

## Themis Nikolas Efthimiou, PhD

[Personal Website](#) | [ORCID](#) | [Google Scholar](#) | [GitHub](#) | [OSF](#)

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### Areas of Expertise and Interest

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| • Social cognitive and affective neuroscience    | • Electroencephalography (EEG)            |
| • Facial expression production/processing        | • Biological Motion production/processing |
| • Statistical Software (Matlab, JASP, R, Python) | • Facial Electrical Stimulation           |
| • Open Science                                   | • Peripheral physiology (HR, GSR)         |

### Professional profile

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I am a methodological researcher with a PhD in Psychology from the University of Essex, specialising in social and cognitive neuroscience. My expertise integrates advanced quantitative methods, such as multilevel modelling and machine learning, with physiological and longitudinal data to investigate complex social interactions. I am a postdoctoral researcher at the University of Edinburgh. I study how social context influences interactions between autistic and non-autistic individuals, exploring the impact on mental health related to loneliness as part of the Diversity in Social Intelligence Project.

My research background includes developing facial neuromuscular electrical stimulation (fNMES) to examine its effects on emotion perception and processing, utilising innovative methods like EEG and automatic video coding. I have a proven track record of high-quality publications and international conference presentations, and I am committed to open science practices. I am adept at managing interdisciplinary research projects, recruiting participants, and creating analytical tools, such as an R package for dyadic analysis.

I am eager to contribute to the Wellcome Trust-funded 'RESTED' project, leveraging my experience in handling complex datasets and working with specialised populations to explore the bidirectional links between sleep, circadian rhythms, and mental health. My strong background in both experimental and applied research will enable me to work effectively within this interdisciplinary team, fostering collaboration and ensuring the successful execution and dissemination of project outcomes.

### Bibliometrics (August 2023)

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| • Citations: 28 (Google Scholar)                  | • h-index: 4 (Google Scholar)                  |
| • 5 articles published in a peer-reviewed journal | • 5 conference presentations (oral and poster) |

### Research Experience

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#### Postdoctoral Researcher | The University of Edinburgh | January 2024 – Present

I work under Dr Catherine Crompton as part of the Diversity in Social Intelligence Project, conducting research into social interactions between autistic and non-autistic adults. My research uses

advanced computer vision techniques to analyse non-verbal synchrony, with a focus on video processing, data analysis, and collaboration on publications. Throughout my work, I maintain a strong commitment to open science principles, promoting inclusivity and responsible research practices.

#### **Key Outcomes:**

1. **Registered Report:** Currently under review at *Autism* a study investigating social motor synchrony and interactive rapport in autistic, non-autistic, and mixed neurotype dyads.
2. **Manuscript in Preparation:** A paper on multimodal gestures and interpersonal relationships between autistic and non-autistic dyads, focusing on the dynamics of verbal and non-verbal social behaviours.
3. **R Package Development:** Created an R package for dyadic analysis to facilitate advanced statistical analyses in dyadic research.

#### **PhD Researcher | University of Essex | February 2020 – January 2024**

Under the supervision of Dr Sebastian Korb, I developed a non-invasive technique called facial electrical stimulation (FES) to engage specific facial muscles. My research included a systematic literature review and two lab experiments exploring the Facial Feedback Hypothesis, focusing on how controlled facial muscle activation influences emotion perception and felt emotion. I addressed user concerns regarding the technology and presented my findings at international conferences, including IOP and ESCAN. All chapters of my PhD were published in academic journals.

#### **Key Outcomes:**

1. **Published Articles:** Four peer-reviewed articles, including papers on FES and its effects on emotion perception and experience.
2. **Conference Presentations:** Delivered at five international conferences, showcasing research on facial electrical stimulation.
3. **Innovative Methods:** Introduced the use of FES in affective neuroscience, providing a new avenue for studying emotion perception through facial muscle activation.

#### **Research Assistant Internship | Middlesex University Student Union | Dec 2016 to Jul 2017**

As a Student Union Intern, I supported elected representatives by conducting in-depth research on complex topics like student housing policy. I utilised various Microsoft tools to process, analyse, and visualise data effectively. My contributions included formulating evidence-based recommendations and proposing actionable measures to positively impact students.

