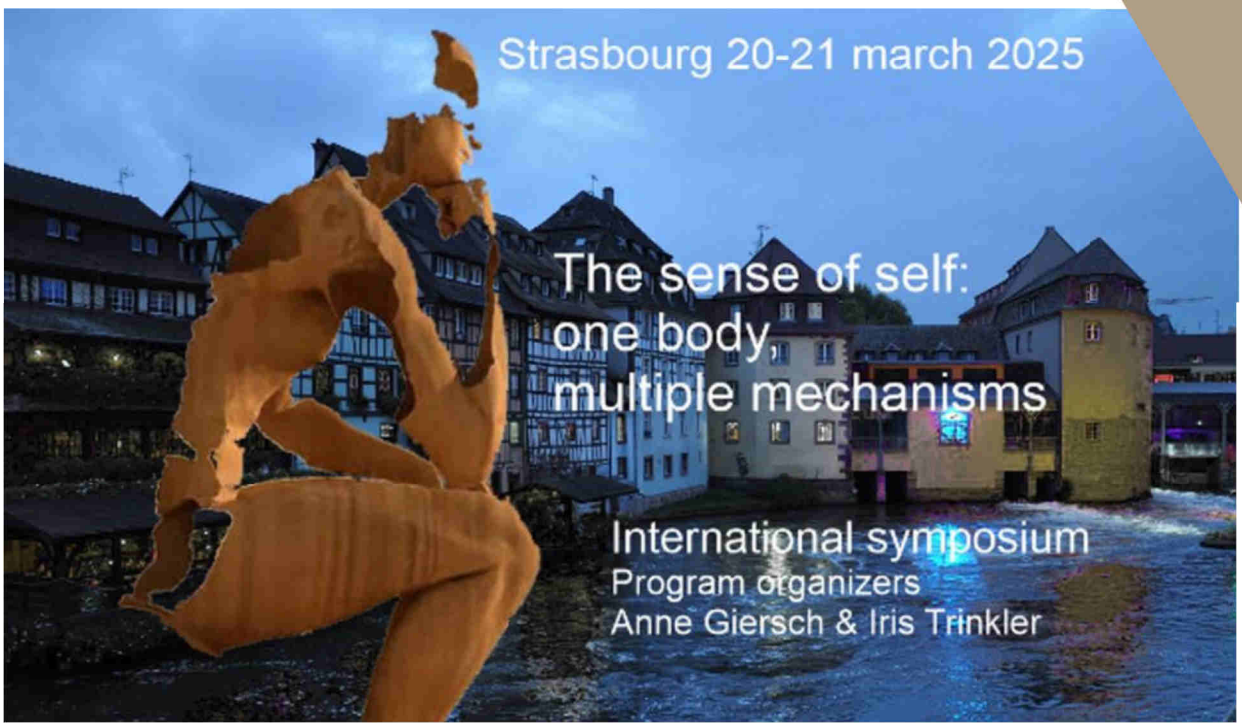

Presentation and Poster Abstracts

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Conference abstracts

Phenomenological Approaches to Coenesthesia

István Fazakas

Bergische Universität Wuppertal – Germany

Authors of the French Enlightenment introduced the notion of a feeling of existence (sentiment d'existence), often described as a bodily feeling, sometimes contrasted with, and other times intimately related to, a feeling of selfhood (sentiment de soi). The idea of a bodily feeling of being a self not only prefigures certain themes we now approach through the notion of existential feelings (as explored, for instance, by M. Ratcliffe) but has already explicitly formed the basis for research in neurophysiology and psychopathology.

J.C. Reil, a German physician who also coined the word psychiatry, and his student, C.F. Hübner, proposed to describe this feeling with the concept of coenaesthesis, which Maine de Biran critically engaged with, likely introducing the term into the French language. The concept of coenaesthesis, understood as the bodily foundation of the feeling of selfhood and existence, became central in the French tradition of psychiatry. This focus on disturbances of coenaesthesis, labeled cenesthopathies, was mainly considered in terms of forms of depersonalization.

Far from being a mere historical curiosity, the concept remains relevant in Basic Symptom Research and even appears in the Examination of Anomalous Self Experience (EASE). Additionally, it can be directly related to the development of the notions of interoception and proprioception.

In this talk, I revisit historical insights concerning coenaesthesia as a pre-reflective bodily feeling of being a self from a phenomenological perspective. I argue that recent developments in phenomenology can account for this anonymous bodily feeling, which already constitutes an incipience of selfhood, preceding reflective subjectivity and even minimal for-me-ness as their fleshly element.

