

NICOLAUS COPERNICUS UNIVERSITY, TORUN, POLAND

Self,
Intersubjectivity &
Social Neuroscience:
from Mind and
Action to Society

CONFERENCE E-BOOK

[TORUN 2007]

NICOLAUS COPERNICUS UNIVERSITY,
TORUN, POLAND

This year's event is a sequel to the [„Embodied and Situated Cognition: from Phenomenology and Neuroscience to Artificial Intelligence” conference](#) held in Torun in 2006. This year's edition's guest of honour will be Prof. Marc Jeannerod, member of the French Academy of Sciences, author of *The Neuroscience of Action, Motor Cognition: What Actions Tell the Self; and Ways of Seeing* (together with P. Jacob).

The main topics include motor cognition, the mind of the other, social cognition, and social neuroscience.

The presentations by the conference participants will be complemented by two panel discussions (one on Marc Jeannerod's *Motor Cognition*, the other on the debate between narrative and 'mindreading' conceptions of the access to the mind of the other), and two small seminars.

September, 24-25

[SELF, INTERSUBJECTIVITY & SOCIAL NEUROSCIENCE: FROM MIND AND ACTION TO SOCIETY]

[Conference Center - Hotel Gromada, Conference Venue - Golden Room, Dabnski Palace, Zeglarska Street]



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[SELF, INTERSUBJECTIVITY & SOCIAL NEUROSCIENCE: FROM MIND AND ACTION TO SOCIETY]

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[INTRODUCTION]

Last year the subject of the debate was “Embodied and Situated Cognition: from Phenomenology and Neuroscience to Artificial Intelligence”, today the topic is “Self, Intersubjectivity and Social Neuroscience: from Mind to Action and Society”. The subject area of the first conference was the field of enactivism connected with 3 E: embodied, extended and embedded. This year we will discuss the place of a subject in the world of 3E, its place between another subjects and we will also discuss what is the base for embodied and wide grounded experience of a subject in the first-person, second-person and third-person dimensions, and further in the perspective of cognitive neuroscience, development and social science. I suppose we all agree, that action and motor cognition plays important role. This is the unifying foundation. This is the matter which together with 3 E constitutes the hard core of enactivism as the area for interdisciplinary and multidisciplinary research with the participation of many various sciences. The participant may be both philosophy (especially phenomenology) and cognitive neuroscience, and also another scientific disciplines. The next year conference titled: “Enactivism: a new paradigm?” will be concerning cooperation of these disciplines. The main subject will be the offer enactivism is given by: neurophenomenology, social and evolutionary robotics and artificial intelligence, biosemiotics, distributed cognition and radical constructivism by Maturana. Last year we were discussing the proposal of radical enactivism by Daniel Hutto. Next year we will also go back to the general proposal by discussing the book of Di Paolo, Gappenne and Stewart, titled: “Enaction: Towards a New Paradigm for Cognitive Science” (MIT Press, In Press) and book by Hutto and Myin (forthcoming).



We will be considering the power of motoric foundation for a subject and its relations with another subjects, for a mind and its relations with another minds. We will also inquire where does the power of motoric come from and we will be searching for the answer. I'm very grateful for Marc Jeannerod's coming, due to his presence we have a chance to discuss very important book: "Motor Cognition" with its author. This book builds motorical and actional foundation for the subject. The lectures of Yann Cello, Mathhis Synofzik and Piotr Jaśkowski will fulfill the motorical foundation. Further, Jonathan Cole, India Morrison, Corrado Sinigaglia, Francesca Morganti and Lucinda Uddin

will show us the problems of intersubjectivity and social cognition from the perspective of movement and motorics. Due to Professor Colwyn Trevarthen this view from the perspective of intersubjectivity and motorics will get new systematic dimension on the level of primary intersubjective dialogues, secondary intersubjective attunement and tertiary intersubjective understanding. This is the chance to consider the problem of intersubjectivity and motorics in the perspective of development (the guide of this subject will be Philip Zelazo, Stephanie Carlson, Cathrine Reed and Jessica Sommerville), and on the other hand on the perspective of narration hypothesis considered as an alternative theory for the theory of mind. this discuss will be animated by Daniel Hutto and Hanne De Jaegher, following Professor Trevarthen. Professor Jeannerod will suggest "Knowing by Acting". Following this idea we should remember that the last day, on Wednesday Włodzisław Duch will ask if we are automatic machines? Let it be the clasp of our meeting.