#### **Teaching and Communication**

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#### **Graduate Laboratory Assistant | University of Essex | September 2020 to September 2022**

In my role supporting first-year psychology students, I was responsible for assisting with weekly workshops on statistics and research methods, marking assignments and providing detailed feedback, and acting as an academic adviser offering guidance and support. I worked closely with colleagues to ensure the smooth operation of workshops and the continuous improvement of teaching processes across several modules. These included first-year statistics teaching SPSS and

PS101-4AU-CO: Understanding Our Place in the World. This role honed my skills in academic duties, student support, and research-led education.

**Student Learning Assistant (SLA) | Middlesex University | October 2016 to May 2017**

I supported senior staff with first-year psychology classes, focusing on psychological research and data analysis. This role honed my skills in academic and administrative duties, student support, and research-led education.

**Other work experience**

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**Volunteer Peer Mentor | MIND, London | August 2015 to August 2016**

I volunteered with the MIND peer mentoring programme, which involved weekly meetings with vulnerable young people and assisting them with their goals set out in an action plan.

**Vice-President of Middlesex University Debating Society | September 2017 to September 2019**

I excelled in public speaking and hosted a debate tournament, showcasing my organisational and leadership abilities. I taught new members the parliamentary debating style, ensuring they were well-prepared and confident. I planned and organised weekly debate sessions, fostering an environment of inclusivity and safety for all participants. My role required effective communication, meticulous planning, and a commitment to creating a supportive and dynamic space for members to engage in meaningful discourse.

**Supervision**

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2024: Informal co-supervisor of 1 Master student's research projects at the Department of Psychology, The University of Edinburgh, UK

**Education**

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**Formal w**

Ph.D. in Psychology | Department of Psychology, *University of Essex*

Pass with no corrections: 18th January 2024

Examiners: Dr Gethin Hughes and Professor Beatriz Calvo Merino

Supervised by Dr Sebastian Korb

Thesis Title: *A spark of emotion: the impact of electrical facial muscle activation on emotional state and affective processing*

MSc in Cognitive Neuroscience | Department of Psychology, *Middlesex University*

Pass with minor corrections: 18<sup>th</sup> December 2019

Examiners: Dr Emma Ward and Dr Nicholas Cooper

Supervised by Dr Alexander Jones and Dr Jonathan Silas

Thesis Title: *Attention Allocation During the Observation of Biological Motion: An EEG Study*

BSc (Hons) in Psychology (First Class) *Middlesex University 2015 – 2018*

Dissertation Project: *Exploring the Relationship Between Interoceptive Awareness and Embodied Cognition*

Relevant Modules: Neuropsychology, Evolutionary Psychology, Language, Communication and Literacy

## Additional

Completed an intensive three-week course on computational techniques (<https://academy.neuromatch.io/>).

## Research and Technical skills

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- Proficient in R, for diverse statistical analyses including mixed effects modelling (lme4), machine learning (tidymodels), and Bayesian analysis (brms).
- Skilled in Python, utilising pandas and numpy for data processing, Scikit-Learn for machine learning, and TKinter and Streamlit for user interfaces and visual dashboards.
- Creating online surveys using Qualtrics.
- Designing behavioural experiments with Psychopy and Pavlovio.
- Experience with automatic video coding tools (FaceReader, Openface, OpenCV).

Methods: facial electromyography (EMG), electroencephalography (EEG), transcranial magnetic stimulation (TMS), peripheral physiology (HR, GSR), neuromuscular electric stimulation (NMES), transcranial direct/altering current stimulation (tDCS, tACS).

## Awards

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- ‘Best Presentation with Poster’ MDX research student summer conference 2019.
- Awarded MDX STEM (Science, Technology, Engineering, Maths) scholarship.

## Journal publications

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- **Efthimiou, T. N.**, Baker, J., Elsenaar, A., Mehu, M., & Korb, S. (2024). Smiling and frowning induced by facial neuromuscular electrical stimulation (fNMES) modulate felt emotion and physiology. *Emotion*. Advanced online publication. <https://doi.org/10.1037/emo0001408>.
- Baker, J., **Efthimiou, T.**, Gartus, A., Elsenaar, A., Mehu, M., & Korb, S. (2024). Computer-controlled electrical stimulation of facial muscles by facial neuromuscular electrical stimulation (fNMES): Hardware and software solutions. *Journal of Neuroscience Methods*, 110266.
- **Efthimiou, T. N.**, Baker, J., Clarke, A., Elsenaar, A., Mehu, M., & Korb, S. (2024). Zygomaticus activation through facial neuromuscular electrical stimulation (fNMES) induces happiness perception in ambiguous facial expressions and affects neural correlates of face processing.

