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### **Understanding others in linguistic interaction**

According to current interactional accounts, social cognition is constituted by embodied social interaction (De Jaegher and Di Paolo 2007; De Jaegher et al. 2010). Social interaction is the autonomous process emerging from the co-regulated coupling of autonomous agents, which can generate the co-creation of social meaning (participatory sense-making) not reducible to the individual sense-making of interactors. A central issue raised by interaction theory is the autonomy-problem: what is the relation between the autonomy of the interactors and of the interaction itself? The poster addresses this problem in the context of linguistic interaction, where the co-creation of meaning is in interplay with, but nevertheless differs from embodied interactional meaning. Drawing on Merleau-Ponty's phenomenology of linguistic expression (Merleau-Ponty 1969), the poster proposes a phenomenological investigation of linguistic co-expression: linguistic interactions in which two or more linguistic self-expressions are intertwined, and which can lead, through the mutual affection of the individual linguistic sense-makings, to a linguistic co-creation of meanings. In this context, the autonomy-problem can be reformulated this way: what is the relation between the autonomy of linguistic intersubjective experience (understanding each other's individual linguistic sense-making) and the autonomy of the linguistic interaction itself (understanding with others the autonomous meaning which emerges from the linguistic interaction)?

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**Title:** Mind-Reading in dialogue: A social cognition-based model of initiative in artificial conversational agents

**Abstract:**

Initiative is an abstract concept in human dialogue, denoting the phenomena of an interlocutor seizing control over the flow of conversation and driving it towards some sort of goal. As we know, initiative is no intrinsic property of conversation itself, but rather emerges in terms of an ongoing cooperative problem-solving process between dialogue participants, where it is usually taken by the person who can contribute the most to a shared dialogue goal at a given moment. It thus depends on cognitive abilities like Theory of Mind (ToM) to permit a reasoning process about the other interlocutors' beliefs, intentions and goals. Although the possibility of changing initiative is an important feature in any task-oriented inter-human dialogue, most automated Spoken Dialogue Systems still employ a single-sided initiative approach, thus lacking capability to conduct human-machine dialogue in a natural and efficient way. In our contribution we will show how Social Cognition techniques can be implemented into the Dialogue Management System of a virtual agent by using Bayesian reasoning about the human user's mental states. This provides a virtual character with basic mind-reading capabilities and allows him to conduct mixed-initiative dialogue in a more efficient and believable manner.

**Extended emotion and psychopathology**

*Abstract for interdisciplinary conference "Other Minds" in Bochum, Germany; September 20-21<sup>st</sup>*

Current psychological and philosophical theories of emotion are based on accounts that emphasize the adaptive evolutionary role of emotions on one hand and their socially constructed nature on the other. Evidence shows that neither of these stances is complete; a middle ground theory describes emotions as multi-level appraisals which involve different cognitive structures in order to serve the well-being of the individual in the world. This view is informed by neo-Jamesian accounts of emotion as bodily reaction, as well as situated cognition and cultural influences where complex emotions are involved.

I claim that this multi-level appraisal theory is not complete without sufficient emphasis on the external components of emotion. Drawing influences from the extended cognition theory in philosophy and the situated emotion approach proposed by Paul Griffiths and Andrea Scarantino, I argue that certain specific interactions between the cognitive agent and the world are a constitutive part of emotional states. Emotion extension occurs on the level of cognitive emotional appraisal, and the environment becomes constitutive of an emotional state.

This approach yields explanatory benefits through refocusing from merely internal cognitive structures of emotion to a systematic approach of viewing the embodied emotional agent in the world. The hypothesis of extended emotion challenges a neuroreductionist approach to psychopathology. This is further applicable to assessing psychiatric problems that involve emotional regulation. Using this model of extended emotion, I reassess panic attacks, a component of many anxiety disorders, thus illustrating how this theoretical perspective bears implications on understanding psychopathology.

## THEORY OF MIND ASSESSMENT THROUGH NARRATIVE PRODUCTION: “THE STORYTELLING IN SEQUENCE TEST”

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**Introduction:** The storytelling in sequence test [1] assesses the ability to update mental representations of another person’s knowledge with a referential communication paradigm. It allows examining the (co)construction of a mutual knowledge through the differentiated use of reference linguistics markers (pronouns, definite, indefinite markers). We present first normative data of this new interactive task.