The conferential papers will be published by IOS Press from Amsterdam. These publications will be enriched by some papers of another scientists, who cannot be here today.

In the hall of Gromada Hotel, on the second floor (next to the restaurant) there is the books display. The display will be open open for three days. On the most of the books we have 20% price reduction. On the display hall you have a place to sit down, rest and have a glance at many new books and some elder ones.

I also would like to invite you to the discussion on the Internet forum [NARRATIVE AND "MINDREADING" THEORIES OF MIND](#) On the forum you may discuss the narration hypothesis and theory of mind.

[Tomasz Komendziński]

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[SELF, INTERSUBJECTIVITY & SOCIAL NEUROSCIENCE: FROM MIND AND ACTION TO SOCIETY]

24.09.2007

11.45-13.15

- **OPEN LECTURE:**

Marc JEANNEROD, *From my self to other selves . A framework for identifying one self and differentiating oneself from another self*

LUNCH

- Jonathan COLE, *Moebius Syndrome: facial immobility and emotion*
- Stephanie CARLSON, *On self-awareness, selfcontrol and theory of mind*
- Matthis SYNOFZIK, *Was that me? Probing the neurocognitive basis of the sense of agency*
- Jessica SOMMERVILLE, *Me, myself and I: The role of agentive experience and agency attributions in early development*

Coffee

- Panel discussion, Moderator: Philip Zelazo, Small symposium SENSE OF AGENCY (Matthis Synofzik, Jonathan Cole, Jessica Sommerville)

BANQUET

SEPTEMBER 24-25
[NICOLAUS COPERNICUS UNIVERSITY, TORUN, POLAND]

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25.09.2007

- Colwyn TREVARTHEN, *Moving, Being Moved and Meaning: Development of Acting Human In Infancy*
- Yann COELLO, *Embodied perception and space categorisation* (with Yvonne Delevoe)
- Piotr JASKOWSKI, *Sub- and supraliminal priming of action*

Coffee

- Catherine REED, *The actions of ourselves and others direct spatial attention* (with Garza, Roberts)
- Corrado Sinigaglia – Introduction and moderator
MOTOR COGNITION [Marc Jeannerod, Yann Coello, Colwyn Trevarthen]

LUNCH

- Daniel HUTTO, *The Narrative Practice Hypothesis*
- Hanne DE JEAGHER, *Participatory Sense- Making: Between embodied and narrative alternatives to mindreading*

Coffee

- Hanne de Jeagher – introduction and moderator:
NARRATIVE AS ALTERNATIVE TO THEORIES OF MIND
(Daniel Hutto, Philip Zelazo, Colwyn Trevarthen)

Guide Tour - Old Town

[Conference Center - Hotel Gromada, Conference Venue - Golden Room, Dabbski Palace, Zeglarska Street]

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[NICOLAUS COPERNICUS UNIVERSITY, TORUN, POLAND]

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26.09.2007

- Philip ZELAZO, *Levels of Consciousness of self and other: Consequences for executive function and evaluative processing*
- Lucina UDDIN, *Neural Correlates of Self- Recognition*
- Corrado SINIGAGLIA, *Mirror neurons and motor intentionality*
- India MORRISON, *Moving feeling: motor and sensory processing in empathy*
- Francesca MORGANTI, *Intersubjectivity for Social Presence: How people “mirror” each other over networks*
- Justin H. G. WILLIAMS, *Importance of action direction in developing social cognition*
- Wlodzislaw DUCH, *Are we automatons?*
- Small symposium on social neuroscience and social cognition [Lucina Uddin, Francesca Morganti, Corrado Sinigaglia],

LUNCH

SEPTEMBER 24-25
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[SELF, INTERSUBJECTIVITY & SOCIAL NEUROSCIENCE: FROM MIND AND ACTION TO SOCIETY]



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Research Interests:

Cognitive neuroscience;
neuropsychology; representation of
action; perception and action;
consciousness; self-consciousness;
schizophrenia; philosophy of science.