Exteroceptive and Interoceptive Contributions to Bodily Self Alterations in the Schizophrenia Continuum

Francesca Ferri

"G. d'Annunzio" University of Chieti and Pescara – Italy

Schizophrenia is primarily characterized by a disruption of the core self, which is deeply rooted in bodily experience-the bodily self. In individuals with schizophrenia, this sense of the bodily self is significantly altered, reflecting changes in both exteroceptive (external sensory) and interoceptive (internal bodily) processing. This presentation will explore how disturbances in multisensory integration and interoceptive processes contribute to altered body representations, shaping various symptom dimensions across the schizophrenia spectrum. Particular attention will be given to the roles of respiration, excitation/inhibition (E/I) imbalance, and multisensory disruptions, as well as their reciprocal interactions. By examining these factors, we aim to offer novel insights into the mechanisms underlying bodily self-disturbances in schizophrenia and discuss potential avenues for targeted therapeutic interventions.

Neuroscience of self-consciousness: embodied and extended

Olaf Blanke

Ecole Polytechnique Fédérale de Lausanne (EPFL) – Switzerland

Humans experience a 'real me' that 'resides' in 'my' body and is experienced as the subject (or 'I') of conscious experience and thought. This aspect of self-consciousness, namely the feeling that conscious experiences are bound to the self and are experiences of a unitary entity ('I'), is often considered to be one of the most astonishing features of the human mind. I will present recent work that targets self-consciousness by investigating a minimal form of self-consciousness that is based on the multisensory perception of tactile, proprioceptive, visual signals as well as interoceptive signals and has been studied in cognitive psychology, neuroscience, and in neurological patients (i.e., bodily self-consciousness, BSC). Highlighting a series of studies investigating two fundamental aspects of BSC, referred to as self-location and self-identification with an individual's body, I show that BSC is based on torso-centered signals in a distributed cortical network, centered in temporo-parietal cortex. Such a torso-centered BSC system, by coupling exteroceptive and interoceptive signals, is fundamental for self-consciousness, leading to conscious mental states that are experienced as if by a unitary and embodied subject. In a second part of my presentation I will highlight recent work that explores links between BSC (self-location, the first-person perspective, sense of agency) and so-called extended or narrative self-consciousness (NSC), in particular spatial navigation and episodic autobiographical memory. I will present data showing that changes in BSC impact (1) spatial navigation performance and grid-cell like activity in entorhinal cortex and are of relevance (2) in episodic autobiographical memory, mediated by hippocampal activity coupled with BSC regions. These data link key subjective components of BSC with spatial navigation and the subjective reliving of personal events from one's past.

The vestibular contributions to the bodily self: behavioural, clinical and neuroanatomical evidence

Christophe Lopez

Center for Research in Psychology and Neuroscience – CNRS Aix-Marseille University – France

I will review data showing that the vestibular system - at the origin of a mostly preconscious and silent sense - is crucial for several facts of the bodily self, including self-location, agency, perspective taking, body ownership and the perceptual body schema. We will present data from patients with peripheral vestibular disorders, patients with epilepsy, as well as results from experiments in healthy participants during artificial stimulation of the peripheral vestibular receptors.

Electrophysiological interplay between perceptual and self-consciousness

Nathan Faivre

Laboratoire de Psychologie Neurocognition – CNRS Grenoble – France

Perceptual experience is a multi-faceted, dynamical process encompassing both perceptual and self consciousness. Simple forms of perceptual experience can be tackled empirically through measures of stimulus detectability and confidence ratings. In this talk, I will argue that stimulus detection and confidence can be explained by evidence accumulation, a form of sequential sampling of sensory evidence performed by the brain. I will present recent invasive electrophysiological recordings in which human volunteers performed detection and discrimination tasks followed by confidence ratings. I will discuss the results in light of a computational model of evidence accumulation explaining key aspects of perceptual experience. I will end the talk by discussing future projects aiming to combine electrophysiological and electrochemical correlates of perceptual experience.

Minimal self, bodily signals and consciousness

Catherine Tallon-Baudry

Ecole Normale Supérieure – INSERM Paris – France

A core characteristic of conscious experience is its subjectivity. Experience is the direct acquaintance with something from a first-person perspective, as it appears to us and what it evokes in us. By very definition, experiences are necessarily had by an experiencing subject, the minimal self. I will present the neural subjective frame, i.e. a mechanistic framework, where bodily signals play a coordinating role capable of accounting for the emergence of a unified first-person perspective, as well as supporting experimental evidence.