**Method:** 21 French-Speaking Swiss speakers (age: 19-39) participated to the storytelling test composed of two tasks. In the collaborative task, participants were asked to tell 9 story sequences to another person whose task was to order story’s pictures correctly. In the second control task, they were asked to complete in writing referential markers missing in stories text. The two tasks were built to elicit 3 referential steps: introduction, maintain and shift of character. For each step of each sequence, we used the verbal productions of our groups to calculate a conventionality index (CI) of each referential marker [2]. **Results:** The type of conventional referential markers differed at each story’s steps in the two tasks: on average, we found use of indefinite markers in introduction; anaphoric pronouns in maintain of a character, and a majority of definite markers to shift. **Conclusion:** Participants conventionally adjust their referential marker according to the presumed knowledge of their interlocutor. Interestingly these CI may be used as normative data for patients with communicative deficits (*i.e.* schizophrenia, TCC, dementia). The storytelling in sequence test is the first task designed to propose norms to assess the (co)construction of mutual knowledge through analysis of reference linguistic markers.

[1] Champagne-Lavau, M., Fossard, M., Martel, G., Chapdelaine, C., Blouin, G., Rodriguez, J.P. and Stip, E. (2009). Do patients with schizophrenia attribute mental states in a referential communication task? *Cognitive Neuropsychiatry*, 14(3), 217 – 239

[2] Lavoie, M.A., Achim, A.M., Rouhtier, S., Courchesne, S., Brunelle-Hamman, L., St Laurent-Dubé, M., Plana, I., Fossard, M. (2010). Existe-t-il une relation entre les mesures référentielles et les mesures standards de la cognition sociale ? *Journée Scientifique du CRULRG, Université laval, Québec, décembre 2010.*

Social sharing of distress: Autistic spectrum disorder predict higher report of distress and avoidance tendency

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Subjects with a diagnostic of autistic spectrum disorder present lower social abilities. More specifically, they have deficits in identifying mental states, report lower compassion and lower tendency to take the perspective of others. However, no study has yet examined their distress responses when facing someone experiencing and expressing it intensively. Our aim was to assess if adults with autistic spectrum disorder would report stronger experience of distress than controls. Twenty-eight subjects participated to the study and filled in items of the Vicarious Distress Questionnaire (VDQ), a self-reported questionnaire that assesses distress responses as well as its approach and avoidance behavioural correlates. The results showed that, relative to controls, participants with an autistic spectrum disorder reported higher level of distress and a stronger willingness to avoid situation during which someone experience and express distress. This study gives thus evidence for a high physiological reactivity and avoidance motivation among subjects with autistic spectrum disorder, which confirms their social impairments.



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Abstract for Poster:

The ARS (Artificial Recognition System) model aims to model the human psyche, by methods from computer technology combined with the second structural model of Freud. The project has been founded by Prof. Dietrich in 2000 and up to now contains more than fourth functional units that are connected in a top-down engineering approach.

The model is simulated by means of an agent simulation called MASON and enables a simulation of the human behavior by several agents interacting with each other.

One step further, the model simulation can be used for mind reading. By simulating a certain character type within the model (e.g. neurotic) one can see how exactly "this" model of the human mind reacts in a simulation. The simulation thus enables to test hypothesis in mind reading, as it is possible to define the type of character and additional properties needed to predict thoughts or actions.

Furthermore, the memory compound of the model has to be able to store and retrieve distinct presentations in order to parameterize the character type of the agent. Thus, by the help of psychoanalytical knowledge and methods from computer science one can bridge the gap between psychoanalysis, psychiatry and technical sciences.

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### *Being more than just “monkeys in shoes”*

A dominant perspective in comparative and developmental psychology supports the idea that social behaviour of human's closest relatives, monkeys and apes, can be characterised as exploitative and, essentially, individualistic. Meanwhile human's world is a social one, onto which many cultural realities are grounded and whose transmissions are made possible by cooperative interactions (Tomasello, 2010). In this poster I am going to clarify which are the cognitive and communicative demands for human's social cognition.