Abstract

From my self to other selves. A framework for identifying one self and differentiating oneself from another self.

Action stands at the transition between the process which caused that action to appear and the changes that its occurrence will produce. Among these changes are those that affect the agent himself. Action execution is the ultimate test of whether the represented anticipation of its goal was adequate or not. This information arising from the interaction with the environment, if congruent with the anticipation, will stabilize the representation and set its parameters for more and more successful interaction. This process results in selecting, possibly among a larger repertoire, those representations which conform best with the available information about the external world. This theoretical framework will be illustrated by experiments showing the role of action in self-recognition and in language understanding.



[SELF, INTERSUBJECTIVITY & SOCIAL NEUROSCIENCE: FROM MIND AND ACTION TO SOCIETY]



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Research Interests:

Cognitive neuroscience;
neuropsychology; representation of
action; perception and action.

Abstract

Emotional expression and emotional experience in M^obius Syndrome

The cardinal features of M^obius Syndrome, a usually congenital sporadic genetic condition are absence of cranial nerves VI and VII, leading to absence of abduction of the eyes and absence of facial expression and movement. In addition there can be tongue and hearing deficits as well as poor motor control, clumsiness and hand and foot maldevelopment. Its relation to learning difficulties and autism remains uncertain.

The talk will give the narratives from a number of people with M^obius to give a view of the condition from the inside. These allow reflections on neonatal facial imitation, Cartesian dualism, the effects of a 'somatic straight-jacket' on others' expectation of children, pre-reflexive awareness of the other and, perhaps most of all, the need for embodied and social expression for the development of emotional experience.

Reference Jonathan Cole with Henrietta Spalding, *Inside M^obius*, OUP forthcoming.

[SELF, INTERSUBJECTIVITY & SOCIAL NEUROSCIENCE: FROM MIND AND ACTION TO SOCIETY]



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Research Interests:

Executive function and self-regulatory processes in cognitive and social development; theory of mind.

Abstract

Self-awareness, self-control, and theory of mind

In social psychology, achieving a complete and accurate understanding of others is often considered a challenge because the self gets in the way. In development, however, awareness and control over the self is increasingly seen as an integral part of the development of theory of mind: children come to understand others vis-à-vis the self. In this talk I will discuss the skills and mechanisms that are likely to be involved in this process. I will then present a brief summary of research in my lab on self-control in preschool children and its relation to social understanding and to symbolic thought and action.

[SELF, INTERSUBJECTIVITY & SOCIAL NEUROSCIENCE: FROM MIND AND ACTION TO SOCIETY]



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<http://www.ruhr-uni-bochum.de/philosophy/thoughts/>

Research Interests:

Cognitive neuroscience;
neuropsychology; bioethics; perception
and action; sense of agency.

Abstract

Was that me? Probing The Neurocognitive basis of The Sense of Agency

Although the „sense of agency“ is one of the most fascinating topics in current cognition research, its conceptual and neurocognitive basis still needs to be systematically explored. Here we propose a new conceptual two-factor account of the sense of agency, distinguishing a basic, preconceptual feeling of self-agency and a more complex, conceptual judgement of agency. By investigating the perception of one’s own hand movements in healthy subjects and schizophrenia patients we were able to show that the feeling of self-agency is gradual and highly plastic in nature. Whereas this plasticity is best explained by a plastic internal feedforward mechanism predicting the sensory consequences of self-action (“comparator”), difficulties of schizophrenia patients in perceiving agency of their own hand movements are best explained by a deficit in integrating internal action signals (internal prediction and proprioception) with external action signals (visual feedback). Thus, different agency information mechanisms underlie the feeling of agency (an internal comparator mechanism, multimodal integration, etc.), which should therefore be understood as the result of a multifactorial weighing process of various agency indicators. Future research will be challenged by exploring the interaction of these agency indicators and the interaction between the feeling of self-agency and the judgement of agency.

[SELF, INTERSUBJECTIVITY & SOCIAL NEUROSCIENCE: FROM MIND AND ACTION TO SOCIETY]



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Research Interests:

Cognitive development from infancy through preschool; perception and action; memory development.

