



**SCALab**

SCIENCES COGNITIVES ET SCIENCES AFFECTIVES

# YEARBOOK 2023



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# The directors' message

In 2023, the Cognitive and Affective Sciences Laboratory (SCALab, UMR 9193) comprised 36 full university research professors, 4 CNRS researchers in psychology and neuroscience, 1 excellence chair, 4 associate lecturers (MAST), and 10 permanent administrative and technical staff members (including 4 supporting the CNRS Visual Sciences and Cultures Research Federation - SCV). By 2023, the unit also had 31 PhD students and 4 post-doctoral researchers.

Positioned at the frontier between the humanities and social sciences and the neurosciences, the laboratory is developing a translational scientific approach involving the study of cognitive and affective processes in the general population and in various pathological populations, using tools from cognitive psychology or clinical psychology, neurobiological measurements and digital tools (particularly in conjunction with the IrDive scientific platform).

The research unit has maintained its philosophy of fostering exchanges between laboratories, allowing several researchers and doctoral students to spend time in other French or international labs through programs such as the Fulbright grant, CNRS delegation, MobLillex grant, and PHC program. Additionally, the laboratory has welcomed post-doctoral researchers and full-status researchers.

In this context, the members of UMR SCALab have continued to develop their research projects in their various areas of expertise; in particular, they have participated in 2 European partnership projects (1 INTERREG: MONUMENT and one H2020: FAIR), 2 PHC (AURORA and Bosphore), 1 Franco-Brazilian chair and funding from CAPES - COFECUB. The unit coordinates 7 ANR projects (EcoLe, ENSA - with Lebanon, ACES, READY-SPOK, DEBBORA, READER, EntrainPark) and is a partner in 1 ANR project (VISION-3E) and 2 InCA projects (SmartBinge, Candystress). In addition, the unit has received three CNRS PRIME grants and is developing collaborations with a range of associative, academic and medical partners supported by funding (PHRC, Fondation de France, France Alzheimer, France Parkinson, Ligue contre le cancer, Région HdF, etc.).



In addition, the UMR SCALab is involved in the operation of the Visual Sciences and Cultures Research Federation (CNRS 2052), where it conducts research and is currently responsible for its management.

Another major structuring element concerns the extension of the Equipex IrDIVE project beyond 2021 through the Equipex+ Continuum project, of which SCALab is a partner. This Equipex+ project aims to coordinate 30 specialist virtual reality platforms nationwide.

In addition, the Unit continues to coordinate the human science part of the Distalz Labex project on Alzheimer's disease, as well as the related LICEND project (Lille Centre of Excellence for Neurodegenerative Disorders) and the SHS part of the ONCOLille Interdisciplinary Cancer Institute project, which brings together clinicians and cancer researchers from three biology laboratories, two humanities and social sciences laboratories and a mathematics laboratory.

In addition, the Unit is heavily involved in major projects for the coming period: the Unit is leading the ENHANCE CPER project (in collaboration with the IRHIS UMR in History) and is participating in the ResIsT CPER, as well as in hospital projects coordinated by the Lille CHRU: the FHU G4 PRECISE and the FHU 1000 premiers jours pour la santé.

Locally, the unit is involved in 4 CDP projects (cross disciplinary projects) run by the university as part of the Excellence Initiative.

The unit has integrated a culture of research development, with several projects in maturation or premature maturation (in particular with the CNRS or University of Lille development units). Policies for the development of open science are now an integral part of the practices of the unit's researchers.



Jean-Louis NANDRINO



Séverine CASALIS

# Directory

## SCALab Members

### Glossary

- **ATER**: Attaché.e Temporaire d'Enseignement et de Recherche (Non-permanent teaching and research fellow)
- **CR**: Chargé de Recherche CNRS (CNRS Researcher)
- **IGE**: Ingénieur.re d'étude (Non-permanent Research Engineer)
- **IGR**: Ingénieur.re de recherche (Permanent Research Engineer)
- **MCF**: Maître.sse de Conférences (Lecturer /Associate Professor)
- **PR**: Professeur.e (Professor)
- **MAST**: Maître.sse de Conférences Associé.e (Part-time lecturer)

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# SCALab networks



**GDR - ESARS** Groupement de recherche « Esthétique, art et science »



# Team AVA



## **Coordinators:**

**Solène Kalénine & Laurent Madelain**

The **AVA** team focuses on exploring a functional approach of vision, the relations between perception and action, and the role of reinforcement in behavioral changes. Research topics encompass behavioral, cognitive and brain mechanisms. Applications relate to the digital domain (cognitive technologies, virtual reality, etc.) and neuropsychology.

**Methodologies:** quantifying response times and choices, eye movements, fNIRS, EEG, EMG, EDA, motion capture, static and dynamic virtual reality, force platform, computational modeling, neural networks.

**Populations:** healthy adults, patients with neurological or psychopathological disorders, children with typical and atypical development, older adults

**Bonnet, C. T., Singh, T., & Barela, J. A. (2023).** Benefits associated with the standing position during visual search tasks. *Experimental Brain Research*, 241(1), 187-199.



The literature on postural control highlights that task performance should be worse in challenging dual tasks than in a single task, because the brain has limited attentional resources. Instead, in the context of visual tasks, we assumed that (i) performance in a visual search task should be better when standing than when sitting and (ii) when standing, postural control should be better when searching than performing the control task. 32 and 16 young adults participated in studies 1 and 2, respectively. They performed three visual tasks (searching to locate targets, free-viewing and fixating a stationary cross) displayed in small images (visual angle: 22°) either when standing or when sitting. Task performance, eye, head, upper back, lower back and center of pressure displacements were recorded. In both studies, task performance in searching was as good (and clearly not worse) when standing as when sitting. Sway magnitude was smaller during the search task (vs. other tasks) when standing but not when sitting. Hence, only when standing, postural control was adapted to perform the challenging search task. When exploring images, and especially so in the search task, participants rotated their head instead of their eyes as if they used an eye-centered strategy. Remarkably in Study 2, head rotation was greater when sitting than when standing. Overall, we consider that variability in postural control was not detrimental but instead useful to facilitate visual task performance. When sitting, this variability may be lacking, thus requiring compensatory movements.



Chopin, B., Otberdout, N., Daoudi, M., & **Bartolo, A.** (2022). 3d skeleton-based human motion prediction with manifold-aware gan. IEEE Transactions on Biometrics, Behavior, and Identity Science.



In this work we propose a novel solution for 3D skeleton-based human motion prediction. The objective of this task consists in forecasting future human poses based on a prior skeleton pose sequence. This involves solving two main challenges still present in recent literature; (1) discontinuity of the predicted motion which results in unrealistic motions and (2) performance deterioration in long-term horizons resulting from error accumulation across time. We tackle these issues by using a compact manifold-valued representation of 3D human skeleton motion. Specifically, we model the temporal evolution of the 3D poses as trajectory, what allows us to map human motions to single points on a sphere manifold. Using such a compact representation avoids error accumulation and provides robust representation for long-term prediction while ensuring the smoothness and the coherence of the whole motion. To learn these non-Euclidean representations, we build a manifold-aware Wasserstein generative adversarial model that captures the temporal and spatial dependencies of human motion through different losses. Experiments have been conducted on CMU MoCap and Human 3.6M datasets and demonstrate the superiority of our approach over the state-of-the-art both in short and long term horizons. The smoothness of the generated motion is highlighted in the qualitative results.

**Dandan, Y. R., Ji, L., Song, Y., & Sayim, B. (2023).** Foveal vision determines the perceived emotion of face ensembles. *Attention, Perception, & Psychophysics*, 85(1), 209-221.



People can extract summary statistical information from groups of similar objects, an ability called ensemble perception. However, not every object in a group is weighted equally. For example, in ensemble emotion perception, faces far from fixation were weighted less than faces close to fixation. Yet the contribution of foveal input in ensemble emotion perception is still unclear. In two experiments, groups of faces with varying emotions were presented for 100 ms at three different eccentricities ( $0^\circ$ ,  $3^\circ$ ,  $8^\circ$ ). Observers reported the perceived average emotion of the group. In two conditions, stimuli consisted of a central face flanked by eight faces (flankers) (central-present condition) and eight faces without the central face (central-absent condition). In the central-present condition, the emotion of the central face was either congruent or incongruent with that of the flankers. In Experiment 1, flanker emotions were uniform (identical flankers); in Experiment 2 they were varied. In both experiments, performance in the central-present condition was superior at  $3^\circ$  compared to  $0^\circ$  and  $8^\circ$ . At  $0^\circ$ , performance was superior in the central-absent (i.e., no foveal input) compared to the central-present condition. Poor performance in the central-present condition was driven by the incongruent condition where the foveal face strongly biased responses. At  $3^\circ$  and  $8^\circ$ , performance was comparable between central-present and central-absent conditions. Our results showed how foveal input determined the perceived emotion of face ensembles, suggesting that ensemble perception fails when salient target information is available in central vision.



Geers, L., & **Coello, Y.** (2023). The relationship between action, social and multisensory spaces. *Scientific Reports*, 13(1), 202.



Several spaces around the body have been described, contributing to interactions with objects (peripersonal) or people (interpersonal and personal). The sensorimotor and multisensory properties of action peripersonal space are assumed to be involved in the regulation of social personal and interpersonal spaces, but experimental evidence is tenuous. Hence, the present study investigated the relationship between multisensory integration and action and social spaces. Participants indicated when an approaching social or non-social stimulus was reachable by hand (reachable space), at a comfortable distance to interact with (interpersonal space), or at a distance beginning to cause discomfort (personal space). They also responded to a tactile stimulation delivered on the trunk during the approach of the visual stimulus (multisensory integration space). Results showed that participants were most comfortable with stimuli outside reachable space, and felt uncomfortable with stimuli well inside it. Furthermore, reachable, personal and interpersonal spaces were all positively correlated. Multisensory integration space extended beyond all other spaces and correlated only with personal space when facing a social stimulus. Considered together, these data confirm that action peripersonal space contributes to the regulation of social spaces and that multisensory integration is not specifically constrained by the spaces underlying motor action and social interactions.