*Social Cognitive and Affective Neuroscience*, 19(1), nsae013.

<https://doi.org/10.1093/scan/nsae013>

- **Efthimiou, T.N.**, Hernandez, M.P., Elsenaar, A. *et al.* Application of facial neuromuscular electrical stimulation (fNMES) in psychophysiological research: Practical recommendations based on a systematic review of the literature. *Behav Res* (2023). <https://doi.org/10.3758/s13428-023-02262-7>
- Baker, J., **Efthimiou, T.**, Scherer, R., Gartus, A., Elsenaar, A., Mehu, M., & Korb, S. (2023). Measurement of the N170 during facial neuromuscular electrical stimulation (fNMES). *Journal of Neuroscience Methods*, 109877. <https://doi.org/10.1016/j.jneumeth.2023.109877>
- **Efthimiou, T. N.**, Hanel, P. H. P., & Korb, S. (2022). Volunteers' concerns about facial neuromuscular electrical stimulation. *BMC Psychology*, 10(1), 117. <https://doi.org/10.1186/s40359-022-00827-3>

## In Prep

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- Baker, J., Ngo, H-V., **Efthimiou, T.N.**, Elsenaar, A., Mehu, M, Korb, S. Probing the time-course of facial feedback effects on facial emotion recognition. Expected publication date June 2025.
- **Efthimiou, T.N.**, Wilks, C., Foster, S., Ropar, D., Dodd, M., Sasson, N., Lages, M., Fletcher-Watson, S., & Crompton, C.J. Social motor synchrony and interactive rapport in autistic, non-autistic, and mixed neurotype dyads: A Stage 1 Registered Report. *Autism*. Stage 1 Principal Acceptance by Autism. Expected publication date August 2025.
- **Efthimiou, T.N.**, Ackerman, R., Wilks, C., Foster, S., Ropar, D., Dodd, M., Sasson, Fletcher-Watson, S., & Crompton, C.J. Partnered Perspectives: A Study of Interpersonal Communication Dynamics in Dyads with and without Autism. Expected publication date May 2025.
- **Efthimiou, T.N.** & Crompton, C.J. (expected 2025). Introducing 'Duet' an R package for the Analysis of Dyads. Expected publication date May 2025.
- Crompton, C.J, Foster, S., Wilks, C., Dodd, M., **Efthimiou T.N.**, Ropar D., Sasson, Lages M, and Fletcher-Watson, S., n. Information transfer within and between autistic and non-autistic people - Stage 2 Registered Report. *Nature Human Behaviour*. Expected publication date May 2025.

## Conference presentations

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- **Efthimiou, T.N.** (2023) The illusion of happiness – an fNMES and EEG study. Presented at the International Organisation for Psychophysiology (IOP). June 2023. Hosted in Geneva, Switzerland. Symposium.
- **Efthimiou, T.N.** (2022) Tuning emotional face perception with facial neuromuscular electrical stimulation (NMES). Presented at the European Society for Cognitive and Affective Neuroscience (ESCAN). July 2022. Hosted in Vienna, Austria. Symposium.

- **Efthimiou, T.N.** (2022) The Effects of Facial NMES on Emotion Perception. Presented at the Eastern Arc Conference (EAR). June 2022. Hosted in Colchester, University of Essex. Poster Presentation.
- **Efthimiou, T.N.** (2021) Exploring volunteers' concerns about facial neuromuscular electrical stimulation. Presented at the British Neuroscience Association (BNA) annual scientific meeting 2021. April 20-24. Hosted online. Poster presentation.
- **Efthimiou, T.N.** (2019) Exploring the role of spatial attention in movement simulation. Presented at the British Association for Cognitive Neuroscience (BACN) annual scientific meeting 2019. September 2-3. Cambridge, England. Poster presentation.
- **Efthimiou, T.N.** (2019) Attention allocation during the observation of biological motion: An EEG study. Presented at Middlesex University (MDX) *Research Students' Summer Conference – 2019*. June 20th. London, England. Poster presentation.