Abstract

Me, myself and I:

The role of agentic experience and agency attributions in early development

In this talk, I discuss two lines of research that investigate the impact of agency on children's developing action understanding and learning from others' actions. In the first line of research, I discuss evidence that agentic experience, over and above mere observational experience, enhances infants' perception and understanding of others' actions. In the second line of research, I investigate the impact of active participation in joint activities on preschool children's agency attributions and subsequent memory for and learning from others' actions. Taken together, the findings from these studies suggest that agency, either experienced or attributed, plays a formative role in understanding others' actions and learning from others' behavior.

[SELF, INTERSUBJECTIVITY & SOCIAL NEUROSCIENCE: FROM MIND AND ACTION TO SOCIETY]



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Research Interests:

Child Psychology and Psychobiology, pre-language development of infants, “musicality” of earliest communications with infants.

Abstract

Moving, Being Moved and Meaning:

Development of Acting Human in Infancy

I would like to speak on the rhythmic and expressive nature of motives and emotions for the elaboration and protection of action -- in reality and in imagination and memory. I would like to explore how this process induces the narration of both self awareness and meaning in community. I believe that what makes human consciousness in activity unique is the rhythmic complexity of attentions arising from our bipedal stance and balance of action, freeing the special senses and the hands with throat and mouth for intricate compositions of movement in planned time. The 'coordination and regulation' of this flexibility of action entails an open or public intentionality and permits an intimacy in purposes in formation that no other animal can comprehend. Human intersubjectivity appears to be a consequence of this process of moving with subtle strategies that may be detected by other human subjects because they too move with that complexity of prospecting. Any theory of mind is nothing but an epi-phenomenon of the creative processes of intelligent acting with a body that has so many degrees of freedom in movement. We can share 'theories' about other minds because we 'theorise' (mentally fabricate) our every waking act, and we can detect the process of 'seeking' to make actions effectively in others. I can bring evidence from infancy for how the arts and techniques of human collaborative intelligence arise from sharing the purposes and concerns that shape the attending and investigating movements of all of us from before birth, and those 'e-motional' qualities of movement that express the urgency, safety and satisfaction expected from moving in different levels of time.

[SELF, INTERSUBJECTIVITY & SOCIAL NEUROSCIENCE: FROM MIND AND ACTION TO SOCIETY]



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Research Interests:

Cognitive neuroscience; visuo-motor and spatial neuropsychology; embodiment and spatial categorisation.

Abstract

Embodied perception and space categorisation

Despite the appearance of a continuous and homogeneous external world, spatial perception is necessarily constrained by the spatial resolution of the sensory systems but also by the pre-reflective representations of the body. Recent empirical data in cognitive neurosciences will be presented that suggest that multidimensional categorisation of perceptual space depends on body representations at both the experiential and functional level. A neuro-cognitive model based on the integration of afferent and efferent information will be presented, which suggests that action simulation and associated predicted sensory consequences may represent the underlying principle of pre-reflective representations of the body involved in space categorisation and selection for action.

[SELF, INTERSUBJECTIVITY & SOCIAL NEUROSCIENCE: FROM MIND AND ACTION TO SOCIETY]



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Research Interests:

Cognitive neuroscience; perception and action; developmental psychology.

Abstract

Sub- and supraliminal priming of action

Choice reaction times to visual stimuli (targets) may be influenced by preceding subliminal stimuli (primes) even if the primes are made invisible by backward masking. Using this method, we made recently several interesting observations which shed some light on the role of consciousness in cognition. It is commonly accepted that the cognitive operations emerge from the competition between two types of processes. Controlled processes reflect a person's current attentional set, intentions, and task requirements. In contrast, automatic processes are thought to be independent of attention and intention. A controlled process can be transformed into an automatic one only after an extensive practice. We showed, however, that an intentional control over processing of subliminal stimuli is possible. Moreover, it has been argued that there are qualitative differences between conscious and unconscious processing in priming. Our recent results show that these differences are due to unmatched stimulation under the both conditions rather than due to fundamental differences between them.

[SELF, INTERSUBJECTIVITY & SOCIAL NEUROSCIENCE: FROM MIND AND ACTION TO SOCIETY]



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Research Interests:

Developmental cognitive neuroscience;
embodied attention, & emotion.