**Gigandet, R.**, Dutoit, X., **Li, B.**, Diana, M. C., & **Nazir, T. A.** (2023, June). The "Eve effect bias": Epistemic Vigilance and Human Belief in Concealed Capacities of Social Robots. In 2023 IEEE International Conference on Advanced Robotics and Its Social Impacts (ARSO) (pp. 15-20). IEEE.



Artificial social agents (ASAs) are gaining popularity, but reports suggest that humans don't always coexist harmoniously with them. This exploratory study examined whether humans pay attention to cues of falsehood or deceit when interacting with ASAs. To infer such epistemic vigilance, participants' N400 brain signals were analyzed in response to discrepancies between a robot's physical appearance and its speech, and ratings were collected for statements about the robot's cognitive ability. First results suggest that humans do exhibit epistemic vigilance, as evidenced 1) by a more pronounced N400 component when participants heard sentences contradicting the robot's physical abilities and 2) by overall lower rating scores for the robot's cognitive abilities. However, approximately two-thirds of participants showed a "concealed capacity bias," whereby they reported believing that the robot could have concealed arms or legs, despite physical evidence to the contrary. This bias, referred to as the "Eve effect bias" reduced the N400 effect and amplified the perception of the robot, suggesting that individuals influenced by this bias may be less critical of the accuracy and plausibility of information provided by artificial agents. Consequently, humans may accept information from ASAs even when it contradicts common sense. These findings emphasize the need for transparency, unbiased information processing, and user education about the limitations and capabilities of ASAs..

**Grisetto, F., Le Denmat, P., Delevoye-Turrell, Y. N., Vantrepotte, Q., Davin, T., Dinca, A., ... & Roger, C. (2023).** Imbalanced weighting of proactive and reactive control as a marker of risk-taking propensity. *PloS one*, 18(1), e0277246.



According to the dual mechanisms of control (DMC), reactive and proactive control are involved in adjusting behaviors when maladapted to the environment. However, both contextual and inter-individual factors increase the weight of one control mechanism over the other, by influencing their cognitive costs. According to one of the DMC postulates, limited reactive control capacities should be counterbalanced by greater proactive control to ensure control efficiency. Moreover, as the flexible weighting between reactive and proactive control is key for adaptive behaviors, we expected that maladaptive behaviors, such as risk-taking, would be characterized by an absence of such counterbalance. However, to our knowledge, no studies have yet investigated this postulate. In the current study, we analyzed the performances of 176 participants on two reaction time tasks (Simon and Stop Signal tasks) and a risk-taking assessment (Balloon Analog Risk Taking, BART). The posterror slowing in the Simon task was used to reflect the spontaneous individuals' tendency to proactively adjust behaviors after an error. The Stop Signal Reaction Time was used to assess reactive inhibition capacities and the duration of the button press in the BART was used as an index of risk-taking propensity. Results showed that poorer reactive inhibition capacities predicted greater proactive adjustments after an error. Furthermore, the higher the risk-taking propensity, the less reactive inhibition capacities predicted proactive behavioral adjustments. The reported results suggest that higher risk-taking is associated with a smaller weighting of proactive control in response to limited reactive inhibition capacities. These findings highlight the importance of considering the imbalanced weighting of reactive and proactive control in the analysis of risk-taking, and in a broader sense, maladaptive behaviors.

Guérin, S. M., Vincent, M. A., & **Delevoye-Turrell, Y. N.** (2023). Effects of motor pacing on frontal-hemodynamic responses during continuous upper-limb and whole-body movements. *Psychophysiology*, 60(5), e14226.



Advances in timing research advocate for the existence of two timing mechanisms (automatic vs. controlled) that are related to the level of cognitive control intervening for motor behavior regulation. In the present study, we used the functional near-infrared spectroscopy (fNIRS) cutting-edge technique to examine the hypothesis that prefrontal inhibitory control is needed to perform slow motor activities. Participants were asked to perform a sensorimotor-synchronization task at various paces (i.e., slow, close-to-spontaneous, fast). We contrasted upper-limb circle drawing to a more naturalistic behavior that required whole-body movements (i.e., steady-state walking). Results indicated that whole-body movements led to greater brain oxygenation over the motor regions when compared with upper-limb activities. The effect of motor pace was found in the walking task only, with more bilateral orbitofrontal and left dorsolateral activation at slow versus fast pace. Exploratory analyses revealed a positive correlation between the activation of the orbitofrontal and motor areas for the close-to-spontaneous pace in both tasks. Overall, results support the key role of prefrontal cognitive control in the production of slow whole-body movements. In addition, our findings confirm that upper-limb (laboratory-based) tasks might not be representative of those engaged during everyday-life motor behaviors. The fNIRS technique may be a valuable tool to decipher the neurocognitive mechanisms underlying naturalistic, adaptive motor behaviors.

**Haddad, L., Wamain, Y., & Kalénine, S. (2023).** Too much to handle? Interference from distractors with similar affordances on target selection for handled objects. *PloS one*, 18(8), e0290226.



The existence of handle affordances has been classically demonstrated using the Stimulus-Response Compatibility paradigm, with shorter response times when the orientation of the object handle and the response hand are compatible in comparison to incompatible. Yet the activation of handle affordances from visual objects has been investigated in very simple situations involving single stimulus and motor response. As natural perceptual scenes are usually composed of multiple objects that could activate multiple affordances, the consequence of multiple affordance activation on the perception and processing of a given object of the scene requires more investigation. The aim of this study was to determine the impact of distractor affordances on the processing of a target object in situations involving several familiar graspable objects. In two online experiments, 229 participants had to select a target object (the kitchen utensil or the tool) in a visual scene displaying a pair of objects. They performed left key presses when the target was on the left and right key presses when the target was on the right. Target handle orientation and response side could be compatible or incompatible. Critically, target and distractor objects had similar or dissimilar handle affordances, with handles oriented for left- or right-hand grasps. Results from the two experiments showed slower response times when target and distractor objects had similar handle affordances in comparison to dissimilar affordances, when participants performed right hand responses and when target orientation and response were compatible. Thus, affordance similarity between objects may interfere rather than facilitate object processing and slow down target selection. These findings are in line with models of affordance and object selection assuming automatic inhibition of distractors' affordances for appropriate object interaction..

**Kalénine, S., & Decroix, J. (2023).** The pain hidden in your hands: Facial expression of pain reduces the influence of goal-related information in action recognition. *Neuropsychologia*, 189, 108658.



The involvement of the sensorimotor system in the perception of painful actions has been repeatedly demonstrated. Yet the cognitive processes corresponding to sensorimotor activations have not been identified. In particular, the respective role of higher-level and lower-level action representations such as goals and grips in the recognition of painful actions is not clear. Previous research has shown that in a neutral context, higher-level action representations (goals) are prioritized over lower-level action representations (grips) and guide action recognition. The present study evaluates to what extent the general priority given to goal-related information in the processing of visual actions can be modulated by a context of pain. We used the action violation paradigm developed by van Elk et al. (2008). In the present action tasks, participants had to judge whether the grip or the goal of object-directed actions displayed in photographs was correct or not. The actress in the photograph could show either a neutral facial expression or a facial expression of pain. In the control task, they had to judge whether the actress expressed pain. In the action tasks, goals influenced grip judgements more than grips influenced goal judgements overall, corroborating the priority given to goal-related information previously reported. Critically, the impact of irrelevant goal-related information on the identification of incorrect grips disappeared in the pain context. Moreover, judgements in the control task were similarly influenced by grip and goal-related information. Results suggest that a context of pain reduces the reliance on higher-level action for action judgments. Findings provide novel directions regarding the cognitive and brain mechanisms involved in action processing in painful situations and support pluralist views of action understanding.

Krebs, R. M., **Prével, A.**, Hall, J. M., & Hoofs, V. (2023). Think green: investing cognitive effort for a pro-environmental cause. *Journal of Environmental Psychology*, 85, 101946.



Despite the overwhelming evidence for global warming and recommendations to respond to the climate challenges, the implementation of pro-environmental behavior (PEB) remains difficult for many individuals. One key notion in this context is that the reconfiguration of behavior generally requires cognitive effort. In a preregistered study entailing both laboratory and online samples we tested in how far participants are willing to invest cognitive effort for a pro-environmental cause (eco reward) and how this differs from cognitive effort for personal outcomes (own reward). Both eco and own reward led to response speeding and reduction of interference compared to no reward trials in a cognitive control task. However, the speeding effect was significantly smaller for eco reward trials, resonating with the notion that pro-environmental outcomes have a lower motivational value than personal ones – despite equal probability and magnitude of the associated monetary incentive. While present in the full sample, this difference was most pronounced in the online sample, which might reflect a weaker contribution of social desirability in this context. By singling out cognitive effort and the inherent costs thereof (rather than temporal and/or financial costs), the current paradigm can be used to test which factors and interventions might increase or decrease the willingness to allocate cognitive resources towards pro-environmental goals – which is key for initiating and also maintaining behavioral change.



**Lenglart, L.,** Cartaud, A., Quesque, F., Sampaio, A., & **Coello, Y.** (2023). Object coding in peripersonal space depends on object ownership. *Quarterly Journal of Experimental Psychology*, 76(8), 1925-1939.



Previous studies have shown that objects located in the peripersonal space (PPS) receive enhanced attention, as compared with extrapersonal space (EPS). However, most objects in the environment belong to someone in particular and how object ownership influences object coding in relation to PPS representation is still unclear. In the present study, after having chosen their own mug, participants performed a reachability judgement task of self-owned and other-owned mugs presented at different distances while facing a virtual character. This task was followed, on each trial, by a localisation task in which participants had to indicate where the mug, removed from view, was previously located. The two tasks were separated by a 900-ms visual mask during which the virtual character was unnoticeably shifted by 3° to evaluate the spatial frame-of-reference used. The results showed that self-owned mugs were processed faster than other-owned mugs, but only when located in the PPS. Furthermore, reachability judgements were biased for self-owned mugs, leading to an extension of the PPS representation, especially for participants with a high score on the fantasy scale of Interpersonal Reactivity Index (IRI). Finally, the virtual character shift altered the localisation performance but only for the distant mugs, suggesting a progressive shift from egocentric to allocentric frame-of-reference when moving from the PPS to EPS, irrespective of object ownership. Overall, our data reveal that the representations of ownership and PPS interact to facilitate the processing of manipulable objects, to an extent that depends on individual sensitivity to the social presence of others.