The affective unity of bodily awareness

Frédérique De Vignemont

Jean Nicod Institute – CNRS PARIS – France

What draws apart the awareness that we have of our own body compared to the awareness that we have of other objects.? One may say that we feel it from the inside and that we have direct control over it, but this description remains relatively cold, so to speak. It neglects a fundamental fact about our subjective bodily life, namely that the body we consciously experience is too often the body that feels uncomfortable or even painful. In brief, we are not like pilots of a ship because a pilot can survive without a ship whereas our body seems to us irreplaceable and everything that happens to it directly matters to us. Discussions on the complex relation between bodily agency and bodily awareness generally focus on proprioception and on instrumental agency (as in grasping or pointing movements). However, one should not neglect another kind of bodily agency, which I call protective agency. By focusing on protective agency, we will be able to consider another major role played by bodily awareness for action, a motivational role.

Schizophrenia in the Flesh

Sohee Park

Vanderbilt University – US

Splitting of the self and bodily self-disturbances, symptom that were central to early conceptualization of schizophrenia, are highly salient and disruptive to individuals with schizophrenia throughout the course of their illness. However, there exists a chasm between the phenomenology that defines one's subjective illness experience, and the current biological understanding of schizophrenia as a brain disorder. We propose to bridge this divide.

An implicit understanding of one's own body as a continuously unified entity across time with fixed boundaries is necessary for establishing a sense of self, and this experienced unity of self and body is indispensable for adaptive interpersonal functioning. Thus, specifying neurocognitive and social mechanisms underlying self-disturbances in schizophrenia has significant practical implications for developing targeted interventions, but progress in this area of research has been limited by the subjective nature of bodily self-experiences, and the scarcity of reliable methodological tools to quantify them.

To help close this gap, we investigate cognitive contributions (e.g., working memory, mental representation, imagery, simulation) to the phenomenology bodily self-experiences to elucidate spatial components of self-disturbances that are closely aligned with anomalous agency, body ownership and embodiment. Results indicate that a unique profile of cognitive deficits and enhancements, when combined with social isolation may contribute to an altered bodily self-boundary, dissociative experiences and abnormal embodiment of emotions. Furthermore, preliminary intervention studies targeting social attention and simulation have yielded promising outcome.

To summarize, mechanistic understanding of the origins and consequences of bodily self-disturbances is beginning to crystallize within the framework of social cognitive neuroscience but much remains unresolved. Leveraging recent advances in neuroscience and technology could lead to a better understanding of the elusive behavioral core of schizophrenia in the flesh.

How we experience time: The bodily self in ordinary and altered states of consciousness

Marc Wittmann

Institute for Frontier Areas of Psychology and Mental Health Freiburg – Germany

I will discuss recent empirical findings within the embodiment framework suggesting that physiological changes of the body, the basis of our feeling states, form an internal signal to encode the duration of external events. The entanglement of self-reflective body awareness and the experience of time are prominently disclosed in altered states of consciousness, i.e. in meditative states and during Floatation-REST, under the influence of drugs as well as in many psychiatric and neurological conditions. This body of work on the intricate relationship between the self and time will be presented.

Unified Self or Network of Selves?

Thomas Fuchs

Heidelberg University – Germany

Contrary to the classical idea of a unified core of the human person, concepts of a multiply composed self or a "network of selves" (Gallagher 2024) have been increasingly proposed in recent times. Such a network manifests itself in different functions and dimensions of self-awareness, including, for example, a bodily (interoceptive and proprioceptive) sense of self, a basic sense of self over time, a sense of agency, sensorimotor or ecological self-awareness, and a narrative or biographical self. However, it remains unclear whether a central integration of these different dimensions of the self is necessary or whether they can also be thought of as a loose association or network. With regard to the rehabilitation of stroke patients and Kurt Goldstein's related concept of the self-actualization of the organism, I will argue that an integration of self-related functions is necessary to explain these adaptive and rebalancing achievements of the organism.

I Overthink, therefore I'm not : Altered Self-Experiences in Depersonalisation

Anna Ciaunica

University of Lisbon – Portugal

Human bodies are highly dynamic systems, constantly moving both inside (e.g. heart beats) and in the outside world (e.g. footsteps, walking) to secure survival. The mechanisms underlying the interplay between exteroceptive and interoceptive self-related sensory signals are key to understanding the sense of self and its disturbances (Park and Blanke 2009). Previous work showed that the bodily self is not fixed but constantly updated through dynamic sensory feedback, including sound feedback (Tajadura-Jiménez et al. 2012; 2015). Depersonalisation (DP) is a very common phenomenon that make people feel detached from their bodily self (Sierra & Berrios 1997). Here I will briefly present work investigating the dynamic coupling between bodily movements from the inside the body (i.e. cardiac signals) with bodily actions in the world (e.g. walking) in people with high and low occurrences of Depersonalisation.