Abstract

The actions of ourselves and others direct spatial attention

Spatial attention research traditionally focuses on how it is influenced by the location of objects within the visual environment. However, a primary function of spatial attention is to plan physical actions. When events occur in the world, visual information needs to be integrated with our current body position to help us prepare effective responses to these events. Further, current actions can subsequently influence further deployments of attention. Thus, spatial attention must be considered within the context of the body. Here we present research demonstrating that one's own body and the actions of others can influence spatial attention mechanisms, influencing the prioritization of functional space near the body and the direction of attention. This work emphasizes a need for an embodied theory of spatial attention and a more dynamic neural model of attention that adjusts to meet the demands of the current environment and the perceiver's goals.

[SELF, INTERSUBJECTIVITY & SOCIAL NEUROSCIENCE: FROM MIND AND ACTION TO SOCIETY]



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Research Interests:

Philosophy of Psychology; Cognitive Science; Wittgenstein; analytical philosophy; idealistic metaphysics; personhood & narrative.

Abstract

The Narrative Practice Hypothesis

It is argued that a sub-set of narrative practices, those involving stories of a distinctive kind, constitute the true basis of our folk psychological understanding and our everyday skill at making sense of actions in terms of reasons (a practice which I call folk psychology, *sensu stricto*). This is the core claim of the Narrative Practice Hypothesis (or NPH). This talk will elaborate, situate, motivate and defend the NPH against some recent challenges - both from those who favour standard explanations of such abilities in terms of 'theory or mind' mechanisms (where this includes most simulationists) and also those who advocate a radically eliminativist stance on folk psychology. Most importantly, I will defuse the worry that the relevant narrative competency must presuppose mature 'ToM' abilities.

[SELF, INTERSUBJECTIVITY & SOCIAL NEUROSCIENCE: FROM MIND AND ACTION TO SOCIETY]



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Research Interests:

Enactive approach, dynamical systems;
intersubjectivity; social cognition;
perception and action.

Abstract

Participatory Sense-Making:

Between embodied and narrative alternatives to mindreading

What would happen if, in the investigation of social cognition, instead of focusing on individual capacities, we concentrated on the interaction process? The first question that comes to mind then is: What is the interaction process? In De Jaegher and Di Paolo (2007), we have characterised the interaction process using the concepts of coordination and autonomy. The interaction process is made up of the coordination of movements and utterances that interaction partners do (coordination being a variable and measurable phenomenon). Furthermore, we see each unfolding interaction/coordination process as taking on a form of autonomy. I explain both these aspects. Taken together with the role of the individuals engaged in the interaction process, these features allow us to reformulate the question of how social cognition works. Social cognition, in our view, becomes a matter of how meaning is generated and transformed in the interplay between the unfolding interaction process and the individuals engaged in it. Individuals are, a lot of their time, engaged in sense-making: the active, meaning - and value generating engagement with their world. In social situations, they participate in each other's sense-making. Participatory sense-making can take on various forms, some of which I detail in the presentation.

[SELF, INTERSUBJECTIVITY & SOCIAL NEUROSCIENCE: FROM MIND AND ACTION TO SOCIETY]



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Research Interests:

Developmental Cognitive Neuroscience;
Cognitive psychology; consciousness;
Self-reflection and awareness.

Abstract

Levels of Consciousness of self and other:

Consequences for executive function and evaluative processing

In this talk, I will first review research on the cognitive and neural mechanisms underlying the development of conscious reflection in childhood. Then, I will consider the implications of this development for children's reasoning about self and other, and for their self-regulation in both "cool" cognitive contexts and more "hot" motivationally significant contexts.

[SELF, INTERSUBJECTIVITY & SOCIAL NEUROSCIENCE: FROM MIND AND ACTION TO SOCIETY]



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Research Interests:

Cognitive neuroscience; consciousness;
social and developmental cognition.

Abstract

Neural Correlates of Self-Recognition

Self-recognition has only been demonstrated by a select number of primate species and is often used as an index of self-awareness. The neural basis of this complex cognitive capacity has only recently been explored. In this talk I will summarize the current literature on self-recognition in various domains, and present my behavioral, functional magnetic resonance imaging, and transcranial magnetic stimulation studies of self-recognition in normal and clinical populations. These and other studies point to a right fronto-parietal network that is critical for discriminating self from other. I will also present models discussing the link between self-recognition capabilities and the mirror-neuron system.