**Li, B., Ajjaji, O., Gigandet, R., & Nazir, T.** (2023). The body images of social robots. In 2023 IEEE International Conference on Advanced Robotics and Its Social Impacts (ARSO) (pp. 1-8). IEEE.



The rapid development of social robots has sparked a challenge for both robotics and cognitive sciences to comprehend how humans perceive the appearance of robots. This understanding is a crucial prerequisite for achieving successful human-robot symbiosis. To uncover people's perceptions and attitudes towards robots, we analyzed image-associated words generated spontaneously by humans for 30 robots developed in the past decades. These words delineated a body image for each of the robots. We then used word affective scales and embedding vectors to provide evidence for links between human perception and the body images. Our findings revealed that the valence and dominance of the body images reflected human attitudes toward the general concept of robots. The study further demonstrated that the user-base and usage of robots significantly influenced people's impressions of individual robots. Moreover, we investigated the psychological and cultural implications of the body images by examining semantic distances between the robots and a human-related word, as well as gender- and age-distinguished words. This analysis revealed a relationship between the semantic distances to the word “person” and the robots' affects, as well as gender and age stereotypes towards the robots. Our study demonstrated that using words to build body images for robots is an effective approach to understanding which features are appreciated by people and what influences their feelings towards robots.

**Mathé, M., Grisetto, F., Gauvrit, N., & Roger, C. (2023).**  
Psychometric validation of the French version of the Hogg Eco-  
Anxiety Scale (HEAS-FR). *Canadian Journal of Behavioural  
Science/Revue canadienne des sciences du comportement*.



Environment-related anxiety is becoming an important and increasingly widespread emotional response to ecological crises. This phenomenon presents new challenges in terms of public health as it can lead to cognitive, emotional, and functional impairments in daily life. These impairments are measured by the Climate Change Anxiety Scale (Clayton & Karazsia, 2020), the only tool validated in French that assesses climate anxiety. However, eco-anxiety, which encompasses more than climate anxiety, may affect an individual's inner life without causing pathological impairments in their daily life. Consequently, new tools for assessing eco-anxiety at a nonpathological level in French-speaking populations are required. The goal of this study was to translate and validate the Hogg Eco-Anxiety Scale (HEAS; Hogg et al., 2021) in French (HEAS-FR) and analyse its psychometric properties based on responses from 275 French-speaking adults. The HEAS is a self-report measure specifically designed to assess psychological responses to climate change and ecological issues. The confirmatory factor analysis confirmed the four-factor structure of the original English version. Cronbach's alphas indicated fair-to-good internal consistency for all four HEAS-FR subscales. Its convergent validity was established by examining correlations with questionnaires assessing related constructs, including climate change anxiety, anxiety, stress, depression, and environmental identity. The results revealed globally moderate-to-strong positive correlations between the HEAS-FR subscales and all questionnaires, indicating good convergent validity. Therefore, HEAS-FR was found to be suitable for assessing the four dimensions of eco-anxiety proposed by Hogg et al. (2021) in French-speaking populations.

Şentürk, Y. D., Tavacioglu, E. E., Duymaz, İ., **Sayim, B.**, & Alp, N. (2023). The Sabancı University Dynamic Face Database (SUDFace): Development and validation of an audiovisual stimulus set of recited and free speeches with neutral facial expressions. *Behavior research methods*, 55(6), 3078-3099.



Faces convey a wide range of information, including one's identity, and emotional and mental states. Face perception is a major research topic in many research fields, such as cognitive science, social psychology, and neuroscience. Frequently, stimuli are selected from a range of available face databases. However, even though faces are highly dynamic, most databases consist of static face stimuli. Here, we introduce the Sabancı University Dynamic Face (SUDFace) database. The SUDFace database consists of 150 high-resolution audiovisual videos acquired in a controlled lab environment and stored with a resolution of  $1920 \times 1080$  pixels at a frame rate of 60 Hz. The multimodal database consists of three videos of each human model in frontal view in three different conditions: vocalizing two scripted texts (conditions 1 and 2) and one Free Speech (condition 3). The main focus of the SUDFace database is to provide a large set of dynamic faces with neutral facial expressions and natural speech articulation. Variables such as face orientation, illumination, and accessories (piercings, earrings, facial hair, etc.) were kept constant across all stimuli. We provide detailed stimulus information, including facial features (pixel-wise calculations of face length, eye width, etc.) and speeches (e.g., duration of speech and repetitions). In two validation experiments, a total number of 227 participants rated each video on several psychological dimensions (e.g., neutralness and naturalness of expressions, valence, and the perceived mental states of the models) using Likert scales. The database is freely accessible for research purposes.

**Wamain, Y.,** Godard, M., Puffet, A. S., Delepoulle, S., & **Kalénine, S.** (2023). Congruent action context releases Mu rhythm desynchronization when visual objects activate competing action representations. *Cortex*, 161, 65-76.



Recent findings demonstrated that object perception is affected by the competition between action representations. Simultaneous activation of distinct structural (“grasp-to-move”) and functional (“grasp-to-use”) action representations slows down perceptual judgements on objects. At the brain level, competition reduces motor resonance effects during manipulable object perception, reflected by an extinction of  $\mu$  rhythm desynchronization. However, how this competition is solved in the absence of object-directed action remains unclear. The present study investigates the role of context in the resolution of the competition between conflicting action representations during mere object perception. To this aim, thirty-eight volunteers were instructed to perform a reachability judgment task on 3D objects presented at different distances in a virtual environment. Objects were conflictual objects associated with distinct structural and functional action representations. Verbs were used to provide a neutral or congruent action context prior or after object presentation. Neurophysiological correlates of the competition between action representation were recorded using EEG. The main result showed a release of  $\mu$  rhythm desynchronization when reachable conflictual objects were presented with a congruent action context. Context influenced  $\mu$  rhythm desynchronization when the action context was provided prior or after object presentation in a time-window compatible with object-context integration (around 1000 ms after the presentation of the first stimulus). These findings revealed that action context biases competition between co-activated action representations during mere object perception and demonstrated that  $\mu$  rhythm desynchronization may be an index of activation but also competition between action representations in perception.

# Team DEEP



## Coordinators:

### Delphine Grynberg & Henrique Sequeira

The **DEEP's team** leads a global project aiming to constitute a competence center in Affective Sciences. To this end, the team resources are focused on the analysis and dynamics of emotional processes regulation, strongly associated to several pathologies and health challenges. The research program, subtended by several advanced multilevel techniques, allows a wide spectrum of emotional information analysis, from the brain control to complex social interactions. The DEEP's approach aims to develop new and efficient therapeutic procedures both at individual and family levels.

**Methods:** brain recordings (EEG, ERPs, Oscillations, MEG); autonomic recordings (facial thermal variations, electrodermal activity, heart rate and variability, respiratory and pupillary variations); behavioral measures (eye movements, quantitative narrative analysis, psychometric assessments, video-behavioral analysis).

**Populations:** healthy adults or having sub-clinical symptoms and patients with mental, somatic or neurological illnesses.

**Manceau, C.**, Constant, E., Brugallé, E., **Wawrziczny, E.**, Sokolowski, C., Flinois, B., Baille, G., Defebvre, L., Dujardin, K., & **Antoine, P.** (2023). Couples facing the "honeymoon period" of Parkinson's disease : A qualitative study of dyadic functioning. *British Journal of Health Psychology*, 28(2), 366-382.



The public health issue of the Parkinson's disease (PD) has led to a great deal of research that has highlighted the individual challenges faced by the person with the Parkinson's disease (PwPD) and the caregiving spouse. Few studies, however, have sought to understand the functioning of couples facing PD, by differentiating each stage, each of which has its own issues. In particular, the "honeymoon period", characterized by a symptomatic respite allowed by the effectiveness of treatments for motor symptoms, has been poorly documented, especially at the dyadic level. This qualitative study, based on Interpretative Phenomenological Analysis, aimed to understand the experience of couples and their functioning at this stage. Fifteen couples participated in separate semi-structured interviews for each partner. The analyses highlighted four dyadic dynamics, which call into question the relevance of the term "honeymoon" to describe the experience of couples. While some couples appear to adjust by means of flexible functioning and a positive reinterpretation of this experience, other dyads oscillate between rigid hyperprotection in the face of perceived distress or a vicious circle of control/avoidance and, in some cases, gradually slipping towards the erosion of the relationship. These results show that the relational difficulties suffered by partners at this stage should be taken into account as soon as possible after the diagnosis. Strengthening the communication and the togetherness between partners, as well as working on dyadic emotional regulation, are particularly relevant options for these couples.



**Bakkali, N., Ott, L., Triquet, C., Cottencin, O., & Grynberg, D.** (2023). Learning from others' experience : Social fear conditioning deficits in patients with severe alcohol use disorder. *Alcohol, Clinical and Experimental Research*, 47(8), 1603-1613.



Alcohol use disorder (AUD) is a significant public health problem. A better understanding of the psychosocial factors contributing to AUD is important for developing public health policy. The purpose of this study was to identify social mechanisms involved in AUD and, more specifically, to determine whether vicarious learning deficits are related to the disorder. A secondary objective was to evaluate the role of empathy in social fear conditioning. **Methods** Patients with severe AUD (n = 30) and healthy participants (n = 30) performed a social fear learning (SFL) task. The task assesses how an association between a stimulus and an aversive consequence is acquired through social means. Specifically, participants observed a person receiving an electric shock (unconditioned stimulus; US) that was associated (conditioned stimulus; CS+) or not (CS-) with a neutral CS. The skin conductance response was used to measure the effect of learning. Individuals with severe AUD showed a deficit in SFL, indicating that they had difficulty learning from another's negative experience. Patients also evaluated the emotional experience as less unpleasant than healthy participants. This study is the first to show that patients with severe AUD have social learning deficits. The findings suggest that these individuals do not learn from another's negative experience. At a fundamental level, the findings demonstrate the importance of understanding the role of social mechanisms in AUD. At a clinical level, the study highlights the potential for using social learning enhancement to prevent relapse in individuals with severe AUD.

**Delelis, G.** (2023). Deleterious effects of unchosen solitude on adolescents' mental and social health: The moderating role of self-esteem. *Scandinavian Journal of Psychology*, 64(6), 710-718.