I will then propose a novel conceptual model of disrupted sense of selfhood in DP through the lens of the Active Inference framework (Friston 2005). I suggest that failures of somatosensory attenuation and consequent abnormal percepts-and beliefs-may underwrite aberrant self-model in DP. This may lead to a disruption of agentive control over both perception (sensory attention) and action (sensory attenuation), triggering abnormal perceptions, and consequent aberrant beliefs of self-detachment.

Given that our bodily self is not a static and closed entity, but rather a dynamic and open system, literally constituted in relation to a proximal environment (Ciaunica & Fotopoulou 2017; Ciaunica et al. 2021c) then somatosensory attenuation becomes a key part of the story of understanding how the self emerges as differentiated and yet related to its surroundings.

If my hypotheses are correct, then depersonalisation symptoms, although typically couched as "losing" one's sense of self, may be the linked, on the contrary, to an inability to attenuate self-related inputs and hence to 'forget' the self in the background. Alterations in the ability to attenuate self-related information in order to optimally perceive, engage and act in the world may further lead to increased reflexivity or 'hyper-reflexivity' (Parnas & Sass, 2003; Fuchs 2005; Ciaunica et al. 2020). This hypothesis is consistent with subjective reports outlining feelings of being simultaneously trapped in one's head (mind) and outside one's body (disembodiment) (Ciaunica et al. 2020; Ciaunica et al. 2021a). Perhaps paradoxically, this imbalance may entail an abnormal elevation of higher-order self-related processing, rather than a 'loss' of the sense of self.

Poster abstracts

Tracking flow in real time: A novel approach for continuous subjective measurement

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Flow experience is defined as becoming deeply absorbed in a task. It is characterized by losing track of time, reduced bodily and spatial awareness, and diminished self-consciousness, leading to an altered sense of self. Flow research typically involves collecting physiological data during a task and associating them with subsequently completed self-reports (i.e., post-task report). However, this approach is limited, as post-task reports provide cumulative assessment of the experience, lacking the temporal resolution required to be analysed with physiological data and failing to capture flow as it unfolds in real time. Here, we introduced a novel method that enabled the continuous and real-time collection of subjective and physiological measurements of flow. Participants continuously reported their perceived degree of flow by pressing a custom-made foot pedal during the task (i.e., real-time report). They (N = 40) played the video game Thumper in virtual reality under two conditions: one with the pedal and one without, while their heart rate was recorded. After each condition, participants completed the Flow Short Scale (FSS) as a post-task report. Thereby, we investigated whether pedal interfered with (a) participants' flow experience and (b) physiological responses (i.e. heart rate variability), and whether (c) it provided a real-time measure of flow that correlated with FSS scores. Results indicated that the pedal did not interfere with (a) participants' flow experience and (b) heart rate variability. Moreover, (c) real-time flow ratings during the second half of the task correlated with FSS scores, suggesting that the pedal provided a reliable self-assessment of flow.

Keywords: flow experience, bodily awareness, spatial awareness, self consciousness, time perception, real time measurement, heart rate variability

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* Poster presenter

One Step Closer to my Heart: Cardiac Cycle is Coupled with Footsteps in Typical but not in Depersonalisation Individuals

Alberto Colombo [1,2], Simon Knogler [3], Giulia Hambsch [4], Ana Tajadura Jiménez [3,5], Alejandro Galvez-Pol [6], Julia Ayache [7,8], Veronika Alekseeva * [9,10], Julien Lagarde [11], Anna Ciaunica [3,9]

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Human bodies are highly dynamic systems, constantly moving both inside and in the outside world to secure survival. The mechanisms underlying the interplay between exteroceptive and interoceptive self-related sensory signals are key to understanding the sense of self and its disturbances (Park and Blanke 2009). Previous work showed that the bodily self is not fixed but constantly updated through dynamic sensory feedback, including sound feedback (Tajadura-Jiménez et al. 2012; 2015). Depersonalisation (DP henceforth) is a very common phenomenon that makes people feel detached from their bodily self (Sierra & Berrios 1997). We conducted a study investigating the dynamic coupling between bodily movements from inside the body (i.e., cardiac signals) and bodily actions in the world (e.g., walking) in 60 participants with high and low occurrences of DP. Participants were invited to walk while wearing headphones displaying their natural footstep auditory feedback across frequency bands in three conditions (control, high frequency, low frequency), following a procedure from Tajadura-Jiménez and colleagues (2015). In parallel, we recorded participants' cardiac signals in real time, as well as gait biomechanics, which were used as an implicit measure of changes in perceived body weight across conditions. We found that in typical controls walking pace is significantly coupled with the systolic cardiac phase, whereas in people detached from their bodies (high DP) this coupling is absent. Our study reveals, for the first time, that real-time cardiolocomotor coupling is altered in DP individuals, with important implications for dynamic body-based potential therapy.

