



Programme

KEYNOTE SPEAKERS:

Prof Essi Viding:

“Why should neuroscientists studying psychiatric disorders care about gene-environment correlation?”

Division of Psychology and Language Sciences, University College London, UK

Prof Michael Berk:

“Can we prevent depression?”

School of Medicine Deakin University, Australia

Dr Mufti Mahmud

“Applied informatics for brain network decoding and disease identification”

Department of Computer Sciences, Nottingham Trent University, UK



APE2021 Day 1. Life Span (20.09.2021)

Please follow links to further information on events; *= Presenter

<p>9:00 – 9:30</p>	<p>Committee Introduction & Opening talk:</p> <p>Di Bailey, Pro Vice-Chancellor - Research and Innovation – Nottingham Trent University, UK Peter Hanenberg, Vice-Rector for Research and Innovation - Universidade Católica Portuguesa, Portugal</p>
<p>9:30 – 10:30</p>	<p>Symposium 1: Promoting Youth Involvement and Social Engagement (PromISE)</p> <p>Dr Raquel Matos, Dean of the Faculty of Education and Psychology, Universidade Católica Portuguesa, Portugal</p>
<p>10:30 – 11:00</p>	<p>Presentation Session 1</p> <ul style="list-style-type: none"> ▪ Psychometric evaluation and validation of the Beck Anxiety Inventory in a New Zealand Sample of Young Pacific Adults (Siegert, R.*, Narayanan, A., Gossage, L., Wrapson, W., Dipnall, J., Tautolo, E., Sumich, A., Merien, F., Paterson, J., Berk, M., Balalla, S., Cornthwaite, K. & Guy, S.) ▪ Risk factors for depression in Pacific adolescents in New Zealand: a network analysis (Gossage, L.E.*, Narayanan, A., Dipnall, J.F., Iusitini, L., Sumich, A., Berk, M., Wrapson, W., Tautolo, E. & Siegert., R.)
<p>11:00 – 11:30</p>	<p>Coffee Break</p>
<p>11:30 – 12:30</p>	<p>Presentation Session 2</p> <ul style="list-style-type: none"> ▪ Motivations for COVID-19 prevention behaviour vary across Dark Triad and Vulnerable Dark trait traits (Blanchard, A.*, Heym, N. & Sumich, A.) ▪ The distinguishing role of empathy in understanding motivations for direct and indirect aggression, across the Dark Tetrad traits (Fleet, M.* & Heym, N.) ▪ Dysfunctional Reinforcement Sensitivity (rRST) underpinning Psychopathic (PP) and Callous-Unemotional (CU) traits: A Latent Profile Analysis (LPA) approach (Firth, J.*, Sumich, A. & Heym, N.) ▪ Analyzing The Discursive Psychology Used Within Digital Media To Influence Public Opinions Concerning Female Child-Killers (Harris, K*, Adhikari, J., & Wallace, L.)
<p>12:30 – 13:00</p>	<p>Posters Blitz 1</p> <ul style="list-style-type: none"> ▪ Shades of Darkness: Individual Differences in Adult Attachment across Dark Personality and Dark Empathy Latent Profiles (Fino, E.*, Sumich, A., Bloxson, C. & Heym, N.) ▪ An increased functional connectivity between several posterior brain regions is detected in patients with late mild cognitive impairment and