Can self-esteem reduce the deleterious effects of solitude on adolescents' mental and social health? Solitude is twofold because it can be chosen (self-determined) or forced (not self-determined). When it is not a chosen behavior (e.g., social ignorance, exclusion, or fear of others' judgment), individuals experience higher levels of anxiety and depression and feel the deleterious effects of loneliness more. On the other hand, the level of self-esteem relates positively to lower levels of anxiety and depression as well as to good social relationships. We hypothesized that self-esteem moderates the effects of unchosen solitude. Eighty high school students participated in this study by filling out a self-report booklet of questionnaires. We first examine the links between unchosen solitude and anxiety, depression, loneliness, hopelessness, and quality of the connection to family and peers; next, we examine the moderating role of self-esteem in these links. Regression analyses confirm the classic negative effect of not-self-determined solitude on the health outcomes considered, and moderation analyses show that a good level of self-esteem decreases this effect, at least on depression, hopelessness, and connection to peers. We suggest further studies to complete and refine these results and propose to assess more systematically the adolescents' self-esteem and to reinforce it to prevent negative mental and social health outcomes.



**Fournier, V., Duprez, C., Grynberg, D., Antoine, P., & Lamore, K.** (2023). Are digital health interventions valuable to support patients with cancer and caregivers? An umbrella review of web-based and app-based supportive care interventions. *Cancer Medicine*, 12(23), 21436-21451.



Digital health technologies have expanded tremendously in the last two decades, creating an emerging research and clinical field. They are regarded as cost-effective, and their use in healthcare is prioritized by many countries. However, the constant evolution of these technologies has led to an abundance of related literature. Thus, we conducted an umbrella review to identify and characterize digital supportive care interventions for patients with cancer and their relatives. A preregistered umbrella review was conducted (PROSPERO registration number CRD42022333110). Five databases were searched (Embase, PsycINFO, PubMed, CINAHL, and the Cochrane Library). To be considered, studies had to be systematic reviews or meta-analyses, be performed on pediatric or adult patients with cancer or survivors or their relatives, report results on web-based or app-based supportive care interventions, and measure psychological, functional, or behavioral variables or quality of life related to cancer. The methodological quality of the studies was assessed using the AMSTAR-2 tool. Twenty eligible studies were identified. Most of the included studies reported results from adult patients with cancer. Globally, digital interventions were shown to be effective for physical activity in patients with cancer but had mixed results regarding emotional outcomes and quality of life. Additionally, a lack of methodological quality was noted for most of the included reviews. Digital supportive care interventions could be an effective tool in cancer care for some outcomes. Recommendations have been formulated for further research in this field using adapted methodologies for the development of digital health interventions

**Nandrino, J.-L., Gandolphe, M.-C., Claisse, C., Wawrziczny, E., & Grynberg, D.** (2023). Heterogeneity of emotion regulation strategies in patients with alcohol use disorder during the first year of abstinence : A clustering analysis. *Alcohol and Alcoholism*, 58(4), 436-441.



Studies examining the use of specific emotion regulation (ER) strategies in patients with severe alcohol use disorder (AUD) are mainly focused on intergroup comparisons to the detriment of intragroup variability. Yet, these patients are in fact characterized by emotional deficits of varying severity, and we seek to identify different patterns of ER strategies in people with AUD during their first year of abstinence. Based on the ER strategies used by a large sample of patients with AUD, we applied cluster analysis to identify the existence of subgroups using distinct patterns of adaptive and nonadaptive strategies. To characterize these groups, we compared their clinical characteristics and then their emotional regulation strategies to those of control consumers. A first cluster, representing 61% of the sample, is constituted by individuals with high adaptive strategy scores and high nonadaptive strategy scores; a second cluster, representing 39% of the sample, corresponds to individuals with low adaptive strategy scores and high nonadaptive strategy scores. The individuals in these two clusters differed in terms of anxiety level and abstinence time. Compared with control consumers, the use of nonadaptive ER strategies remained lower for the two clusters, while the use of adaptive strategies differed. Our results support the idea of considering the heterogeneity of emotional capacities in individuals with AUD during the first year of abstinence. The identification of these profiles suggests either the existence of different adaptive ER capacities at baseline or a specific recovery of adaptive strategies over this period.

**De Groote, C.,** Cottencin, O., Tison, P., Triquet, C., & **Nandrino, J.-L.** (2023). Autobiographical memories cued by self-statements in patients with alcohol use disorder : Linking self-conceptions to past events. *Memory*, 31(5), 732-746.



The study examined the personal sense of identity in alcohol use disorder (AUD) through the relation between autobiographical memories and individuals' self-conception. The AUD detoxified patients and control participants were asked to create a list of self-statements to which they associated for the three main autobiographical memories illustrating them. The group variable was not associated with the number of positive self-statements, but it was associated with the number of negative self-statements. Furthermore, for the autobiographical memories cued by a positive self-statement, the group was related to the number of positive memories and general memories, while no relation was observed for the memories cued by a negative self-statement. Our results also support that AUD patients' memories cued by self-statements are older and more alcohol-related. Hierarchical regression analyses in the AUD patients demonstrated that the use of adaptive emotional regulation strategies was the only significant predictor of the use of positive or negative self-statements.

**Degouis, F.**, Pham, T., **Saloppé, X.**, **Gandolphe, M.-C.**, Lavallée, A., **Ott, L.**, Darsonville, A., & **Nandrino, J.-L.** (2023). How do people with antisocial personality disorder with or without psychopathic personality disorder activate and regulate emotions? Neurovegetative responses during an autobiographical task. *Journal of Experimental Psychopathology*, 14(4), 20438087231210477.



People with antisocial personality disorder (ASPD-nonPPD) are described as insensitive to others and as relentlessly pursuing their goals. A severe form of antisociality is observed in psychopathic personality disorder (ASPD-PPD). In the spectrum of emotional reactivity, people with ASPD-nonPPD present more emotional dysregulation, whereas people with ASPD-PPD exhibit a reduced or nonexistent emotional response. To personally engage people with ASPD-nonPPD and ASPD-PPD, we used emotionally charged autobiographical stimuli, specifically their self-defining memories (SDMs). As these participants exhibit high control over voluntary responses, we measured neurophysiological indicators (heart rate variability (HRV) and electrodermal activity (EDA)). In the resting task and the SDM task, people with ASPD-PPD had significantly higher HRV, suggesting higher emotion regulation abilities. Conversely, the EDA of people with ASPD-nonPPD and ASPD-PPD reflects less activation during the SDM task than when resting. We suggest that people with ASPD-PPD are more adaptive to stimuli that provide less emotional activation. Furthermore, the correlation analysis results suggested that the higher people with ASPD-PPD score on Factor 1 of the Psychopathy Checklist-Revised (PCL-R), the less emotional activation they exhibit. This low activation (EDA) associated with good emotion regulation abilities (HRV) is thought to be the signature of psychopathy.

**Allé, M. C., Rubin, D. C., & Berntsen, D. (2023).** Autobiographical memory and the self on the psychosis continuum: Investigating their relationship with positive- and negative-like symptoms. *Memory* (Hove, England), 31(4), 518-529.



Autobiographical memory is severely impaired in schizophrenia, but previous work has largely treated both as unitary concepts. Here, we examined how various dimensions of autobiographical memory relate to different aspects of psychosis. Participants were recruited from the general population (Study 1, N = 264) and a university subject pool (Study 2, N = 305). We examined different measures of autobiographical memory and self (i.e., involuntary memory, autobiographical recollection, self-knowledge and self-awareness), at the trait level in Study 1 and both trait and state levels in Study 2, as a function of positive- and negative-like symptoms of psychosis. Across both studies, positive and negative dimensions of psychosis were found to be related to an increase in involuntary memories (i.e., the spontaneous recall of personal memories), and to lower self-concept clarity and insight. Positive and negative dimensions of psychosis correlated differently with autobiographical recollection characteristics, measured at both trait (Studies 1 and 2) and state levels (Study 2). Positive-like symptoms (in particular hallucination-proneness) showed a stronger and more consistent pattern of correlations than negative-like symptoms. These findings call for a dimensional approach to the relationship between autobiographical memory and psychosis symptoms in clinical and non-clinical individuals, to better understand the breakdown of autobiographical memory in the psychopathology of psychosis.

**Fontesse, S., Fournier, V.,** Gérain, P., Dassonneville, C., Lelorain, S., **Duprez, C.,** Christophe, V., Piessen, G., & **Grynberg, D.** (2023). Happy thus survivor? A systematic review and meta-analysis on the association between cancer survival and positive states, emotions, and traits. *Psycho-Oncology*, 32(11), 1631-1643.



Traditionally, the literature investigating patient-reported outcomes in relation to cancer survival focused on negative factors such as distress. Meta-analyses in this field have provided a clear identification of negative affect that reduce cancer survival (e.g., depression). Nevertheless, positive psychological factors and especially positive affect might be equally crucial for cancer survival but have been neglected so far. While studies in this domain have been conducted, they remain less numerous and have produced mixed results. Methods A pre-registered systematic review and meta-analysis (<https://osf.io/jtw7x>) aimed at identifying the positive affect linked to mortality in cancers were conducted. Four databases (Pubmed, PsycINFO, Embase, and Cochrane Library) were searched to find longitudinal studies linking positive affect to survival in cancers. Two reviewers completed each stage of the study selection process, the data extraction, and the Quality in Prognosis Studies risk of bias assessments. Results Twenty-four studies involving 822,789 patients were included based on the 2462 references identified. The meta-analysis reveals that positive affect is associated with longer survival (Hazard Ratio [HR] = 0.91; 95% CI [0.86, 0.96],  $z = -3.58$ ,  $p < 0.001$ ) and lower mortality (Odd Ratio [OR] = 0.59; 95% CI [0.45, 0.78],  $z = -3.70$ ,  $p < 0.001$ ). Sub-group analyses indicated that the main predictors of survival are emotional and physical well-being, optimism, and vitality. Conclusion This work emphasizes the need to consider the role of affective mechanisms in patients with cancer, including their levels of well-being or optimism to provide the most favorable conditions for survival. Therefore, stronger and continuous effort to improve patients' positive affect could be particularly beneficial for their life expectancy.