Keywords: depersonalisation, bodily self, cardiolocomotor coupling, cardiac cycle, dynamic sensory feedback

*Poster presenter

The Perception of the Whole: Evidence for Bayesian Causal Inference Mechanisms in Full-Body Ownership Illusions

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Body ownership-the multisensory perception of limbs and body parts as one's own-has been extensively studied in the contexts of vision, touch, and proprioception. Bayesian causal inference models have recently been employed to explain body ownership illusions, such as the visuotactile rubber hand illusion, suggesting that observers compute the probability that visual and tactile signals originate from a common source. However, it remains unclear whether similar computational processes underlie the perception of ownership over the entire body.
To address this question, we developed a detection task relying on the classic full-body illusion paradigm. Participants reported whether the body they observed (a mannequin's body) felt like their own (yes or no answer). We systematically manipulated the asynchrony between visual and tactile stimuli delivered to the mannequin and the participant's real body, alongside varying levels of visual noise.

Our results revealed that the probability of experiencing the full-body illusion was accurately predicted by a causal inference model, wherein observers estimate the likelihood that visual and tactile signals arise from a common source. This model outperformed a non-Bayesian alternative that did not account for sensory uncertainty, even though the behavioral effects of visual noise were relatively weak. These findings provide evidence that Bayesian causal inference mechanisms extend to whole-body ownership illusions. We discuss the implications of these results for understanding the relationship between part-based and whole-body ownership in multisensory awareness.

Keywords: Body ownership, Multisensory integration, psychophysics, Bayesian modelling

* Poster presenter

Visual dominance of body stimuli aligns with Gender Identity rather than Assigned Sex in Transgender Adults

Marina Leggieri * [1], Tommaso Ciorli [1], Maria Pyasik [2], Sarah Finzi [1], Maria Teresa Molo [3], Gabriele Volpara [4], Lorenzo Pia [1]

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In this study, we assessed whether administering the Full Body Illusion (FBI) with an avatar of gender congruent or incongruent to that of the participant would influence gender-related implicit attitudes, as well as visual dominance of male and female body stimuli, in cisgender and transgender adults. We found that visual dominance of gender-related body stimuli aligns with gender identity in both groups, with a slight facilitating effect in the congruent avatar condition. Nonetheless, in transgender participants, the FBI procedure had a weakening effect on the implicit attitudes towards one's own gender. These results may contribute to a better understanding of what own-body representations and pre-conscious self-referential processes are like in transgender adults.

Keywords: Gender identity, perceptual dominance, Full Body Illusion

* Poster presenter

From Brain Networks to the patient-environment system in clinical neuroimaging

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Like the Hydra of Lerna in Greek mythology, regrowing two heads for each chopped-off one, the advancements in our understanding of the brain produce more questions than answers. Yet, neuroimaging technologies allowing the visualization of brain architecture and activity in vivo have become a central tool in psychiatric research and present promising avenues to improve patients' quality of life. Although an impressive development in data analysis techniques and clinical neuroimaging research programs including hundreds, if not thousands of subjects, we still lack a clear understanding of the role of the brain in psychiatric disorders. The quest to find the causes of psychiatric illnesses in terms of their neural underpinnings turned researchers to assume that it was possible to understand brain alteration in isolation from the patient's body and environment. However, to fully understand the neural characteristics of psychiatric disorders, it is necessary to consider the body carrying the brain and the environment in which this happened. That is the patient-environment system. In this line, previous work in philosophy and clinical psychology has emphasized the importance of paying attention to the patient-environment scale of analysis; however, an explicit link between these ideas and clinical neurosciences is still lacking. The present work builds on the radical embodied cognition framework to envisage how to integrate patient-environment data in clinical neuroscience.