	<p><i>Alzheimer's disease</i> (Penalba, L.*, Oliveira-Silva, P., Sumich, A. & Cifre, I.)</p> <ul style="list-style-type: none"> ▪ <i>Artificial Intelligence System for the Automatic Detection of Alzheimer Disease through Electroencephalographic Signals</i> (Araújo, T.*, Teixeira, J. P. & Rodrigues, P. M.) ▪ <i>Machine learning models for automatic detection of Alzheimer's Disease using Magnetic Resonance Imaging (MRI)</i> (Silva, J.* & Rodrigues, P.M.)
13:00 – 14:00	Break (European lunch time)
14:00 – 15:00	<p>Keynote</p> <p>Prof Essi Viding: “<i>Why should neuroscientists studying psychiatric disorders care about gene-environment correlation?</i>”</p> <p>Division of Psychology and Language Sciences, University College London, UK</p>
15:00 – 16:00	<p>Symposium 2: <i>Detection and Reporting of Child Abuse and Neglect</i></p> <ul style="list-style-type: none"> ▪ <i>The Prochild Project: Empowering Teachers in Detecting and Preventing Child Abuse</i> (Betts, L.*, Holland, D., Dillon, G., Heym, N., Buglass, S. & Abell, L.) ▪ <i>Teachers' confidence in detecting and reporting child abuse in the UK</i> (Heym, N.*, Bilsby, H., Stevenson, N., Jones, D., Buglass, S., Dillon, G., Abell, L., Ford, C., Mohammed, M. & Betts, L.) ▪ <i>Time 2 Talk – School Program to integrate DVA awareness into the curriculum</i> (Clinton-Harris, T.)
16:00 – 16:15	Coffee Break
16:15 – 17:00	<p>Presentation Session 3</p> <ul style="list-style-type: none"> ▪ <i>Impact of media exposure on body perception and emotional regulation: A racial-ethnic study</i> (Aguiar, C.* & Oliveira-Silva, P.) ▪ <i>Characterization of caffeine consumption in the Portuguese population</i> (Peixoto, J.* & Oliveira-Silva, P.) ▪ <i>Can motivation and parental support predict musical achievement?</i> (Oliveira, A.*, McPherson, G. E., Ribeiro, L. M. & Oliveira-Silva, P.)
17:00 – onward	<p>Poster Presentations & Evening Programme</p> <p>Networking (Gather town, Hometowns across the world gallery)</p>



APE2021 Day 2. Mental Health (21.09.2020)

Please follow links to further information on events

9:00 – 10:00	<p>Keynote:</p> <p>Prof Michael Berk: “<i>Can we prevent depression?</i>” School of Medicine Deakin University, Australia</p>
10:00 – 11:00	<p>Symposium 3: Virtual Reality</p> <ul style="list-style-type: none"> ▪ <i>Effects of system and media driven immersive capabilities on presence and affective experience</i> (Standen, B.*, Anderson, J., Sumich, A. & Heym, N.) ▪ <i>Self-guided virtual-reality exposure therapy for public-speaking anxiety: stepping into the spotlight</i> (Premkumar, P.*, Heym, N., Brown, D.J., Battersby, S., Sumich, A., Huntington, B., Daly, R. & Zysk, E.) ▪ <i>Hyperscanning & VR: An Exploration of Neuroscience and Collaborative Virtual Environments</i> (Gumilar, I.*, Barde, A. & Billinghamurst, M.) ▪ <i>Using Virtual Reality with people with intellectual disabilities to reduce social isolation</i> (Harris, M.*, Vyas. P., Lewis, J. & Brown, D.)
11:00 – 11:30	<p>Coffee Break</p>
11:30 - 12:00	<p>Workshop: “Impact!”</p> <p>Dr Grace Harvey, Nottingham Trent University, UK.</p>
12:00- 13:00	<p>Presentation Session 4</p> <ul style="list-style-type: none"> ▪ <i>Psychological trauma, Mood and Social Isolation do not explain elevated Dissociation in Functional Neurological Disorder (FND)</i> (Blanco, S.R.*, Mitra, S., Howard, C.J. & Sumich, A.) ▪ <i>Interoception as a superglue interlinking mindfulness, emotion regulation and mental health</i> (Tripathi, V.*, Kumari, V. & Pandey, R.) ▪ <i>The Portuguese paradigm regarding pre and probiotics as health management tools</i> (Soares, J.*, Ferreira, M., Freitas, S., Oliveira-Silva, P., Pintado, M. & Batista, P.) ▪ <i>Identifying Influential Symptoms and Covariates in Problematic Internet Use Development and Maintenance</i> (O’Brien, O.*, Sumich, A., Baguley, T. & Kuss, D.)
13:00 - 14:00	<p>Break (European lunch)</p>
14:00 - 14:30	<p>Posters Blitz 2</p> <ul style="list-style-type: none"> ▪ <i>Portuguese perception of psychological impact of COVID-19 vaccines</i> (Batista, P.*, Menezes, B., Pereira, A. & Oliveira-Silva, P.) ▪ <i>Detection of cardiomyopathy activity through deep learning algorithms</i> (Paiva, D.*, Sá, J., Ribeiro, P., & Rodrigues, P. M.) ▪ <i>Detection of Myocardial infarction activity through Convolution Neural Networks</i> (Sá, J.*, Ribeiro, P., Paiva, D. & Rodrigues, P.M.)