**Gérain, P., Wawrziczny, E., & Antoine, P. (2023).** The use of psychological network analysis in informal dementia care : An empirical illustration. *Aging & Mental Health*, 27(9), 1780-1789.



Theoretical models in informal dementia care have been developed to understand how risk and protective factors interact to cause caregiver's distress. The development of psychological network analysis provides a rich complement to our current models, as explores how different variables (or nodes) are associated using graph theories. : The present study explored the use of network analysis using data from 125 informal caregivers of their partner with dementia (PWD). The included variables were recipient's dependency, self-efficacy, conflict within the family, dyadic adjustment, and caregiver's distress. : The analysis suggests a complex network of interacting variables. The core variable was not the caregiver's distress but rather their dyadic adjustment with their PwD. Variables were associated with caregiver distress through a large array of direct and indirect pathways and were associated with each other in the form of an asymmetric spider's web.: The results show the complex interplay of variables in a psychological network. The central role of distress suggests a complex and dynamic role, notably through a bidirectional influence with quality of interactions. In the same way, quality of interactions appeared as one of the strongest nodes, its connectivity suggesting a crucial role to consider in our models and interventions.

**Wawrziczny, E., & Nandrino, J.-L.** (2023). Considering management behaviours to identify vulnerable caregivers of persons with dementia. *Psychogeriatrics*, 23(4), 650-656.



Persons with dementia gradually disengage from daily activities, and therefore require increasing daily support. Caregivers face a dilemma as to whether they should encourage the persons with dementia in terms of initiative and autonomy, or supervise and take charge of tasks, which may cause distress for both parties. This study seeks to better understand how caregivers manage the disengagement of the persons with dementia and the repercussions on their caregiving experience. A total of 217 caregivers participated. Their management behaviours and the characteristics of their caregiving experiences were assessed with questionnaires. A cluster analysis was first performed to identify possible profiles of management behaviours and comparison, which were then compared to identify the caregiving experience associated with each profile. The first cluster (25.8% of the sample) corresponds to caregivers with high negative control behaviour scores and high positive stimulation behaviour scores; the second cluster (43.8% of the sample) corresponds to caregivers with low positive stimulation behaviour scores and high negative control behaviour scores; and the third cluster (30.4% of the sample) corresponds to caregivers with low negative control behaviour scores and high positive stimulation behaviour scores. Caregivers in Clusters 2 and 3 differ in terms of anxiety, depression, burden, gratification, health and financial problems. Cluster 1 is an intermediate profile with similar characteristics to Cluster 3. Our results support the idea of considering management behaviours to identify vulnerable caregivers and highlight the deleterious role of negative control behaviours, especially when they are not offset by positive protective stimulation behaviours.



**Ruthmann, F.**, Guerouaou, N., Vasseur, F., Migaud, M.-C., Deplanque, D., Gottrand, F., Beghin, L., & **Viltart, O.** (2023). Are anxiety and depression associated with cognition and cardiovascular function in young male and female adults? PLOS ONE, 18(10), e0292246.



The results of recent studies suggested that emotional disorders (such as anxiety and depression), cognitive impairments and cardiovascular disorders are related on the subclinical level. These major health issues are often concomitant and have complex, sex-dependent relationships; it is therefore important to study these issues concomitantly in the general population, in order to gain a better understanding of early-stage subclinical relationships between these conditions. The objective of this exploratory study was to assess correlations between anxiety, depression, cognition, and endothelial function in young adults from the general population. Endothelial function (via the reactive hyperaemia index (RHI) was assessed with a plethysmographic device. Depression and anxiety were self-reported via the Beck Disorder Inventory II and the State-Trait Anxiety Inventory, respectively. The Cambridge Neuropsychological Test Automated Battery was used to measure performances in visuospatial memory, visuospatial working memory, and sustained attention. Performances in inhibition and flexibility were evaluated with the Color Word Interference Test. Forty-four young adults (21 males; mean  $\pm$  standard deviation age:  $25.8 \pm 1.1$ ; 23 females; mean age:  $25.6 \pm 1.4$ ) were included in the study. Anxiety was correlated with a low RHI ( $r = -0.40$ ,  $p = 0.015$ , 95% CI  $[-0.64, -0.08]$ ). In females, the depression score was positively correlated with the number of errors in the visuospatial memory task ( $r = 0.42$ ,  $p = 0.049$ ; 95% CI  $[-0.002, 0.70]$ ) and visuospatial working memory ( $r = 0.57$ ,  $p = 0.005$ ; 95% CI  $[0.10, 0.79]$ ). In males, high anxiety and depression scores were negatively correlated with the number of errors in visuospatial working memory task (anxiety:  $r = -0.77$ ,  $p = 0.001$ ; 95% CI  $[-0.91, -0.43]$ ; depression  $r = -0.61$ ,  $p = 0.004$ , 95% CI  $[-0.82, -0.22]$ , respectively). However, the relationship between cognitive performance and RHI was not significant. Our data suggest that anxiety and depression could be differentially related to cognitive and endothelial functions in a non-clinical population of young adults. More research is needed to confirm these results, understand the pathophysiological mechanisms in more details, and assess the importance of a sex-specific approach.

Degraeve, B., **Sequeira, H.**, Mecheri, H., & Lenne, B. (2023). Corpus callosum damage to account for cognitive, affective, and social-cognitive dysfunctions in multiple sclerosis : A model of callosal disconnection syndrome? *Multiple Sclerosis* (Houndmills, Basingstoke, England), 29(2), 160-168



The corpus callosum (CC) is the major commissure interconnecting the two hemispheres and is particularly affected in multiple sclerosis (MS). In the present review, we aimed to investigate the role played by callosal damages in the pathogenesis of MS-related dysfunctions and examine whether a model of callosal disconnection syndrome is a valid model for MS. For this purpose, we will first review structural and functional evidence of callosal pathology in MS. Second, we will account for the potential role of CC abnormalities in MS-related dysfunctions. Finally, we will report data concurring with a “multiple disconnection hypothesis” that has been proposed to explain those dysfunctions, and we will examine evidence pointing toward MS as a “callosal disconnection syndrome.” We will end by discussing the contribution of this interpretation to the understanding of MS and MS-related deficits.

**Duclos, J.,** Piva, G., Riquin, É., Lalanne, C., Meilleur, D., Blondin, S., EVHAN Group, Cook-Darzens, S., & Godart, N. (2023). Caregivers in anorexia nervosa: is grief underlying parental burden?. *Eating and weight disorders* : EWD, 28(1), 16.



Purpose Anorexia Nervosa (AN) is a severe chronic disorder and parents' experience of caregiving is usually marked by emotional distress and burden. Severe chronic psychiatric disorders are known to be linked with the concept of grief. Grief has not been investigated in AN. The aim of this study was to explore parents' and adolescents' characteristics that may be related to parental burden and grief in AN, and the link between these two dimensions. Methods Eighty mothers, 55 fathers and their adolescents (N = 84) hospitalized for AN participated in this study. Evaluations of clinical characteristics of the adolescent's illness were completed, as well as self-evaluations of adolescent and parental emotional distress (anxiety, depression, alexithymia). Levels of parental burden were evaluated with the Experience of Caregiving Inventory and levels of parental grief with the Mental Illness Version of the Texas Revised Inventory of Grief. Results Main findings indicated that the burden was higher in parents of adolescents with a more severe AN; fathers' burden was also significantly and positively related to their own level of anxiety. Parental grief was higher when adolescents' clinical state was more severe. Paternal grief was related to higher anxiety and depression, while maternal grief was correlated to higher alexithymia and depression. Paternal burden was explained by the father's anxiety and grief, maternal burden by the mother's grief and her child's clinical state. Conclusion Parents of adolescents suffering from AN showed high levels of burden, emotional distress and grief. These inter-related experiences should be specific targets for intervention aimed at supporting parents. Our results support the extensive literature on the need to assist fathers and mothers in their caregiving role. This in turn may improve both their mental health and their abilities as caregivers of their suffering child. Level of evidence Level III: Evidence obtained from cohort or case-control analytic studies.

# Team Langage



## Coordinators:

### Angèle Brunellière & Sandrine Mejias

The **Langage team** focuses on the cognitive and neurocognitive mechanisms involved in the learning and processing of spoken and written language by using behavioral measures, brain imaging measures and psychometric and computational approaches in relation with the experimental approach.

**Reading:** We examine the place of morphological operations in learning to read and write. Alos, we examine the specificity of processes involved in reading in dyslexics.

**Learning words:** We investigate whether acquisition trajectories are comparable in normal and special populations. In second language, learning an L2 in a school context presents many specificities. In this framework, we examine the role of spelling in word learning and the interactions between the written lexicon of the L1 and the L2.

**Spoken communications:** We study how to perceive speech, how to understand a spoken sentence and how to dialogue between individuals. In this context, we try to address various challenging questions as the link between the percpetion and production of speech or the role of memory in shared knowledge in dialogue.

**Counting:** We are interested in identifying the skills that young children need to acquire good arithmetic skills. The environmental and neuro-biological factors involved in the proper development of these skills are also studied.

**Fasquel, A., Brunellière, A., & Knutsen, D. (2023).** A modified procedure for naming 332 pictures and collecting norms: Using tangram pictures in psycholinguistic studies. *Behavior Research Methods*, 55, 2297–2319.



Tangram pictures are abstract pictures which may be used as stimuli in various fields of experimental psychology and are often used in the field of dialogue psychology. The present study provides the first norms for a set of 332 tangram pictures. These pictures were standardized on a set of variables classically used in the literature on cognitive processes, such as visual perception, language, and memory: name agreement, image agreement, familiarity, visual complexity, image variability, and age of acquisition. Furthermore, norms for concreteness were also provided owing to the influence of this variable on the processes involved in lexical production. Correlational analyses on all variables were performed on the data collected from French native speakers. This new set of standardized pictures constitutes a reliable database for researchers when they select tangram pictures. Given the abstract nature of tangram pictures, this paper also discusses the similarities and differences with the literature on line drawings, and highlights their value for dialogue psychology studies, for psycholinguistics studies, and for cognitive psychology in general.

**Knutsen, D., & Brunellière, A. (2023).** How awareness of each other's mental load affects dialogue. *Journal of experimental psychology. Learning, memory, and cognition*, 49(10), 1662–1682.



