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SYNCC-IN

HORIZON 2023

“

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:**
 - workshops: Sicily, Warsaw
 - conferences: NEURONUS, ESCAN, OKPR
- **Looking Ahead** - publications
- **Did You Know?** - interesting facts from ESCAN

Welcome

Welcome to the latest edition of the SYNCC-IN newsletter! The past few months have been packed with activities, including workshops and conferences, and we are delighted to share some of the highlights with you!



Highlights from Recent Months

Workshop in Catania, Sicily



From 11-13 May 2026, we met in Catania, **Sicily**, for one of the planned **SYNCC-IN consortium workshops**. Colleagues from all partner institutions came together to share updates on ongoing research activities, discuss project progress, and plan the next steps.

Over three productive days, we **exchanged ideas**, presented **recent findings**, and explored opportunities for **future collaboration**. The workshop provided valuable time for in-depth discussions, problem-solving, and strengthening connections across the consortium.



Beyond the formal programme, we enjoyed plenty of opportunities for informal conversations and team building. Shared meals, walks around Catania, and the chance to sample delicious Sicilian specialties created a relaxed atmosphere for continuing both project-related and personal conversations.



SECORE training Warsaw



Students and researchers from the Universities of Warsaw, Copenhagen, Heidelberg, and Milan gathered in Warsaw on 27–28 March for an intensive workshop marking the culmination of a comprehensive training program on the SECORE microanalytical coding scheme. The instrument will be used to analyze parent–child interaction data collected across all four institutions.

During the two-day workshop, participants engaged in **hands-on coding exercises, video-based analyses,** and lively **discussions** aimed at ensuring a consistent and standardized application of the coding scheme across research sites. This collaborative effort represents a key step in strengthening methodological alignment across teams.



A central objective of the training was to achieve a **high level of inter-coder agreement among students and researchers from the participating institutions.** This is essential for ensuring the reliability and validity of the analyses, and ultimately for supporting the robustness of the upcoming project's findings.

The workshop left us with new ideas, fresh motivation, and a stronger sense of collaboration as we move forward with the next stages of SYNCO-IN.

CONFERENCES

As the project enters the stage of preliminary analyses, recent months have seen us attending a number of conferences, where we were excited to present some of our first findings.



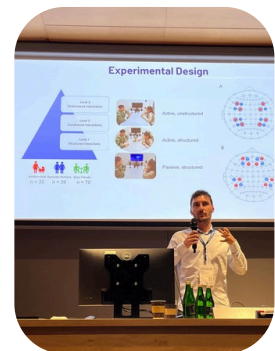
14th Neuronus & Young PTBUN Neuroscience Forum

From 23 to 26 April, we had the pleasure of presenting the SYNCC-IN project at the 14th Neuronus & Young PTBUN Neuroscience Forum as part of the symposium **“Interpersonal Neural Synchrony in Close Relationships: Hyperscanning Studies of Parents, Children, and Romantic Partners.”**

The symposium provided a valuable platform for scientific exchange on hyperscanning methodologies and interpersonal neural synchrony across different types of relationships.

The session was opened with a broader overview of current research on synchrony:

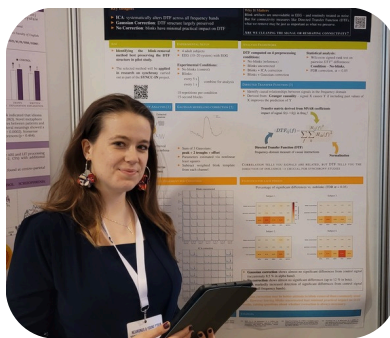
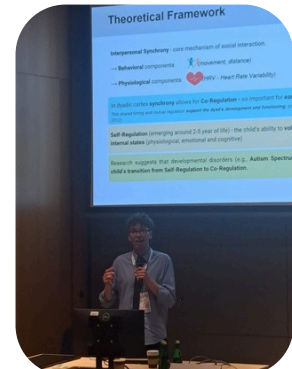
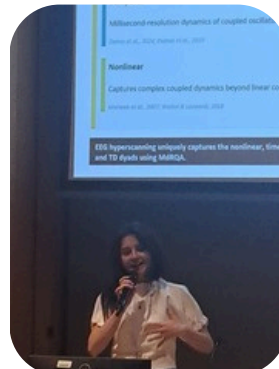
- **Antonia Hamilton** - a real expert in the field - presented an introduction talk entitled “Tracking synchrony to understand social interaction”
- **Alessandro Carollo** presented results from his fNIRS study in which he recorded brain activity from 142 dyads - including close friends, romantic partners, and mothers with their children - while they watched a video together, played a cooperative game, or interacted freely