<p>14:30 – 15:30</p>	<p>Round Table Discussion: <u><i>Working with charities and 3rd sector Organisations</i></u></p> <ul style="list-style-type: none"> ▪ Tammy Clinton-Harris, <i>Living Without Abuse</i> ▪ Steven Webster, <i>FND Dimensions</i> ▪ Prof David Kosson, <i>Aftermath: Surviving Psychopathy</i>
<p>15:30 - 15:45</p>	<p>Coffee Break</p>
<p>15:45 – 16:45</p>	<p>Invited talk:</p> <p>Ted Scharf¹ & Emily J. Haas²: <u><i>Psychological adaptation to hazardous work environments, and the “dual-attention” demand</i></u> National Institute for Occupational Safety and Health, (NIOSH), ¹Cincinnati, Ohio; ²Pittsburgh, Pennsylvania, USA</p>
<p>16:45 – 17:30</p>	<p>Symposium 4: <u><i>Havening</i></u></p> <ul style="list-style-type: none"> ▪ <i>Havening: what is it and how is it applied</i> (Kate Truit.*) ▪ <i>The power of touch: The effects of Havening on subjective distress, mood, brain function and wellbeing</i> (Sumich, A.*, Heym, N., Sarkar, M. & Hunter, K.) ▪ <i>The use of the Havening Technique to support athletes’ mental health</i> (Johal, K.*, Sakar, M., Sumich, A. & Hunter K.)
<p>17:30 – onwards</p>	<p>Poster presentation & Evening programme</p> <p>Mindfulness, Yoga and Havening sessions in gather town</p>



APE2021 Day 3. Big data and the Brain (22.09.2020)

9:00 – 10:00	<p>Keynote:</p> <p>Dr Mufti Mahmud: <i>“Applied informatics for brain network decoding and disease identification”</i></p> <p>Department of Computer Sciences, Nottingham Trent University, UK</p>
10:00 – 11:00	<p>Symposium 5: Neuroinformatics</p> <ul style="list-style-type: none"> ▪ <i>Early Diagnosis and Prognosis of Ultra High Risk of Psychosis in Young Adults Through Neuromorphic Computational Modeling of Longitudinal Cognitive Data</i> (Doborjeh, Z.*, Doborjeh, M., Sumich, A., Goh, W., Lee, J., William, M., Lai, E. & Kasabov, N.) ▪ <i>Personalised Prediction of Tinnitus Therapy Success using AI decision Tool: Integrated Neurological, Clinical, and Psychological Data</i> (Doborjeh, Z., Doborjeh, M.*, Shen, Y., Liu, X., Wang, G., Yan, W., Kasabov, N., Sumich, A., William, M. & Searchfield, G.) ▪ <i>A New Interpretable Machine Learning Methodology for Diagnosis and Prognosis of Psychosis Using Genetic Features</i> (Singh, B.*, Budhaha, S., Doborjeh, M., Doborjeh, Z., Goh, W.W.B., Lee, J., William, M., Lai, E., Limson, W., Sumich, A. & Kasabov, N.)
11:00 – 11:30	<p>Coffee Break</p>
11:30 – 12:30	<p>Workshop: “Bayesian models of perception”</p> <p>Dr Darren Rhodes, Nottingham Trent University, UK</p>
12:30 – 13:30	<p>Break (Sacred European Lunch Hour)</p>
13:30 – 14:15	<p>Presentation Session 5</p> <ul style="list-style-type: none"> ▪ <i>Interplay between the salience and the default mode network in a social-cognitive task towards a close other</i> (Da Costa, C. R.*, Soares, J. M., Oliveira-Silva, P., Sampaio, A. & Coutinho, J. F.) ▪ <i>Right Bundle Branch Block detection by Convolution Neural Networks</i> (Ribeiro, P.*, Paiva, D., Sá, J. & Rodrigues, P. M.) ▪ <i>Boosting Attention in scholar aged children with Subclinical ADHD through Near-Infrared Spectroscopy-based Neurofeedback Intervention</i> (Freitas, S. & Oliveira-Silva, P.)
14:15 – 15:00	<p><i>The new Doctoral program in Emotion Psychology: Big old questions and fresh new approaches</i></p> <p>Augusta Gaspar, Cátia Reis, Francisco Esteves, Patrícia Oliveira-Silva Universidade Católica Portuguesa, Portugal</p>
15:00 – 15:30	<p>Coffee Break</p>
15:15 – 16:00	<p>ECR Keynote</p> <p>Gabriel Silva: <i>“A low-cost web platform for neuro-disorders diagnosis”</i></p>