I will, firstly, outline a more specific characterisation of cross-species cooperative behaviour: competitive cooperation and collaborative cooperation (Brinck & Gärdenfors, 2001). I shall, secondly, argue that the capacity to share mental content and to attend to shared mental content are essential to the capacity to transfer knowledge in a social group. The capacity to transfer knowledge in a social group is the mark of social cognition. And if mirror neurons are essential to explain the underpinning mechanisms of the machinery that allows the capacity to attend to a shared mental content, therefore mirror neurons are essential to social cognition. I will, consequently, present my claim: the role that imagination, thanks to language (by which I mean a communicative modality based upon symbolic references [Deacon, 1997]), plays in collaborative cooperation is what makes this activity different from competitive cooperation, in that imagination provides the added value that allows us to understand intentional states, *plus* mental states. This human-unique ability has, also, been referred to as the “detachment of the mind” because it requires to represent the contents of another's mind in a “detached” modality (Gärdenfors, 1996). If we agree with the hypothesis that “the sensory motor system has the right kind of structure to characterise both sensory-motor and more abstract concept” (Gallese, 2008, p. 3) we might be able to understand how language arise and why it is necessary in order to be able to imagine. And imagine is a necessary faculty in order to engage in collaborative cooperation.

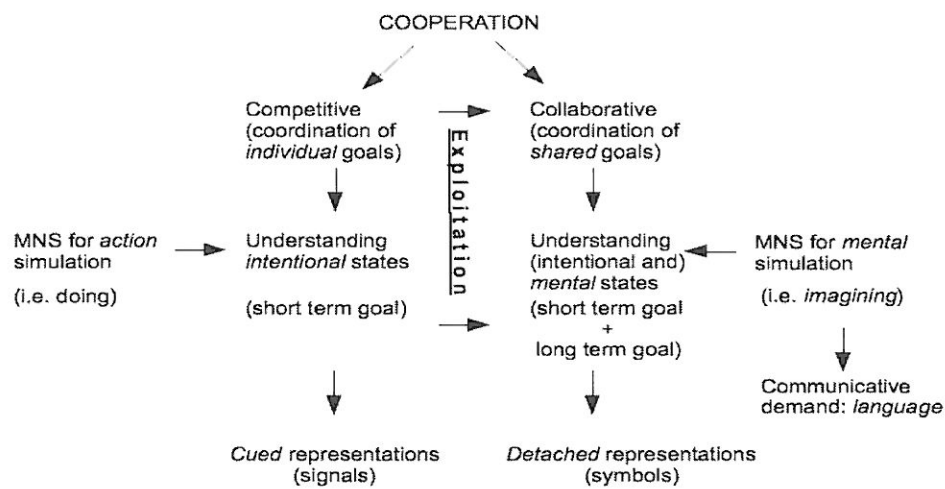
Schematic reconstruction of the argument:

- (i) Symbolic representation is required in order to have detached representations (represent the content of another's mental states in the form of propositional attitudes).
- (ii) In order to engage in collaborative cooperation, one needs to be able to have detached

representations.

- (iii) Therefore, the ability to have symbolic representations is necessary for collaborative cooperation.
- (iv) Apes do not have the ability to have symbolic representations.
- (v) Humans do have the ability to have symbolic representations.
- (vi) This is why we only see collaborative cooperation in humans.

Graphic reconstruction of the argument:



### References.

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## Coordination of EEG between speakers and listeners

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This project explores a possible coordination of neural activity between a person speaking and a person listening, as assessed via recordings of their ongoing EEG (electroencephalogram). The EEG of twelve speakers was recorded while narrating short stories, or giving directions on how to follow a route marked on a map. The EEG of another set of twelve participants was recorded while watching video recordings of these narrations.

To exclude the trivial explanation that a neural similarity between speakers and listeners is due to processing similar sensory input, audiovisual recordings were superimposed on each other so that two speakers were narrating simultaneously. Listeners were instructed to attend either to one or the other speaker. Thus, while keeping the sensory input identical across all listeners, the assumption is (1) that listeners' EEG will be coordinated predominantly with the speaker who is being attended to. Consequently, we also expect that (2) the EEG should be more similar among listeners attending to the same speaker.

