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SYNCC-IN

HORIZON2023

> IN THE DELICATE DANCE BETWEEN CAREGIVER AND CHILD LIES THE FOUNDATION OF HUMAN CONNECTION. BY UNDERSTANDING THEIR SYNCHRONY, WE UNLOCK THE KEYS TO HEALTHIER MINDS, STRONGER RELATIONSHIPS, AND BRIGHTER FUTURES.

AT A GLANCE	• **Highlights from Recent Months**:
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	  ○ study visit in Copenhagen,
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Welcome

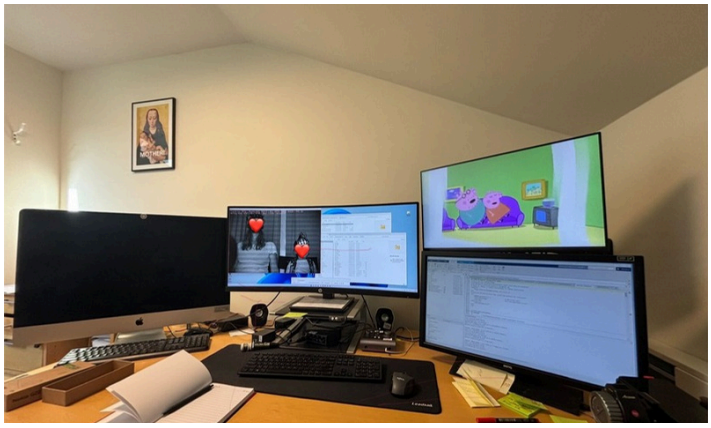
Welcome to the next edition of our SYNCC-IN newsletter! As always, we are delighted to share the latest highlights from our project - from **working visits** and **workshops** to **ongoing research** activities and **upcoming plans**.

Highlights from Recent Months

Research in Progress: Data Collection is going well!

In this study, we examine parent–child dyads using a multimodal approach, gathering data on **behavioral attunement**, **psychophysiological signals**, and **brain activity**. Combining these levels of analysis is essential, as it allows us to understand how **moment-to-moment coordination** during interaction is reflected both in the body and the brain, and how these systems work together to support co-regulation, communication, and children's development.

We continue to actively collect data at the University of Warsaw: we are delighted to report that more than **80 sessions** have already been completed across all groups planned in the project. **Data collection has now also begun at the University of Copenhagen.**



In Copenhagen, the process is running very smoothly — testing started in late fall, and by the end of the year we expect to have reached **60 tested dyads**.

We are especially **grateful to all participating families**—many of whom have traveled long distances to take part. Thank you for your commitment and generosity.

We couldn't do this research without you!

Dissemination workshop: From Lab to Career Paths: SYNCC-IN Meets HerPath

SYNCC-IN team from the University of Warsaw organized a special Science Wednesday session for **migrant women interested in developing digital skills** and exploring new career paths – participants of the EU-funded **HerPath project**. They visited our lab, saw how eye-tracking and EEG are used in real research, and tried out a sample task themselves. The event combined a hands-on introduction to cutting-edge digital tools with a discussion about how such technologies can open up diverse professional opportunities. We are delighted that our experience can serve as both inspiration and practical support for women building their skills and planning their future careers.

Administrative workshops: We continue to gain knowledge and experience!

As part of activities aimed at strengthening administrative and networking capacities within the **Twinning project**, the UNIWARSAW team took part in two workshops focused on developing new grant proposals.

Our **PI, Agnieszka Pluta,** attended the second meeting in London, dedicated to designing a new funding application. The workshop was hosted by world-renowned biobehavioral synchrony researcher **Prof. Antonia Hamilton**, who also serves on our Advisory Board.

Over two intensive days in London, together with an international group of researchers, we explored how to advance the science of biobehavioral synchrony – from better integrating behavioral, physiological, and neural measures to translating this knowledge into more ecologically valid, socially relevant research. Building on these discussions, we are now working on the idea of a new educational and training network for early-career researchers in this field, to be developed as a doctoral network proposal.

During the same period, our project manager, **Ewa Komorowska**, took part in the **NCURA Global Workshop for U.S. Research Funding and Management** held at University of Warsaw (5–6 November 2025). The workshop — organized by NCURA (National Council of University Research Administrators) — provided hands-on training in preparing competitive proposals for U.S. funding agencies, navigating federal funding regulations, and managing awards, compliance, and contracts under U.S. frameworks.

Peripatetic Conference: We continue to engage in activities that strengthen both our scientific goals and collaborative

Members of the SYNCC-IN team took part in the **Cognitive Systems Modelling Conference — the 14th Peripatetic Conference**, held on 23–25 October in the Tatra Mountains. True to its peripatetic spirit, the meeting combined scientific sessions with discussions held *in motion*, during shared mountain walks.

Our team, represented by **Joanna Beck**, delivered a presentation titled "**Who Leads, Who Follows?**", sharing our latest findings on biobehavioral synchrony in mother–child dyads. Drawing on both the SECORE procedure (micro-analysis of movement and heart rate variability) and the co-watching MOVIES (EEG, eye-tracking, HRV, and fNIRS during shared viewing), we discussed emerging insights into lead–follow dynamics across multiple behavioral, physiological, and neural levels.

The conference provided an inspiring environment for refining our methodology and deepening interdisciplinary exchange.