[SELF, INTERSUBJECTIVITY & SOCIAL NEUROSCIENCE: FROM MIND AND ACTION TO SOCIETY]



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Research Interests:

Cognitive neuroscience; social neuroscience; perception and action, empathy and motor processing.

Abstract

Moving feeling:

motor and sensory processing in empathy

A major current of research within the growing field of social neuroscience deals with ways in which sensory information is filtered by neural mechanisms that allow us to interpret aspects of social interactions, such as others' goals, intentions, and related subjective mental states. While much research has focused on the role of vision and action in such processes, one quite conspicuous and accessible social organ has been largely overlooked—the skin. Cutaneous (skin-related) perceptions such as touch and pain can carry affect-laden information influencing the feelings and attitudes of both perceiver and toucher, as well as supplying an observer with cues about the nature of the current situation. This fundamentally motivational and affective dimension of pain and touch may thus provide an important basis for interpreting others' emotions and desires, constraining inferences about observed interactions, and may even contribute to empathy. This talk discusses this proposition from a neuroscientific standpoint, presenting evidence and a theoretical framework.

[SELF, INTERSUBJECTIVITY & SOCIAL NEUROSCIENCE: FROM MIND AND ACTION TO SOCIETY]



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Research Interests:

Cognitive neuroscience; Philosophy of Science; Logic; Neurophenomenology; perception and action.

Abstract

Mirror neurons and motor intentionality:

Embodied perception and space categorisation

Most of our social life rests upon the ability to understand actions performed by others. Philosophers and psychologists agree that this ability first and foremost depends on our capacity to mentalize others' behavior, by attributing them with the mental states that would drive that behavior, make it comprehensible and eventually predictable. Over the last few years, however, this view has been challenged by the study of the cortical motor system and in particular by the finding of a specific class of sensory-motor neurons: *mirror neurons*. The functional properties of these neurons point out that action understanding is primarily based on a mechanism that directly matches the sensory representation of perceived actions with one's own motor representation of the same actions. This not only indicates that mindreading is neither the sole nor the primary form of intentional understanding, but also reveals how deeply motor and intentional components of action are intertwined, suggesting that both action and action understanding can be fully comprehended only starting from a motor approach to intentionality.

[SELF, INTERSUBJECTIVITY & SOCIAL NEUROSCIENCE: FROM MIND AND ACTION TO SOCIETY]



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Research Interests:

Cognitive neuroscience; distributed cognition; embodied interaction; psychology of interaction and communication.

Abstract

Intersubjectivity for Social Presence:

How people “mirror” each other over networks.

Recently the introduction of emerging communication technologies, such as multi-users virtual environments, has presented a new venue to gain insight to the relationship by introducing of the concept of social presence. Social presence is defined as the subjective illusion of *being together* in a virtual place and it has been frequently used to evaluate people’s ability to connect via telecommunication systems. As social presence involves a degree of mutual awareness, its definition it requires to understand what it means that an user is reciprocally aware of the mediated other “through the limitation” of a medium.

I introduce a framework that explains how the subjective sense of social presence is derived from participation in meaningful situations where users engage themselves in systems of joint activities creating an intersubjective space.

Finally I show how this perspective could provide guidelines for designing advanced workplaces (even technology-based ones) where people dynamically reconfigure their knowledge, collaboratively working together and/or efficaciously communicating.

[SELF, INTERSUBJECTIVITY & SOCIAL NEUROSCIENCE: FROM MIND AND ACTION TO SOCIETY]



Włodzisław Duch

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Research Interests:

Cognitive neuroscience; artificial intelligence; robotics; brain; machine learning .

Abstract

Are we automatons?

In this talk many fundamental questions are addressed from the neuroscience perspective:

How is the self represented in the brain? How to bridge the gap between the first and the third-person perspective? How does the conscious become subconscious? Why do the qualia exist? What is needed to have qualia in artificial systems? Are we automatons or is there a self that makes the decisions?