The speaker data, being more artifact-ridden, are currently being analysed. Concerning the second hypothesis, we found reliable evidence that different individuals show similar time-locked activity when attending to the same speaker, with strongest effects in lower frequency bands (0–4 Hz) and medial frontal as well as right parietal areas. This suggests that our paradigm and methods are able to capture neural processes involved in the processing of communicated information, and can serve as a basis for further investigations of social interaction.

EMPATHY-BASED ETHICS:  
AN INTEGRATIVE FRAMEWORK

Harald Maurer (Tübingen), Jochen Sautermeister (München), John Michael (Aarhus)

In this paper, we develop a theoretical framework within which it is possible to distinguish various accounts of the role of empathy in ethical theory and in moral reasoning (e.g. Putnam, Breithaupt, Prinz, Levy). The cornerstone of this framework is a typology of different conceptions of empathy according to which of the following three primary components they emphasize: an affective, a cognitive and a motivational component. We propose that the various accounts we discuss agree on these three basic components of empathy but highlight different components, and can be reconciled within our more general framework. Drawing from within the theory of mind debate, we discuss theoretical conceptions highlighting each of these components and review relevant empirical evidence. Our discussion of the cognitive component is guided by theory theory (TT), whereas we invoke simulation theory (ST) in conceptualizing the affective component. In discussing the motivational component, we take interaction-based approaches (IT) as our point of departure and focus on the role that narratives play in structuring ethical experience. Within this theoretical framework, we employ connectionist and dynamic-systems approaches to organize models and empirical evidence bearing upon the role of empathy in ethics and moral reasoning – e.g. in the cognitive neurosciences and in developmental and social psychology.

Andreas F. Mayer

**Opacity of other minds in Samoa?  
ToM performance among children in an alleged  
non-mindreading environment.**

As part of a VW research group on intersubjectivity and 2.-person-approaches to social cognition ([www.soziales-gehirn.de](http://www.soziales-gehirn.de)), the focus of my work lies on the relationship between anthropological observations in the Southern Pacific on the “doctrine of the opacity of other minds” (Robbins & Rumsey, 2008) and the traditional theory of mind (ToM) framework. People in certain states of the South Pacific frequently state that one cannot know what is in another person’s mind. Such statements contrast with ToM according to which such knowledge is possible via mindreading and mental state inference.

The poster will shortly introduce my theoretical work and focus on the results of my empirical studies in Samoa, where culturally adapted false belief tasks (“Cup-Task” and “Bring Me!-Task”) were given to more than 300 children. The performance on the “Cup-Task” improved gradually with age and speaks against a universal onset of mental state understanding, in contrast to existing cross-cultural results (Callaghan et al., 2005). With respect to the “Bring Me!-Task”, Samoan children had – in contrast to a German control group – not only problems with the false belief, but also with the true belief condition. My suggestion is that the difficulties of transferring experimental tasks to other cultures has been underestimated – the problem is the experimental situation *per se*. In the light of these results, the possible relationship between opacity and ToM is discussed.

Callaghan, T.C, Rochat, P., Lillard, A., Claux, M.L., Odden, H., Itakura, S., Tapanya, S. & Singh, S. (2005). Synchrony in the onset of mental-state reasoning. *Psychological Science*, 16, 378–384.

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### **Shared worlds, excluded worlds**

Social understanding is conceived as embodied, second-person interactions with others (Gallagher, De Jaegher and Di Paolo), which occurs through a process of common modulation of sense-making activities. Common sense-making stands for the fulfilment of the goals of a human being which requires interactions. Additionally, what other people are doing in everyday life contexts cannot be understood in isolation from emotions (Maiese), narratives (Hutto), and some particular cultural structures.

But the understanding of others is rooted in conceiving and dealing with a shared world in which the encounter of others is based on social roles and norms. The shared structures of a common world (Schutz, Gurwitsch) offer the possibility of understanding the goals of others in relation to our own goals and the possibility of producing joint actions. These goals are undertaken within cultural frames and various social roles that allow the understanding of social situations.

This state of affairs highlights the issue of shared and unshared cultural values and social norms within different communities or inside a particular intercultural one. A shared world with others can produce relatively often an unshared world in which misunderstanding in and on everyday life easily produces fragmentation. The poster will be focused on the process in which culturally shared worlds can produce misunderstandings, fragmentation of the shared world, and processes of exclusion/inclusion.