The results showed that **real interacting pairs synchronize more than artificially matched pairs**, especially in brain regions involved in social communication and understanding others. Yet synchrony is not simply a case of “the more, the better.” In mother–child dyads, **higher synchrony was linked to maternal neuroticism**, suggesting that strong brain-to-brain coupling may sometimes reflect hypervigilance or over-monitoring rather than optimal connection. Overall, these studies show that social connection leaves a measurable neural signature, but its meaning depends on the context, the relationship, and the people involved.

Then SYNCC-IN session started:

- **Agnieszka Pluta** introduced the objectives of the project
- **Joanna Beck** presented results from eye-tracking data collected at the University of Warsaw
- **Joanna Duda-Goławska** shared findings based on EEG
- **Grzegorz Kaliński** discussed motion analysis.



We are also pleased to share that a member of our student team - **Weronika Bakun** - received the **Award for the Best Cognitive Poster Presentation**. In her poster titled ***“Impact of Blink Artifact Removal Methods on Directed Transfer Function Estimation in EEG”*** she addressed a key methodological issue relevant to our project's analysis main focus.



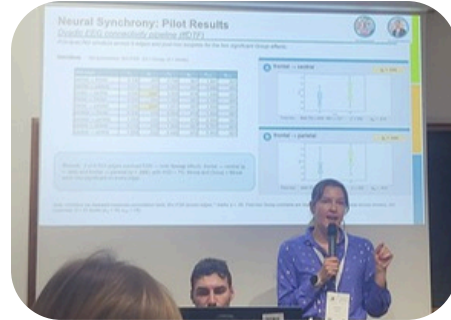
Blink artifact removal in EEG is not a neutral preprocessing step - it can significantly change estimates of brain connectivity. In our pilot study using Directed Transfer Function (DTF), we found that **ICA-based blink correction systematically altered connectivity patterns** across frequency bands, while Gaussian-based correction preserved the original structure more closely. Surprisingly, leaving blink artifacts uncorrected had minimal impact compared to the “clean” baseline. These results suggest that common preprocessing choices may reshape inferred neural interactions rather than simply remove noise, highlighting the need to carefully reconsider artifact handling in causality-based synchrony research.



European Society for Cognitive and Affective Neuroscience (ESCAN)

The SYNCC-IN project was presented at the ESCAN conference in Rome as part of a **symposium devoted to contemporary research on social interaction**, as well as in the form of **three posters** prepared by young researchers from the team.

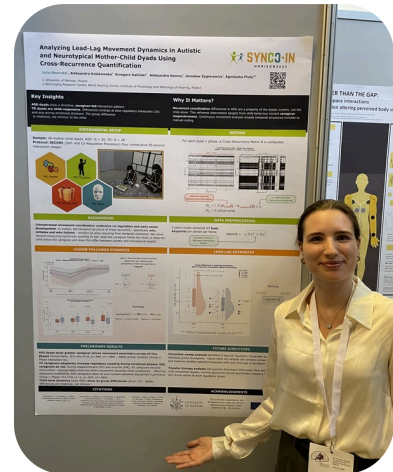
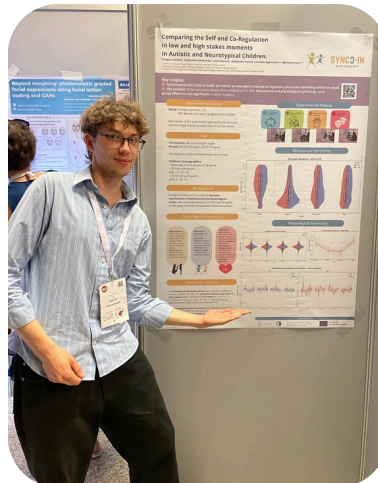
- The presentation on symposium was delivered by **Prof. Agnieszka Pluta**, who introduced the first findings from the project and focused on what the SYNCC-IN data may reveal about neurodiversity.