Poster session

Motor timing and high level of mental ability

[Dreszer, J.^{1,2}, Szelağ, E.^{2,3},
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Temporal information processing seems to be more related to the general intelligence level than classical measures of mental speed. A large body of experimental evidence has suggested that the rate of brain 'clock' systems determines temporal aspects of information processing (e.g. perception, speech or working memory, or motor activity). Timing control of voluntary movements has been a neglected topic in the existing studies on neuropsychological basis of intelligence.

As Arthur R. Jensen (2006) claim the term - *gifted* – commonly used in psychology of individual differences, refers to "a high level of general mental ability or psychometric g, which is typically associated with accelerated progress in scholastic achievements". Accordingly, the present study investigated differences between temporal control of repetitive finger movements in gifted (GI) and nongifted individuals (NI).

GI and NI groups were tested using two conditions of finger-tapping tasks: performed in a maximum or in personally chosen tempo. Both these tasks were performed separately with the right and left hand. Two parameters of movement were analyzed: motor *preparation* and motor *execution*.

Analysis of linear statistics and nonlinear elements for reconstruction of dynamical properties of motor timing, revealed significantly faster and more stable performance on the maximum than on personal tempo in both groups. A clear dissociation between groups was found for the movement preparation in the maximum tempo. The NI group tapped faster with the right hand than with the left one. Such difference disappeared in the GI group, who performed with the right and left hand on the similar level. In personal tempo GI group tapped faster and significantly more stable than NI.

These findings suggest: (1) more efficient temporal information processing in GI individuals in comparison with NI subjects; (2) the involvement of the right cerebral hemisphere in timing motor control in GI. Additionally, results support the notion that motor control may be dependent on more than one timing mechanism.

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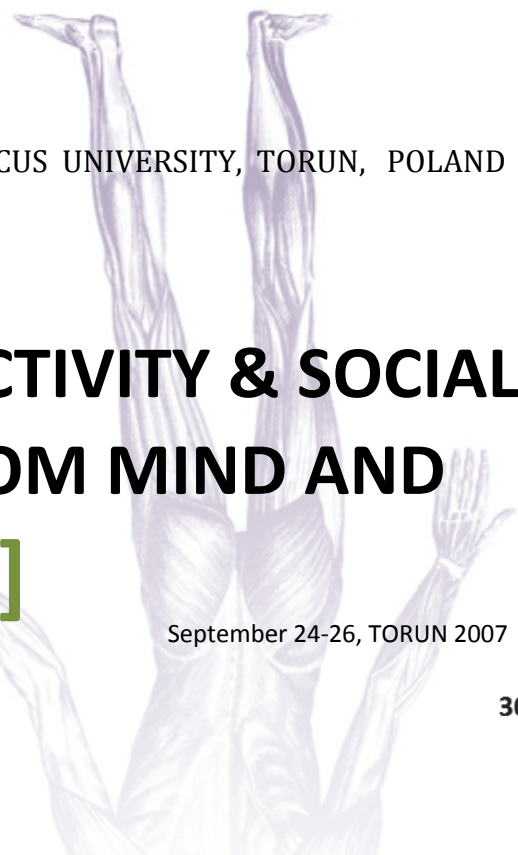
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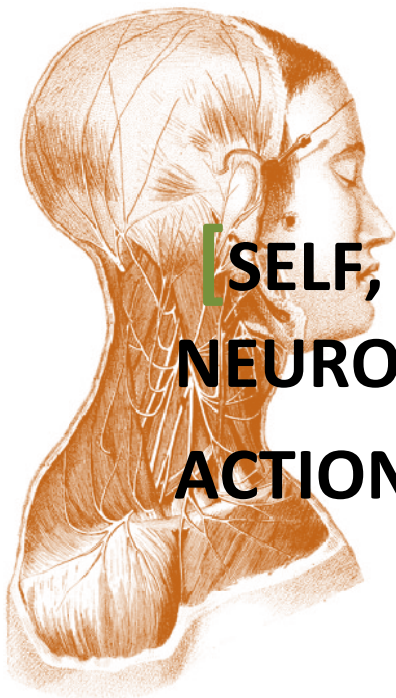
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