Keywords: Clinical neuroimaging, Psychiatric disorders, Radical embodied cognition

* Poster presenter

The biophysics of balanced living: balancing is (one aspect of) organism-level mechano-homeostasis

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What exactly does my sense of balance sense? What exactly is kept, when I keep my balance? On current views, the sense of balance is arguably just an abstraction from diffuse sensorimotor activity involved in not falling over. The task of balancing remains under-defined, reliant upon the intuitive notion of not falling over rather than formal concepts. The outcome, balance (noun) is conceived as epiphenomenal; a mere consequence, not a cause, of balancing activity. This poster will present a radically new conception of balance as one aspect of organism level mechano-homeostasis, organised by control loops akin to thermic homeostasis. On this view, balance (noun) is (like body temperature) a proper, measurable physical entity. Specifically it is, almost tautologically, a certain field of mechanical force (i.e. that which perfectly cancels gravitational acceleration of the body). This force field is both what is sensed and what is kept, in the same sense as body temperature is what is sensed and kept by thermo-regulation. This force field may appear impossible to characterise in a general manner because it is fluid and dynamical, unique to each morphology and configuration. However animal evolution has found a way to do it, which this poster will explain in formal and conceptual detail. This homeostatic conception of balance is relevant to topics covered in keynote talks on contributions to the sense of self from vestibular activity (Prof Lopez), and protective agency (Prof de Vignemont). Mechano-regulation and thermo-regulation may contribute to the sense of self in very similar ways.

Keywords: balance, homeostasis, mechano, regulation, sense of balance, sensorimotor

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* Poster presenter

Peeling the dynamical layers of self: Impact of aversive electrodermal stimulations on the phenomenological, physiological and motor components of social interactions

Julia Ayache * [1], Laroche Julien [1], Camille Pistre [1], Simon Pla [1], Marta Bienkiewicz [1], Benoit Bardy [1]

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The self is a multidimensional construct interacting with the external (and social) world. Emotional experiences color the way we interact with the world and pain is one of the most archaic emotions that trigger stereotypical physiological and behavioral responses. Accumulative evidence shows that behavioural synchrony influences pain threshold by increasing social connectedness, yet those studies have neglected to consider the emotional component of pain and its consequences on physiological and behavioural rhythms. This study investigated the impact of aversive electrodermal stimulations on the phenomenological, physiological and motor components of social interactions.

10 mixed-gender quartets (N = 40) performed oscillatory movement with their arm under three conditions: (i) SOLO (i.e., without visual coupling), (ii) TOGETHER (i.e., with visual coupling) and (iii) SYNCHRO (i.e., with the instruction to synchronize). Electrocardiograms and motion tracking were recorded while aversive electrodermal stimulations were delivered to half of the participants. Between experimental conditions, participants completed self-reports of emotional states, social connectedness, unpleasant experiences, and the fear of experiencing the stimula- tion.

The administration of the aversive stimulation induced localized unpleasant sensations, associated with a decrease of emotional valence and an increase of the fear of stimulation. The aversive stimulation also led to an increase in participants' heart rates when there was a threat of stimulations or when stimulations were effectively delivered. However, the stimulation did not influence social connectedness and behavioural synchrony, but individual movement's variability. Altogether, these results stress the distinct sensitivity of the rhythmic components of the self to emotional and social context.

Keywords: pain, emotion, synchrony, social connectedness

* Poster presenter

(Dis)Embodied Joint Agency in Human-VR Agents Interactions

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The sense of agency –feeling of being in control of one's actions– is a fundamental aspect of the human mind. Previous work showed that the Joint sense of agency(JSoA)-sense of control experienced when acting with others- depends on the embodied agent we are acting with(1). However, the effect of interacting with human versus artificial bodies remains an open question. Here we investigate the effect of Depersonalisation(DP) –condition making people feel detached from theirself and body- on embodied JSoA in Human/Human versus Human/Robot avatar dyads, using the Joint Simon Task(2) with the Intentional Binding task(3). We designed the task in Virtual Reality where participants with High versus Low DP levels embody either a Human or a Humanoid Robot Pepper avatar, performing the task either with a Human or Pepper avatar.

People who feel less connected to their bodies and feel as 'machines' or 'automata'(4) may develop a higher JSoA while doing a task with a robotic body opposed to a human body. We hypothesize for HighDP group a higher Joint Simon Effect embodying Pepper performing the task with Pepper avatar co-agent opposed to the Human co-agent. For LowDP group we hypothesize higher effect in the Human/Human avatars dyad condition.

Our study investigates for the first time the effect of the human embodiment on JSoA in human versus robotic avatar in VR. A better understanding of how feelings of being (dis)connected from one's body impacts how people feel (dis)connected from human and artificial others may help design better human/artificial agents' interactions.