Keywords: social cognition, participatory sense-making, exclusion/inclusion.

## Embodying Hand Gestures: A Computational Model

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During social interaction humans perceive and generate both verbal and nonverbal behavior intensively. In this context, neuropsychological studies claim coupling between both perception and generation processes that underlie many human social capabilities and characteristics. Such a coupling accounts for many embodied phenomena along the continuum of motor cognition: from the motor aspects of behavior to the semantics and intention behind it. This continuum starts from social characteristics such as alignment and priming, to more complex social abilities such as imitation and emulation, up to embodied recognition and understanding of behavior (cf. simulation theory).

With a focus on hand gestures, we propose a cognitive computational model which endows a virtual agent with the aforementioned social capabilities and characteristics. The model consists of a hierarchical representation of motor knowledge for hand gestures, which is shared between perception and generation processes. This enables the virtual agent to learn observed gestures through imitation. Furthermore, the model supports alignment and priming through activating and using the same representation by both processes. Finally, the virtual agent recognizes a gesture in an embodied manner, by comparing the movement to its own way of performing that gesture. The results show the underlying processes during interaction with a human.

# Beliefs About Beliefs Reconsidered: A Short Abstract

Alexander Stathopoulos

August 19, 2011

Is it true, as seems almost universally held in philosophy and psychology, that the layman's root method for explaining and predicting the behaviour of others, is to constantly posit inner mental states, such as beliefs and desires, as inner causes of behaviour?

Though this basic idea is widely embraced, adherents very much differ in their conceptions of it, and in their methods of evaluating it. As I hold, these differences are great to the point of disunity, and this disunity has long muddied the water over which evidence and which arguments truly support any given conception of the thesis.

In order to clarify this thesis, I will conduct a review of the arguments and studies that gave rise to it (emphasising Sellars and Dennett), and map out the different current varieties of the thesis (circumscribing differences between philosophy's and psychology's conceptions of the thesis, as well as some differences within these fields).

In order to evaluate its truth, I will define a clear and clearly testable version of it which respects the basic commitments of its adherents, then systematically consider its supporting arguments as well as some novel criticisms (including from Gauker, de Villiers, Knobe, Ratcliffe, and Hutto).

# The Role of Enactive Imagination in Goldman's Simulation Theory

Abstract

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In this presentation I criticize Alvin Goldman's simulation theory which involves the claim that the basic method of folk psychologically predicting behaviour is to form pretend beliefs and desires that reproduce the transitions between the mental states of others, in that way enabling to predict what the others are going to do. The pretend states are supposed to be generated by a process which Goldman calls 'enactive imagination'. I argue that when it comes to simulating propositional attitudes it isn't clear whether pretend beliefs and desires could be distinguished from 'real' ones as a separate kind of mental states. More specifically, I claim that the putative pretend desires can't be actually distinguished from ordinary desires neither introspectively, functionally, nor physically. Since belief-desire model underlies the conception of pretend states in higher-level mindreading, dropping pretend desires from the picture isn't possible and, due to that, the notion of enactive imagination may be incoherent. This would mean that the central model of simulation in Goldman's theory isn't feasible. Then again, the theory could still survive because it includes an additional model, but the latter brings it more into line with the theory theory.

## The Social Origins of Intentions

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### Abstract

Intentions are generally conceived as discrete mental states that cause appropriate actions. However, attempts to localize intentions do not seem to converge to a single brain structure, and the properties inherent in the notion of intention seem deeply incompatible with neural data about action control. We will argue that this is due to the fact that the concept of “intention” does not primarily denote a neural or psychological state, but instead that it is a social construct used for explaining behavior. Positing intentions helps us reconstruct the motivations behind our own and others’ actions in a comprehensible way, and highlight the aspects of behavior that we deem important in the context, but it would be a mistake to take this approximation to be the key causal factor in the genesis of our actions. We will show that, in explaining actions, there is a wide range of pieces of behavior on which one can focus, but also a wide range of levels of abstraction to describe a single action. As a result, a multitude of descriptions is available for even the simplest pieces of behavior. Consequently, the content of an attributed intention is dependent on the context, and can vary to a large extent.

**Keywords:** Action, Intention, Prefrontal Cortex