The preliminary findings show that **synchrony in autism is not globally reduced**. Dyads with children on the spectrum showed lower motor coordination in some situations, but their neural synchrony was not weaker - rather, it followed a different pattern. In some cases, the child's alpha-band activity preceded the caregiver's activity, which may indicate a specific dynamic of attention monitoring in these interactions. The SYNCC-IN findings encourage a more nuanced understanding of synchrony in neurodiversity: not as a simple deficit, but as a **phenomenon shaped by context, modality, and the nature of the task**.

We were also visible during the poster sessions:

- The poster presented by **Aleksandra Kołakowska** focused on the **movement analysis of video recordings** that capture the phases of dyadic interaction at different levels of regulation and arousal.
- The poster presented by **Grzegorz Kaliński** focused on the **dynamics of co-regulation** during the SECORE procedure, which divides interactions into moments of low regulatory challenge (joint play) and moments of higher tension: situations that elicit frustration or anxiety.
- **Julia Słowicka** presented a poster "**Analyzing Lead-Lag Movement Dynamics** in Autistic and Neurotypical Mother-Child Dyad Using Cross-Recurrence Quantification

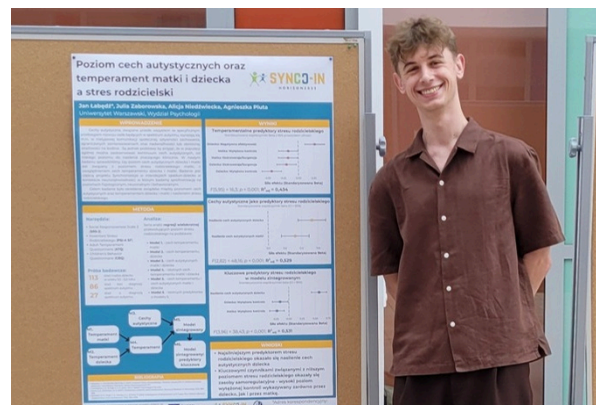


The results indicate a **significant interaction between group and phase in the area of motor synchrony**. During high-tension moments, neurotypical dyads exhibited lower dynamics of motor similarity compared to ASD dyads. In contrast, the physiological factor (heart rate synchronization) was found to be driven by situational context rather than by the child's developmental trajectory. Physiological synchrony decreased with the transition from low-tension phases to phases involving high regulatory challenges.



34th Polish National Conference on Developmental Psychology

On 15–17 June, the **34th Polish National Conference on Developmental Psychology** was held in Rzeszów. It is the most important national event devoted to human development. Members of our team presented research results conducted within the SYNCC-IN project.



- During the plenary session, **Dr. Alicja Niedźwiecka** spoke about **conversations about mental states during mother-child dyadic interactions**.

Parent-child conversations, understood as exchanges of verbal communication, become an increasingly frequent form of interaction during the preschool period. The topics of these conversations may concern mental states (mental state talk, MST). MST can take different forms - it may refer to perception, feelings, desires, thoughts, memories, etc. Such conversations are important because they support the child's cognitive and socio-emotional development.

In our study, we assessed the frequency and characteristics of MST during conversations in two groups of dyads: mother-child dyads with a diagnosis of autism spectrum disorder and mother-child dyads without any developmental diagnosis. The assigned topic of conversation concerned previous events during a laboratory research session. The analyses included between-group and between-gender comparisons, as well as an assessment of dyadic alignment in conversational style with regard to MST.