Study visit: Neural Synchrony, Movement Patterns and Holiday Hygge

In the middle of December, just as **Copenhagen** was switching on its Christmas lights, researchers from the **University of Warsaw** and the **University of Trento** visited the city to work together on our fNIRS dataset. Our experienced partners from UniTrento, who specialize in **fNIRS data analysis**, provided hands-on training in advanced preprocessing and statistical methods. Using fNIRS in the context of mother–child interactions allowed us to examine how the brains of both partners respond during real-time, naturalistic exchange – for example, how they synchronize, how they react to shared attention, and how they adapt to each other's emotional and communicative signals.

In addition to fNIRS, the team also worked on **movement pattern analyses**. By studying fine-grained movement dynamics, we aimed to better understand how coordination, turn-taking, and subtle nonverbal cues contribute to successful interaction in the dyad.

An important part of the meeting between the members of the three teams was **participating in testes** in Kopenhagen's lab and brainstorming on an **effective data storage structure**. These discussions are crucial for achieving consistency between research centres, which will facilitate joint analyses.

Of course, the visit was not only about data and code: the team also enjoyed the charms of winter, pre-Christmas Copenhagen and spent time together at the city's Christmas markets, strengthening collaboration and team spirit.

Our team is growing!

From December 2025 we have two more collaborators in Warsaw: Weronika Bakun and Jan Łabędź and one in Copenhagen - Amalie Lunde.

UNIVERSITY OF WARSAW

Weronika Bakun is a graduate of the Faculty of Psychology at the University of Warsaw and a final-year student of Neuroinformatics at the Faculty of Physics. She is also a member of the Student Neuroinformatics Club. In the project, she will use her interdisciplinary education as part of a team responsible for collecting and analysing EEG data as well as performing and coding SECORE. Her scientific interests focus on autism. During studies, she investigated the neurobiological basis of sensory disorders in mouse models of ASD, the characteristics of resting-state EEG in autistic individuals, and the potential of music therapy as a supportive intervention for autistic individuals.

UNIVERSITY OF WARSAW

Jan Łabędź is a psychology student at the University of Warsaw and an employee of the Diagnostic Techniques Laboratory. His research interests focus on psychometrics and psychophysiology, with a particular passion for eye-tracking. For two years, he has been gaining experience working with neuroatypical populations as an occupational therapist. A member of the Research Section of the Student Scientific Association for Neuropsychology and Psychophysiology. In the SYNCC-IN project Jan will be responsible for ET and fNIRS data collection and analysis.

UNIVERSITY OF COPENHAGEN

Amalie Lunde comes from Norway and holds a bachelor's degree in psychology from Inland Norway University of Applied Sciences. She is currently working as a research assistant at the Department of Psychology at the University of Copenhagen. Amalie has been part of the SYNCC-IN project since September 2025, where she has been involved in data collection and, among other things, has been responsible for compiling questionnaires. She looks forward to continuing the collaboration on this exciting project, including coding SECORE after the data collection has been completed.

Looking Ahead – Publications in Progress

Our team is currently working intensively on the first publications from the project. We are refining manuscripts that were started earlier and, at the same time, beginning to analyse the data.

Analysis of the questionnaires

Our first focus is on the **psychological data from questionnaires** completed by parents. These measures provide information, among other things, on participant characteristics such as **temperament**, **autistic traits**, and **parental stress**, which are important for dyadic synchrony.

Methodological paper on movement patterns

We are also preparing a **methodological paper on movement patterns**. This will primarily be a methods-focused contribution, but in subsequent studies we plan to compare movement patterns between parent–child dyads with typical and neuroatypical developmental trajectories. Such comparisons may be crucial for identifying subtle differences in coordination, timing, and bodily attunement that are not visible to the naked eye, but which could inform early detection of developmental risk and inspire more tailored support and intervention strategies.

Did You Know?

Your brain "tunes in" to others more than you think

A **new study** published **in NeuroImage** by our team member **Alessandro Carollo** and colleagues, supervised by **Gianluca Esposito**, reveals that our brains naturally sync up during everyday social interactions.

Using **fNIRS hyperscanning**, the researchers simultaneously measured brain activity in 142 real-life pairs—friends, romantic partners, and mothers with their children—while they watched videos together, played a cooperative game, or simply chatted.

The findings show that **real pairs' brains synchronize significantly more than those of randomly paired individuals**, especially in regions involved in **empathy, imitation, and understanding others**. Surprisingly, the strongest neural synchrony happened during shared video watching, followed by cooperative gameplay, with the lowest synchrony occurring during free, unstructured conversations.

The researchers also found subtle differences across relationships: **adult pairs synchronized more** strongly than mother–child pairs, suggesting that neural alignment may emerge more readily during newer, less routinized interactions where our brains actively adapt to each other.

Together, the study highlights how our social bonds and the context of our interactions shape the ways our brains "tune in" to one another, offering fresh insight into how we connect, communicate, and understand the people around us.

- **real pairs' brains synchronize significantly more than those of randomly paired individuals**
- **adult pairs synchronized more strongly than mother–child pairs**

Further Readings

Interested in this topic and eager to learn more?

Carollo A, Bizzego A, Schäfer V, Pletti C, Hoehl S, Esposito G. (2025): *Interpersonal neural synchrony across levels of interpersonal closeness and social interactivity.* NeuroImage: 322:121532. doi: 10.1016/j.neuroimage.2025.121532. Epub 2025 Oct 17. PMID: 41110650.

Merry Christmas from SYNCC-IN team!

Stay tuned for updates on our website and social media!

We're excited to share this journey with you.

STAY CONNECTED

Website: https://synccin.uw.edu.pl

Facebook: https://www.facebook.com/people/Syncc-in-project/61566761616576/

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