Can Machines Have Free Will?". Whereas compatiblism holds that the freedom of will is compatible with determinism and that humans can have free will even if determinism is true, libertarianism, as a doctrine of incompatiblism, maintains that the freedom of will is incompatible with determinism and that humans can have free will only if indeterminism is true. We shall examine how some leading proponents of contemporary compatiblism, including classical compatiblists (such as Daniel Dennett) and neo-compatiblists (such as Harry Frankfurt and Susan Wolf), and of libertarianism (such as John Searle, Robert Kane, and advocates of the so-called "agent-causation" approach) would reply when they were requested to consider whether machines can have free will.

Special attention will be paid to the concepts of consciousness and the self, as they are deeply related to that of free will. It will be revealed that different philosophical doctrines of free will may presume certain conceptions of consciousness and the self, which constrains whether and how machines can be endow genuine free will and justifiably bear the attribution of moral responsibility.

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