We observed **differences in the ways mothers guided the conversation**, which may translate into the child's tendency to talk about their own and others' mental states. By including analyses of both parent and child speech, we were able to show the child's contribution to shaping conversations involving MST.

- **Jan Łabędź** presented results of analyses concerning parental stress in a poster session. The study examined the predictive power of temperamental traits and the severity of autistic traits in mothers and children. The results indicate a particular role of high **self-regulatory competencies as protective factors**.

Translational potential of findings - lecture at the science for society congress

Prof. Agnieszka Pluta delivered a lecture at the Science for Society Congress, a national event dedicated to showcasing research with societal impact and fostering dialogue between researchers, policymakers, and stakeholders.

During her presentation, she discussed the **translational potential of findings** from the SYNCC-IN project. She highlighted how measures of biobehavioral synchrony during caregiver–child interactions could complement traditional diagnostic approaches by **incorporating a relational perspective**, rather than focusing solely on child characteristics.

Such measures may also help inform future recommendations for caregivers aimed at improving the coordination of behavior, affect, and psychophysiological signals during everyday interactions.

An interactive stand at the Stai Sano Run



During the Stai Sano Run, the Milan team organized an interactive outreach stand to **introduce the SYNCC-IN project to families and the wider public**. Through an engaging quiz, posters and informal discussions, we explained the concept of caregiver–child synchrony, presented the project's objectives and invited potentially interested families to participate in the study.

We are pleased that the results of our work within the SYNCC-IN project are reaching an increasingly wide audience. We are extremely grateful to the study participants for the time they devoted to participating in the project. It is thanks to you that we can advance knowledge on synchrony in parent–child interactions.

Looking Ahead

After a productive conference period, in the coming months we plan to consolidate our initial research findings into publications. Our plans include:



a chapter in ***Academic Psychology for Practical Application***



a methodological paper on **effective approaches to preprocessing blink artifacts in EEG** based on our award-winning poster



a research paper on **movement synchrony**

Did You Know?

We'd like to share with you some interesting facts that inspired us while attending recent conferences!



... that the "soundtrack" of your life can actually change how heavy you feel? Research shows that listening to sounds with an ascending pitch while moving can make you feel lighter and happier (Fernández Vallejo, 2026). On the flip side, descending sounds can make you feel heavier and even slightly decrease your mood. Your brain literally uses sound to help map out your own body's weight!

Fernández Vallejo, I. (2026). Altered modulation of body perception and affect through movement sonification in individuals with depressive symptoms Poster presented at ESCAN Conference, 2026.



... that playing an instrument as a kid is like an insurance policy for your brain? People who had at least two years of formal musical training when they were younger show better memory and sharper thinking skills much later in life (Rodriguez, 2026). It turns out those childhood piano lessons really do pay off for your long-term cognitive health

Rodriguez, A. (2026). Can musical training protect cognitive function in later life? Poster presented at ESCAN Conference, 2026.



... that your brain has to work harder when you watch someone who moves differently than you? If you observe someone whose "style" of movement is very different from your own, your brain activates a "conflict-monitoring" network (Maronati, 2026). It essentially has to override its own expectations and pay closer attention to the incoming visual information to understand what the other person is doing.

Maronati, C. (2026). When others move differently: Alpha-band sensory gating and conflict-monitoring networks track kinematic dissimilarity. Poster presented at ESCAN Conference, 2026.



... that "social touch" changes how you perceive the space around you? Gentle, affective touch (like a slow caress) actually expands your "peripersonal space"—the bubble of space immediately surrounding your body that your brain considers "yours" (Ferroni, 2026). This suggests that touch is a fundamental tool for how we connect our physical selves to the social world

Ferroni, F. (2026). When touch shapes space: Neural bases of social and instrumental peripersonal space Poster presented at ESCAN Conference, 2026.

Wishing you a joyful summer filled with rest and inspiration!

Stay tuned for updates on our website and social media!
We're excited to share this journey with you.

STAY CONNECTED



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