During dialogue, people reach mutual comprehension through the production of feedback markers such as "yeah" or "okay." The purpose of the current study was to determine if mental load affects feedback production, as there is currently no consensus as to how mental load constrains the way in which dialogue partners reach mutual comprehension. In two experiments, pairs of participants interacted in order to complete a collaborative puzzle game. We manipulated the amount of mental load experienced by each participant by giving them a series of digits to memorize (or no digits) before the beginning of the game. In Experiment 1, the participants were given no information about their partner's mental load. In Experiment 2, each participant was told whether their partner had received digits to memorize. We found that although some results were identical in both experiments (directors produced more words, longer utterances, and fewer feedback markers than matchers), the effect of mental load was different in both experiments. Indeed, whereas in Experiment 1, mental load mainly affected the number of words and speech turns produced, in Experiment 2, participants who had to follow the instructions of their partner and were under low mental load produced more feedback markers when their partner was under high mental load. Taken together, these results help disentangle the contribution of experienced and perceived mental load on collaboration in dialogue. They also highlight the importance of being explicitly aware of each other's mental load in interpersonal coordination.



**Lecerf, M. A., Casalis, S., & Commissaire, E. (2023).** New insights into bilingual visual word recognition: State of the art on the role of orthographic markedness, its theoretical implications, and future research directions. *Psychonomic Bulletin & Review*.



In the past decade, research on bilingual visual word recognition has given rise to a new line of study focusing on a sublexical orthographic variable referred to as orthographic markedness, derived from the comparison of the two orthotactic distributions known by a bilingual reader. Orthographic markers have been shown to speed up language decisions but also, to some extent, to modulate language nonselectivity during lexical access (i.e., the degree of co-activation of lexical representations of the two languages). In this review, we (1) describe the results available in the literature about orthographic markedness on language membership detection and lexical access and discuss the locus of these effects, which leads us to (2) present theoretical extensions to the bilingual interactive activation models and discuss their respective adequacy to the data, finally leading us to (3) propose future research directions in the study of orthographic markedness, such as extension to different reading tasks and contexts as well as considering developmental and learning dynamics.



**Menut, A.,** Brysbaert, M., & **Casalis, S.** (2023). Derivational awareness in late bilinguals increases along with proficiency without a clear influence of the suffixes shared with L1. *Bilingualism: Language and Cognition*, 26(1), 138–151.



Morphological awareness contributes to vocabulary acquisition and reading in bilingual children who learned English after their native language. In line with these considerations, we further investigated L2 processing in late adult bilinguals where questions related to morphology need to be clarified. French-English speakers (N = 92) were assessed for three morphological awareness stages: lexical semantic knowledge, syntactic knowledge, and distributive knowledge. We investigated whether the evolution of morphological awareness was related to L2 proficiency and whether it was facilitated by the presence of suffixes shared in L1 and L2. Our results confirmed the influence of language proficiency at each stage of morphological awareness. However, the hypothesis of an advantage of suffixes shared between French and English was not confirmed as no clear advantage was found for those suffixes. Our findings are discussed in line with the morphological congruence hypothesis and compared with the previous results in the literature.

**Rémy-Néris, A.,** Solotareff, L., & Macchi, L. (2023). Analysis of the items, internal consistency, and internal structural validity of the Lille Test of Phonological Discrimination 2. *Revue de neuropsychologie*, 15 (4), pp.237-245.



In 2012, the Epreuve Lilloise de Discrimination Phonologique (ELDP) (Lille Test of Phonological Discrimination) 2 was created to assess the early stages of speech processing in French-speaking children aged between five and a half and eleven and a half. The child has to say whether two pseudowords are the same or different. His/her results are compared with those of a reference group of the same age. However, further research is needed to gain a better understanding of the psychometric qualities of this test. We therefore conducted analyses of the items, internal consistency, and internal structural validity. Pairs of different pseudowords have an interesting discriminating power, whereas identical pairs present a ceiling effect limiting the sensitivity and consistency of the test. However, the inclusion of identical pairs is justified for the information they provide in association with different pairs. The overall internal coherence of the test is satisfactory, and its structure is consistent with various aspects of theoretical models of phonology and its development. In the future, other psychometric features of this test could be investigated.

**Stinkeste, C., Vincent, M. A., Delrue, L., & Brunellière, A. (2023).**

Between alpha and gamma oscillations: Neural signatures of linguistic predictions and listener's attention to speaker's communication intention. *Biological psychology*, 180, 108583.



When listeners hear a message produced by their interlocutor, they can predict upcoming words thanks to the sentential context and their attention can be focused on the speaker's communication intention. In two electroencephalographical (EEG) studies, we investigated the oscillatory correlates of prediction in spoken-language comprehension and how they are modulated by the listener's attention. Sentential contexts which were strongly predictive of a particular word were ended by a possessive adjective either matching the gender of the predicted word or not. Alpha, beta and gamma oscillations were studied as they were considered to play a crucial role in the predictive process. While evidence of word prediction was related to alpha fluctuations when listeners focused their attention on sentence meaning, changes in high-gamma oscillations were triggered by word prediction when listeners focused their attention on the speaker's communication intention. Independently of the endogenous attention to a level of linguistic information, the oscillatory correlates of word predictions in language comprehension were sensitive to the prosodic emphasis produced by the speaker at a late stage. These findings thus bear major implications for understanding the neural mechanisms that support predictive processing in spoken-language comprehension.



According to Multilink, words from the first (L1) and (L2) second languages share a common store and their access is non-selective. Thus, the presentation of a target word activates in parallel lexical candidates from both languages that share form and semantic overlap. The degree of words' activation also depends on their resting levels of activation (words that are more used have a higher resting levels of activation). Since non-cognate translations and synonyms share meaning, they may be seen as qualitatively similar lexical representations, and consequently subject to similar processing if their frequency levels are matched. However, whereas masked priming lexical decision studies with synonyms failed to find reliable masked priming effects, the majority of those with non-cognate translations (especially in the forward direction, i.e., from L1 to L2) showed significant effects. The present study extends those findings by directly comparing the processing of synonyms and translations in bilinguals. A masked priming lexical decision task (targets were preceded by a related 50-ms word [an L1 translation or an L2 synonym] or by a 50-ms unrelated word) was conducted. Lexical frequency of usage was higher for primes than for targets. Reaction times and accuracy from 24 sequential (highly proficient) European Portuguese-English bilinguals were analyzed with linear mixed effects models. Results showed priming effects for translations, but not for synonyms, indicating a differential processing of synonyms and non-cognate translations. This is the first empirical work that directly compares the processing of synonyms and translations in bilinguals by using the same targets words for both prime types. The findings contradict the Multilink model, since they index a differential representational nature of lexico-semantic links for translations and synonyms. Modifications in the model are needed to account for the data.

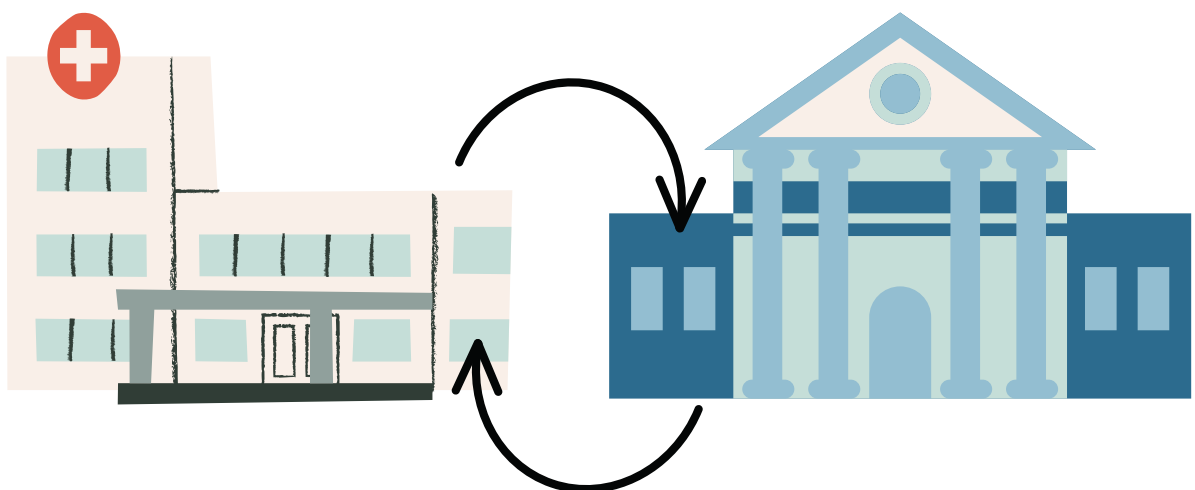
# Valuing Health Partnerships



## **Lisa Laroussi-Libeault: a collaborator in a multidisciplinary research team and patient-partner.**

Holder of a Master's degree in International and Development Economics from the Université de Panthéon-Assas Paris II, she led a career within the French Ministry of Foreign Affairs, before joining the United Nations system. She first worked for the United Nations Development Programme (UNDP) in Geneva, where she was responsible for implementing cooperation with France. The call of the field led her to work for the UN Department of Peacekeeping Operations. She joined the Mission in Haiti for four years, then the one in the Democratic Republic of Congo.

Since 2021, she has been working in the healthcare sector. Committed to patient partnership, she holds a degree on the Foundations of Patient Partnership from the University of Montreal, complemented by a University Diploma on The Art of Care in Partnership with the Patient from the University of Côte d'Azur and a DU in Ethics applied to healthcare from the University of Nantes. Today, she offers her solid expertise in partnership concepts, implementation and evaluation to institutions in Switzerland and France in the fields of care, training and research.



# Valuing Corporate Partnerships



## SENSEFIT : Sensorial Environments for Noteworthy, Stimulating, Effortful Fitness & Immersive Training

The SENSEFIT project aims to create an **open lab** for the creation and validation of augmented sensorial environments. A public-private partnership in research will aim to develop design principles to optimize the impact of immersive environments that combine scents, sounds, and visuals. The industrial chair will bring together fundamental knowledge, skills and knowhows from six partners located in the Hauts-de-France region.