Keywords: Depersonalisation, Embodiment, Virtual Reality, Sense of Agency, HRI

* Poster presenter

The sense of self in patients with otoneurological disorders and PPPD : alteration and implication of anxiodepression

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The vestibular system plays a crucial role beyond balance, contributing to the emergence of the bodily self through multisensory integration. Dysfunction in this system can disrupt the sense of self, leading to depersonalization-derealization (DD) symptoms. Anxiety and depression, common comorbidities in otoneurological disorders, may mediate this relationship. Regarding this, chronic dizziness such as Persistent Postural-Perceptual Dizziness (PPPD) is of particular interest, as it often results from the interplay between vestibular dysfunction, anxiety and depression. Consequently, this study aims to identify alterations of the sense of bodily self in patients with vestibular disorders and PPPD and to examine the mediating role of anxiety and depression.
We recruited 342 patients with vertigo/dizziness (221 with vestibular disorders and 121 with PPPD) and 215 control participants without vertigo/dizziness. Participants completed questionnaires assessing DD symptoms (CDS), state anxiety and depression (HADS), and trait anxiety (STAI). Data were analyzed using intergroup comparisons and structural equation modeling.

Results revealed that patients scored significantly higher on DD, anxiety (state and trait), and depression than healthy controls, with PPPD patients showing the highest scores. Structural equation models further demonstrated that anxiety and depression significantly mediate the relationship between vestibular dysfunction and DD symptoms.
These findings suggest that vestibular dysfunction in otoneurological and PPPD patients lead to bodily self distortions, supposedly because of mismatches in multisensory integration. This incoherence, exacerbated by anxiety and depression, contributes to the observed symptoms. Future studies should explore these bodily self distortions using experimental approaches and investigate the cerebral processing of associated vestibular information.

Keywords: bodily self, vestibular system, PPPD, depersonnalization, derealisation, anxiodepression

* Poster presenter

Does Body Ownership require visual awareness: The Virtual Hand Illusion in a Continuous Flash Suppression paradigm

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There is wide agreement that the rubber hand illusion is multisensory. Capitalizing on the fact that multisensory integration can occur even if one sensory signal is unconsciously perceived, we tested whether (or not) visual awareness is necessary to induce the illusion by combining immersive virtual reality and Continuous Flash Suppression.
Thirty-six healthy subjects participated in a Virtual Hand Illusion (VHI) procedure to assess the presence of the illusion. Then, those susceptible to the illusory feeling underwent a VHI task where we manipulated spatial perspective (1PP/3PP), stimulation congruency (Synch/Async), and awareness (Conscious/Unconscious) through Continuous Flash Suppression. We measured proprioceptive drift and stimulus visibility.

Results showed that in the Conscious condition, the drift was significantly higher in the 1PP sync compared to 3PP/Async conditions, thus indicating a successful procedure. Crucially, the drift in any 1PP Unconscious condition (i.e., Sync and Async) did not differ from that in the 1PP Synch Conscious condition. A significant difference in the drift was found between the unconscious 1PP and 3PP conditions, being higher in the former. These data show that the drift was induced without visual awareness only when the virtual hand was unconsciously perceived in 1PP.
Our findings suggest that objective illusory ownership is unconsciously modulated by perspective, similar to when stimuli are consciously perceived. This work suggests that body ownership can be triggered without visual awareness, highlighting a complex interplay between consciousness and bodily self-perception.

* Poster presenter

Experiencing time in peripersonal space

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Time and space constitute the fundamental scaffoldings for an embodied agent who acts upon and interacts with the environment. From this perspective, experienced time and space are not merely abstract or geometrical fields but closely related to action possibilities. This phenomenal aspect of action space is reflected in the well-established concept of peripersonal space (PPS), which refers to the space immediately surrounding body parts. PPS functions as both a safety zone and an action space.

In contrast, psychological studies on time perception have primarily focused on bodily states and sentience, paying less attention to the dynamics of sensorimotor processes and actions. Nonetheless, a significant intersection exists between PPS and time perception. For instance, the presentation of a threatening object has been shown to expand PPS as a safety zone, while studies on time perception reveal a tendency for subjects to overestimate the duration of such events. Moreover, philosophers often characterise the phenomenality of PPS in temporal terms, such as the immediacy of action, the feeling of presentness, or the anticipation of near-future action.

Despite these connections, the felt time within PPS as an action-involving space remains under-explored, as does the felt space it describes. To address this issue, I will examine the interplay between the action speed of an embodied agent and the anticipated speed of environmental change. Particularly, I will analyse the constitutive role of time in the expansion or projection of PPS into far space, facilitated by the integration of tools into the body schema.

Keywords: peripersonal space, time perception, enaction, tool use

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* Poster presenter

Dynamics of Self-Consciousness and Its Bodily Basis: A Comparative Analysis of Depersonalization and Meditation

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In this paper, I explore the dynamics of self-consciousness, focusing on its various aspects and their interactions. Drawing on recent neurophilosophy, I examine altered states of self-consciousness as a method to refine theories of self.