	Universidade Católica Portuguesa, CBQF, Porto, Portugal
16.00 – 18.00	Closing Ceremony & Awards & Cultural Experience: Viola de Gamba Performance, Israel Castillo
18:00- onwards	Networking and wine (Gathertown)



Poster Rooms:

Links to posters will be made available during the conference

- #POSTER-01 [*The Utility of Specialist Algorithms in Distinguishing Neurodivergent Children in a Domestic Violence Cohort*](#) (Stevenson, N. & Heym, N.)

- #POSTER-02 [*Gut microbiota modulate electrophysiological correlates of feedback processing*](#) (Lenzoni, S., Hunter, K., Heym, N., Blanco, S., Heasman, B., Gibson, G., Mograbi, D. & Sumich, A.)

- #POSTER-03 [*New insights into neural networks of error monitoring and clinical implications: A systematic review of ERP studies in neurological diseases*](#) (Lenzoni, S., Baker, J., Sumich, A. & Mograbi, D)

- #POSTER-04 [*The impact of the COVID-19 pandemic on the risk of exposure to domestic violence and abuse and mental health problems in vulnerable mothers and their children*](#) (Tanasescu, A. & Heym, N.)

- #POSTER-05 [*An exploratory study of the relationship between continued consumption of Kombucha and cognitive and affective functioning*](#) (Fraga, J., Ferreira, M., Soares, J., Pintado, M. & Oliveira-Silva, P.)

- #POSTER-06 [*The impact of social media exposure during COVID-19 lockdown on body satisfaction*](#) (Nóbrega, S.C. & Oliveira-Silva, P.)

- #POSTER-07 [*Relationships of psychopathic and callous-unemotional traits with proactive and reactive aggression*](#) (Firth, J., Sumich, A. & Heym, N.)



ABSTRACTS

1. KEYNOTE SPEAKERS:

Prof Essi Viding: “Why should neuroscientists studying psychiatric disorders care about gene-environment correlation?”

Professor of Developmental Psychopathology, Division of Psychology and Language Sciences, University College London, UK

Contact: e.viding@ucl.ac.uk

Abstract: Much of the neurocognitive research into various psychiatric disorders has been cross-sectional and often focused on affective processes that are atypical in a given disorder. To progress our understanding of how psychopathology develops, we need to combine different analytical approaches within a longitudinal, developmental, genetically informative framework. This can help us understand phenomena of gene-environment correlation.

In this talk I will provide a brief overview of neurocognitive and genetically informative research into conduct problems. I will use this overview as a framework for considering how atypical neurocognitive functioning may serve to generate and maintain maladaptive social interactions. I will argue that neurocognitive studies can inform our understanding of individuals as active agents in the generation of particular social ecologies and that unlocking the mechanisms of gene-environment correlation will be of key importance. Advances in this area of research have scope to inform theoretical understanding, as well as interventions designed to help children at risk of developing a disorder and their families.

Brief Biography: Essi Viding is Professor of Developmental Psychopathology at UCL where she co-directs the Developmental Risk and Resilience Unit. Her research utilises multiple methodologies to investigate different developmental pathways to disruptive behaviour disorders and poor mental health. She has received several prizes for her work, including the Royal Society Rosalind Franklin Award and the British Psychological Society Spearman Medal. She is a fellow of the British Academy and the Academy of Medical Sciences.