Located at the heart of the **Plaine Image**, the project is sourced through the actors of the Affective and Cognitive laboratory (SCALAB) of the University of Lille (France) and of the Technological Federation SCV of the CNRS. Our ambition is to establish a public-private meeting place where students, researchers, and industry professionals can interact to test protocols, products, and commercial services in multi- sensory environments with controlled temperature and humidity parameters. The scientific approach will validate design choices, providing a benchmark of solutions while aiming for a strategy of high impacting scientific publication.





# Valuing Corporate Partnerships



## HIBOU app

### *What is the HIBOU app ?*

- Interactive digital book.
- Offers texts in original and adapted versions.
- BoxDys to make reading easier for children with reading difficulties.
- Rich settings memorised for each child.
- Text vocalisation .
- Comprehension questionnaires.
- Recording and transmission of experimental data to researchers (reading speed, answers to questionnaire, etc.).



### **Texts from the Alector Corpus (ANR):**

a collection of 100 original and simplified literary and scientific documentary texts from a range of sources and school levels (from 2nd grade to 5th grade class).



### **Gains have been observed in reading fluency and reading comprehension,**

particularly for students with the greatest difficulties in reading aloud, spelling or morphology. Simplification represents a crutch for these students. (Javourey-Drevet, 2021; Javourey-Drevet et al., 2022).

- To make interactive-book accessible to as many people as possible, porting the iBook application to a standard EPUB format, so it can be used on all digital media.
- Collaboration with ISI as part of a project funded by ANRT/AMPIRIC (2021-2023) and PIA3 funding, 100% IDT (2023-2025).

### ***The new version of HIBOU uses :***

- > The EPUB creation and enhancement platform.
- > The ISlaccess platform, which is already used in secondary schools, is RGPD-compliant and GAR-certified.



# 18th International Conference for Young Researchers in Psychology

Dec 08 2023

“

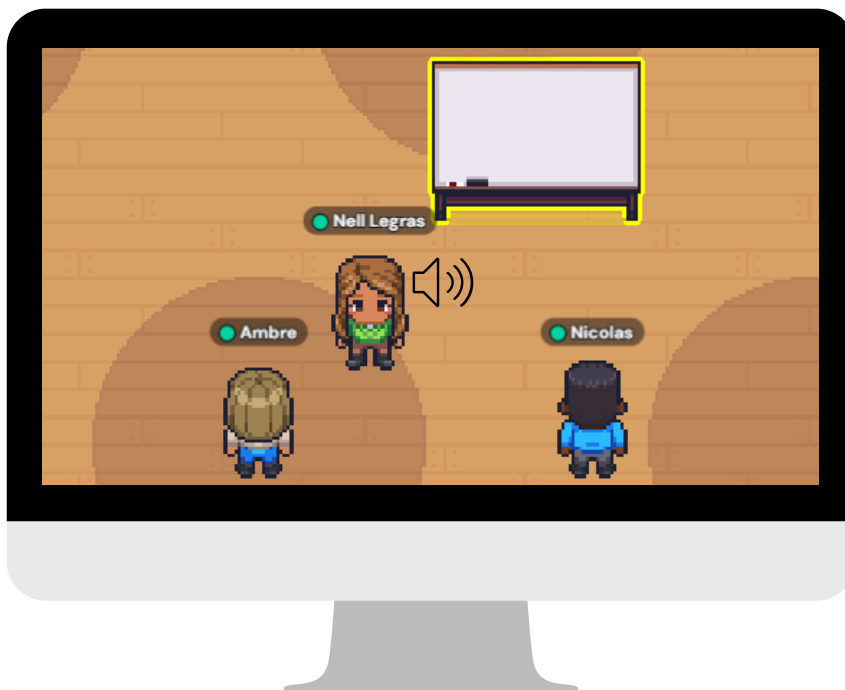
The **18th JSJC** was a very successful event, bringing together young researchers from **20 laboratories in 4 countries**. This international event was marked by in-depth presentations, interactive workshops and a dynamic poster session on **Gather.Town**. Last but not least, this success was due solely to the commitment of the **organising PhD students\*** from the **Psitec** and **SCALab** laboratories!

”

Guillaume **GIMENES** (MCF, **Psitec**), co-organiser

\*Thank you to PhD students organisers:

Emilie **AUGER**, Maxime **MARTEL**, Florent **BECLIN**, Charlotte **BARON**



Gather Town is a video discussion forum that made this remote conference more immersive and interactive. Participants were able to freely move around the poster room and choose the posters that interested them. The sound was spatially realistic, giving the impression that they were physically there.

Congratulations to Nell **LEGRAS** for her poster:

## THE RELATIONSHIP DYNAMICS AND ADJUSTMENTS OF COUPLES FACING HUNTINGTON'S DISEASE : AN INTERPRETATIVE PHENOMENOLOGICAL ANALYSIS

N. Legras<sup>1</sup>, C. Manceau<sup>1</sup>, E. Constant<sup>1</sup>, E. Decorte<sup>2</sup>, C. Simonin<sup>2</sup>, & P. Antoine<sup>1</sup>

And the other SCALab members for their participation:

Lilas **HADDAD** (PhD), Laura **LAZARTIGUES** (MCF) and Céline **MAUPIN** (IGE)

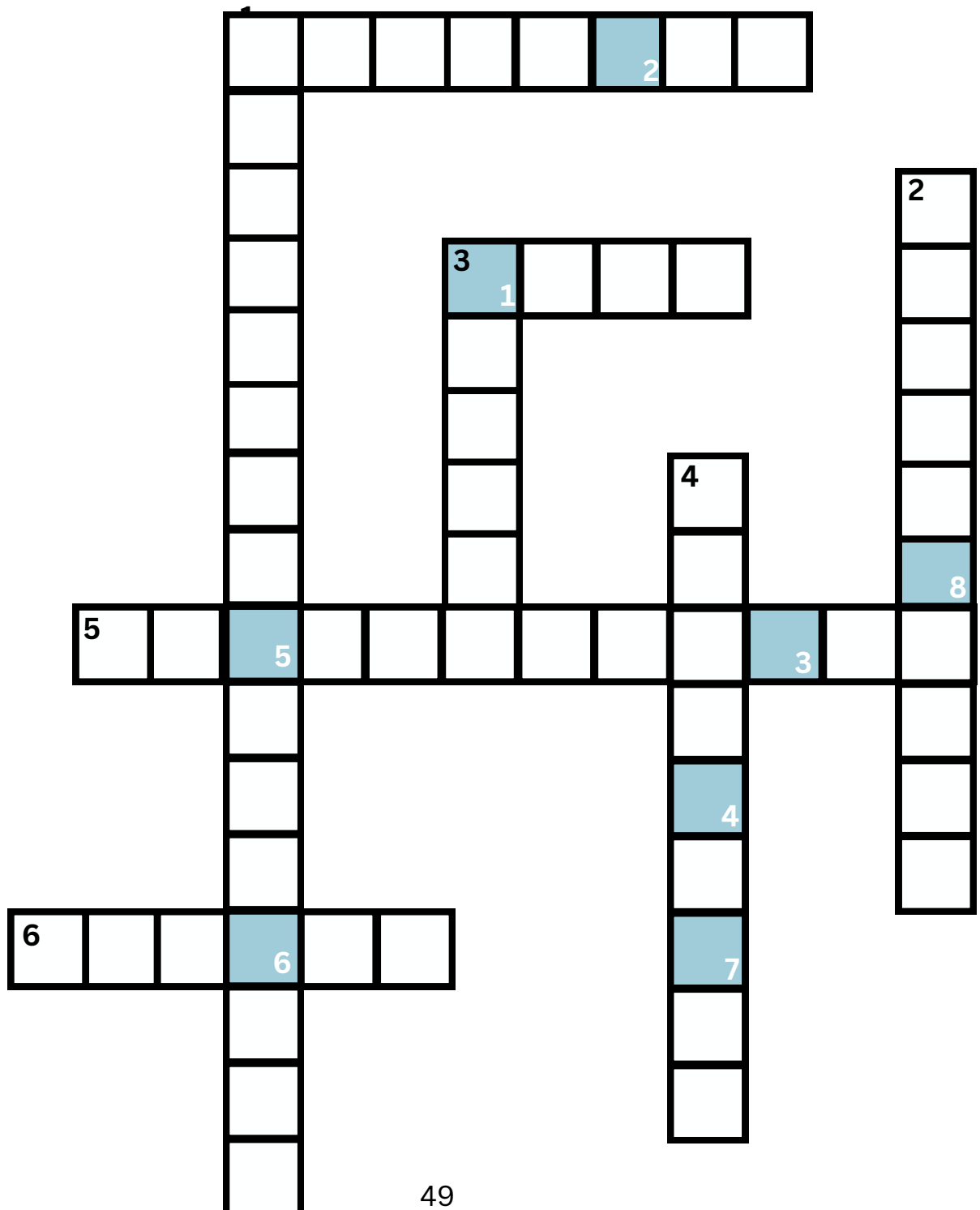
# Crossword

## SCALab

Welcome to the crossword puzzle! The objective is to find the words using the provided definitions. Additionally, there is a hidden word in this crossword. To discover this hidden word, you need to take the 8 letters from the blue cells. Good luck and have fun!

**HIDDEN  
WORD :**

1
2
3
4
5
6
7
8



# DEFINITIONS

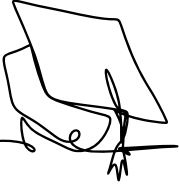
## HORIZONTAL

- 1** - Describes both something that is not concrete and the only part read of many articles. Clue : page 42
- 3** - A component of EEG signals that will be more pronounced if a robot tells you it can beat you at the 'Mai on a bike' challenge even though it has no legs. Clue : page 16.
- 5** - Space around the body which will contribute to interactions with the coffee machine in front of you. This space is used extensively by doctoral students. Clue : page 13.
- 6** - A pillar of our current experiments that was sorely lacking in the social psychology experiments of the 1960s and 1970s.

## VERTICAL

- 1** - A memory system made up of recalled episodes from a person's life. This memory will be used if you're trying to remember where you put the keys to the experimental box you needed 15 minutes ago. Clue : page 33.
- 2** - Discipline at the heart of SCALab but that, contrary to popular belief, does not allow us to read the minds of others.
- 3** - Adjective describing a language learned in childhood. You may currently have difficulty completing this crossword if English is not yours. Clue: page 46
- 4** - Escape reaction to quickly and temporarily relieve an unpleasant state or situation. This strategy is most often used when our mailbox is full again. Clue : page 28.