A key conceptual distinction distinguishes two forms of self-consciousness (Zahavi 2014). Minimal self-consciousness (MSC) refers to the core subjectivity of experience, encompassing embodied and affective dimensions. Reflective self-consciousness (RSC), instead, is the capacity to take oneself as the object of reasoning and self-narrative.

Both meditation and pathological depersonalization can be defined as de-identification: mental states in which the self feels distant. That is, alterations in the sense of self in these mental states bear notable similarities (Ciaunica et al. 2021; Kirberg & Chadha 2024; Metzinger 2003). Minimally self-conscious affective aspects diminish, while bodily awareness may intensify. Similarly, changes in self-reflection show parallels, with RSC continuously engaged in focusing on MSC.

However, I argue that experiences of depersonalization disorder and meditation also differ significantly. In particular, bodily MSC shows distinct characteristics, leading to different alterations in RSC and the overall MSC-RSC dynamics. In meditation, RSC actively modulates MSC, involving voluntary adjustments of affectivity, enhanced bodily awareness, and reduced narrativity. Conversely, MSC is distorted in depersonalization disorder, with a diminished sense of agency and bodily self-consciousness. This disruption results in compulsive hyper-reflectivity (Sass et al. 2013). By comparing these phenomena, I highlight the crucial role of bodily processes in grounding self-consciousness and the need to study the intricacies of the dynamics of self-consciousness in more detail.

Keywords: sense of self, minimal self, reflective self, depersonalization, meditation

* Poster presenter

Sports Training in Psychosis: Cognitive Barriers and Therapeutic Benefits

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Physical activity has been recognized for several years as a non-pharmacological therapeutic approach. It is now an essential component in the management of numerous chronic somatic conditions.
In mental health, its benefits are twofold: on one hand, it improves psychiatric symptoms and cognitive disorders; on the other hand, it helps prevent cardiometabolic complications often caused by the side effects of psychotropic treatments and unhealthy lifestyles (unbalanced diet, sedentary behavior).

However, patient adherence remains low, particularly among individuals with schizophrenia. Our research, supported by the literature, suggests that beyond motivational factors, disturbances in the perception of bodily self (such as agentivity and perception of bodily boundaries), as well as difficulties distinguishing self-generated movements from those originating in the environment, may also contribute to this lack of engagement.

Indeed, the simple act of walking generates self-related visual movements that must be differentiated from those originating in the environment. This distinction becomes even more challenging as some previously hidden objects may appear as a result of the individual's movement.

Initially, we will assess patients' ability to differentiate self-related movements from those of surrounding objects. Subsequently, we will examine whether walking training in various types of environments can mitigate the observed difficulties. The ultimate goal is to develop tailored training programs that can promote adherence to physical activity.
Finally, we will verify whether walking training in different environmental contexts can help compensate for patients' challenges in distinguishing self-related movements from those of environmental objects. This will enable us to propose well-adapted training programs.

Keywords: Psychosis, exercise, barriers, bodily self

* Poster presenter

Cardiac Interoception and Motor Preparation in Libet's task

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The Somatic Marker Hypothesis, introduced by Antonio Damasio in 1994, emphasizes the essential role of perceiving 'body states' in decision-making processes. This theory links interoceptive processing to specific brain areas, such as the insula and somatosensory cortex, suggesting their primary function is emotional evaluation of action outcomes. Later, motor initiation was shown to be influenced by the phases of the cardiac cycle (Palser et al., 2021; Al et al., 2023), and even motor agency was suggested to depend on cardiac input (Herman & Tsakiris, 2020). Here, we further explore this perspective on cardiac input for motor preparation, advocating for its possible incentive role in movement execution. We implemented the classical Libet's paradigm with W- and M-experimental condition and 40 self-paced movements per each of the two conditions in naïve participants (n = 41) (Bredikhin et al., 2023). Behavioral data were aligned with the cardiac cycle. We observed a non-uniform distribution of button presses along the cardiac cycle in the W-experimental condition. Button presses predominantly occurred during the diastolic phase of the cardiac cycle, which provides a link between cardiac input and motor initiation. These findings suggest that cardiac interoception relates to motor preparation under conditions of uncertainty, offering a novel interpretation of the W-condition in Libet's task. Moreover, our results reinforce the association between cardiac interoception and the experience of volition in tasks that involve self-paced movements. Overall, our results challenge traditional interpretations of the W-condition and presents an alternative perspective on the 'urge to move' phenomenon.

Keywords: motor execution, volition, cardiac interoception

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