# Congrats to the new doctors (2023)



## **March 10. Baptiste Chopin's thesis defense.**

*New approaches to human motion prediction and generation using 3D skeletons:  
application to nonverbal interactions in virtual reality.*

## **March 22. Miao Li's thesis defense**

*Spatial numbers : How visual crowding and redundancy masking modulate numerosity  
perception.*

## **April 19. Dandan Yu's thesis defense.**

*Foveal input bias in ensemble emotion perception.*

## **September 04. Angela Gomes Tomaz's thesis defense.**

*Appearance and performance at the limits of spatial vision.*

## **December 15. Yann Romain Kechabia's thesis defense.**

*Synergistic behavioral approach to uncover deficits in vision-posture-attention interactions  
in Parkinson's disease.*

## **December 15. Fabrizia Gallo's thesis defense.**

*Study of the relationship between gestures and socio-emotional processes using fMRI and  
physiological measurements.*

## **December 19. Lilas Haddad's thesis defense.**

*Impact of multiple affordances on object perception in natural scenes.*



# Congrats to the new HDR (2023)

**Congratulations to Dr. Kristopher Lamore on obtaining his Habilitation à Dirigé des Recherches (HDR) on October 20, 2023.**

## **Individual and family adjustment along the cancer intervention continuum**

The cancer intervention continuum is a concept that refers to all the disease stages and interventions that apply throughout the cancer patient's care pathway. It emphasizes a multidisciplinary approach to oncology research. This manuscript presents my research work in psycho-oncology, and more specifically on individual and family adjustment during this continuum.

To date, my research focuses on: (1) primary prevention, (2) secondary prevention, and (3) individual and family adjustment following a cancer diagnosis, in pediatric and adult oncology. My interests have focused on such variables as intimacy, sexuality, return to work, shared decision-making, caregiving, dyadic adjustment, supportive care needs, long-term psychosocial effects, and medical transition from pediatric to adult care. On the basis of these various studies, therapeutic recommendations have been proposed and interventions developed, which are themselves being evaluated as part of research protocols.

This initial work has clarified my desire to propose new research over the next few years, with the aim of improving the care of patients and their families through tailored, personalized interventions. More specifically, I'd like to adopt a partnership approach to healthcare and develop digital tools.



**Kristopher LAMORE**

# Congrats

## to the Laureates (2023)

**Mélissa Allé**

AAP Manifestations  
scientifiques ULille  
Laureate

**Angela Bartolo**

Distinguished by the  
insignia of Chevalière de  
la Légion d'Honneur

**Cédrick Bonnet**

Franco-Brazilian Chair,  
STIMULE and CAPES-  
COFECUB Laureate

**Angèle Brunellière**

AAP CPER Enhance  
Laureate

**Séverine Casalis**

ANR Laureate

**Yann Coello**

Académie des Sciences  
Morales et Politiques  
Laureate

**Yvonne Delevoye**

IUF Senior Member and  
Industrial Chair Laureate

**Delphine Grynberg**

European Commission  
Laureate

**Solène Kalénine**

Fulbright and ANR  
Laureate

**Kristopher Lamore**

Funding Ligue contre le  
Cancer Laureate

**Bilge Sayim**

Campus France and PHC  
BOSPHORE Laureate

**Yannick Wamain**

AAP MESHS and AAP  
CPER Enhance Laureate

# Welcome

## to the new doctoral students



**Sabah Al Bilani**, team Langage

**Constance Beaumont**, team DEEP



**Marine Coeugnet**, team AVA

**Mélen Guillaume**, team Langage



**Angelica Gutierrez**, team Langage

**Ambre Ittouchène**, team DEEP



**Nell Legras**, team DEEP

**Marie Mathé**, team AVA



**Aurélien Said Housseini**, team Langage

**Nicolas Slaski**, team AVA



**Mélisa Yavuz**, team AVA



# Welcome to the new MCFs

With a Master's degree in Psychology, specializing in Clinical Health Psychology, Pauline JUSTIN continued her training by completing a doctoral thesis at Université Paris Cité. Her thesis focused on the knowledge and practices of oncology healthcare professionals in relation to young carers. Currently a Senior Lecturer in Health Psychology at the SCALab Laboratory at the University of Lille, she is continuing her research on young carers, healthcare professionals and patients with chronic somatic illnesses. She also works as a psychologist for the Comité Départemental de la Ligue Contre le Cancer, supporting patients and family carers.

Her research, rooted in the field of Health Psychology, focuses mainly on the adaptation and experiences of patients and their families in relation to chronic illness, and particularly on the role of caregivers and young carers in supporting patients, as well as the support provided to these vulnerable populations and the way professionals view these issues.



**Pauline JUSTIN**

Laura LAZARTIGUES' research focuses on statistical learning, particularly within sequences. Statistical learning is known to be involved in language (cutting out speech, acquisition of grammar, vocabulary etc.), yet the factors taken into account when learning sequences (language or non-language) and the mechanisms of statistical learning are still to be specified.

In her past research, she explored the effect of several factors within non-language sequences (visuo-spatial sequences), then language sequences (pseudo-words) using paradigms involving eye-tracking and pointing tasks (touch screen).

His current aim, in line with his past work, is to determine which factors derived from statistical learning are used in language comprehension, and what role prediction plays in language learning and processing.



**Laura LAZARTIGUES**

# Welcome

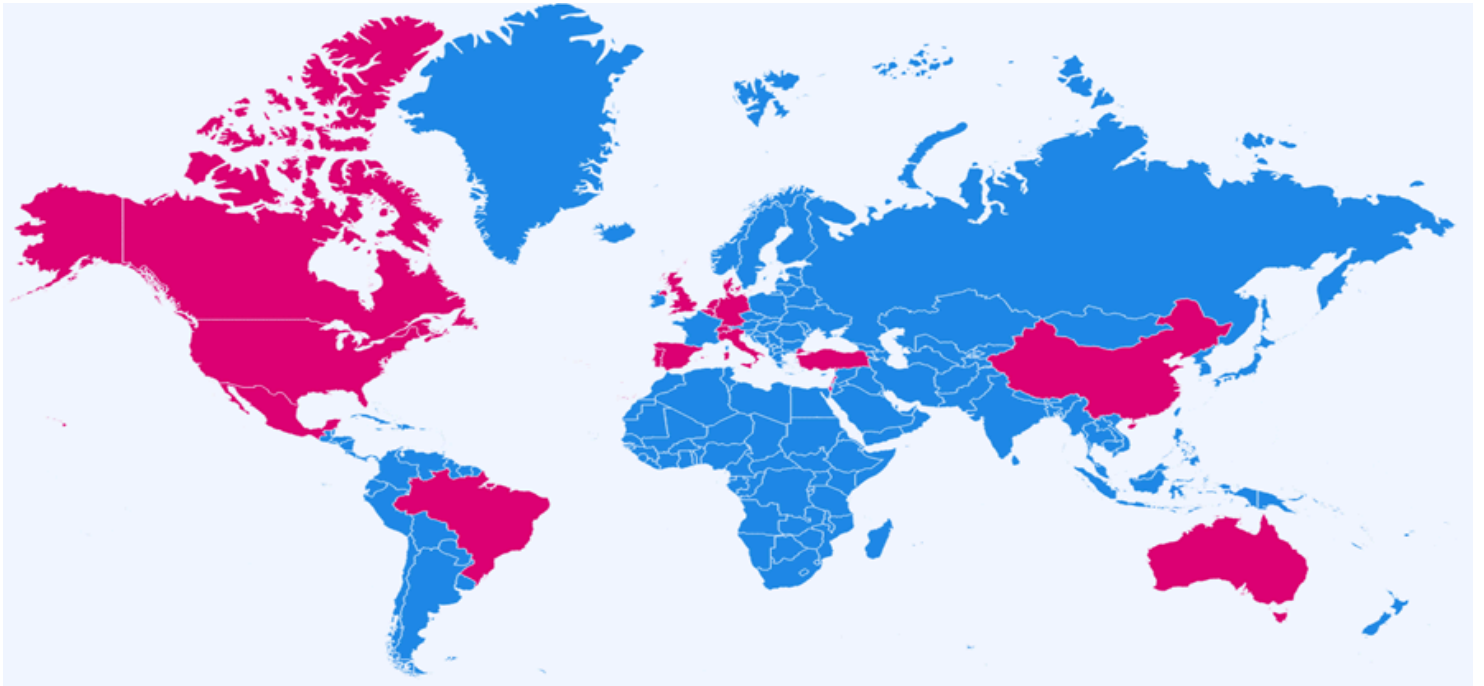
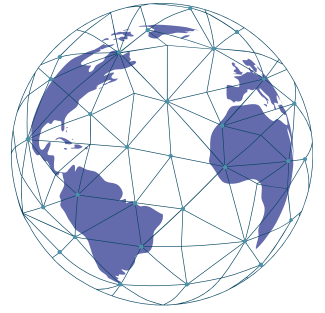
## to the new post-doctoral researcher

Anke Hua completed her PhD at Zhejiang University in 2023, where she focused on multisensory integration and postural control in her research. Since September 2023, She is a postdoctoral researcher at SCALAB. She works with Cédric Bonnet from the AVA team. Her research centers on the interaction between postural sway and goal-directed task performance.



**Anke Hua**

# International Collaborations



*Australia, Belgium, Brazil, Canada, China, Denmark, Germany, Israel, Italy, Lebanon, Luxembourg, Mexico, Netherlands, Portugal, Singapore, Spain, Switzerland, Turkey, United Kingdom, USA*



# TEAM YEARBOOK 2024



**Ambre**

**Jules**

**Nicolas**

**Marine**

[illegible]

This image shows a blank sheet of white paper designed for taking notes. At the top, there is a light blue horizontal bar. Centered within this bar is the word "Notes" in a bold, dark blue font. Below the header bar, the page is filled with horizontal grey lines, providing space for writing. The lines are evenly spaced and extend across the width of the page. In the bottom right corner, there is a small, light blue decorative element consisting of two overlapping rounded shapes.