**Prof Michael Berk: “*Can we prevent depression?*”**

Alfred Deakin Professor of Psychiatry, School of Medicine Deakin University, Australia

Contact: michael.berk@deakin.edu.au

Abstract: Prevention has made a major contribution to the achievements in reductions in cardiovascular disease and cancer mortality. However, in the field of psychiatry, similar population-level initiatives in the prevention of common mental disorders, depression and anxiety are conspicuously lacking. There is a need for effective universal preventive approaches to the common mental disorders at a population level. There has been a recent growth of research into potentially modifiable risk factors for depression. Varied lifestyle, social, psychological and biological factors contribute to vulnerability. Early childhood trauma and neglect are key risk factors. Diet, physical activity and smoking are recognized as fundamental contributors to the high prevalence non-communicable diseases. However, multiple studies now suggest that similar modifiable lifestyle behaviours are also risk factors for common mental disorders and are therefore prevention targets. This lecture aims to overview the existing literature on the prevention of common mental disorders and provide an analysis on the way forward for prevention research and implementation. Many biological, social and environmental factors are transduced via common pathways. The consensus from a large body of evidence supports the assertion that interventions to prevent mental disorders across the lifespan can be both effective and cost-effective. Psychological approaches have the largest evidence base. Addressing the social, psychological, lifestyle, medical and biological drivers in a personalized, formulation-based, and integrated manner has the capacity to reduce the overall burden of mental and non-communicable physical disease.

Brief Biography: Michael Berk is an NHMRC Senior Principal Research Fellow at Deakin University, where he heads the IMPACT institute. He is listed by Thompson Reuters as amongst the world’s most influential scientific minds (2015-2020) and was awarded the Brain & Behaviour (NARSAD) Colvin Award for Mood Disorders in 2015, the Victoria Prize for life sciences in 2019, the International Society for Bipolar Disorders Bob Post award for mentorship in 2020 and the RANZCP Senior Research Award in 2021. He is past president of the International Society for Bipolar Disorders and the Australasian Society for Bipolar and Depressive Disorders. His major interests are in the discovery and implementation of novel therapies.



Dr. Mufti Mahmud: “Applied Informatics for Brain network decoding and disease identification”

Department of Computer Sciences, Nottingham Trent University, UK

Contact: mufti.mahmud@ntu.ac.uk

Abstract: Cognition is one of the main capabilities of the mammal brain and understanding it thoroughly requires decoding the Brain’s information processing pathways (IPPs) which are composed of neuronal networks formed by complex connectivity among neurons. This talk will showcase applied informatics to decode neuronal networks at the first level of approximation. The example will illustrate the decoding of networks during whisking – an action that represents sensing in rodents. This high-level cognitive function allows rodents to localise objects and discriminate textures. Conventionally, scientists mostly rely on local field potentials (LFPs) averaged over several trials to infer the IPP. However, considering the probabilistic nature of the Brain, this may lead to information loss when trying to understand its stochasticity demonstrated during information processing. As LFPs represent lumped activities of populations of neurons, their shapes serve as fingerprints of the underlying networks which can be used in identifying diseases and building smart neuroprosthetic devices.

Brief Biography: Dr Mufti Mahmud received his PhD degree in information engineering from the University of Padova, Italy, in 2011. He is currently serving as an Associate Professor of Cognitive Computing at Department of Computer Science of Nottingham Trent University, UK. He is recipient of the NTU Vice-Chancellor's outstanding research award in 2020 and the Marie-Curie Postdoctoral Fellowship in 2013. Dr Mahmud’s expertise include computational intelligence, applied data analysis, and big data technologies with a keen focus on neuroscience and healthcare applications. As of July 2021, he has published over 160 peer-reviewed articles and papers in leading journals and conferences, and (co-)edited 5 volumes and many journal special issues. Dr Mahmud has secured research grants totalling around £3.3 million and has supervised over 50 research students (PhD, Masters and Bachelor).

He is a Senior Member of IEEE and ACM, a Professional Member of the British Computer Society, and a Fellow of the Higher Education Academy, the UK. Dr Mahmud has been serving as the Vice-Chair of the Intelligent System Application and Brain Informatics Technical Committees of the IEEE Computational Intelligence Society (CIS), a member of the IEEE CIS Task Force on Intelligence Systems for Health, an advisor of the IEEE R8 Humanitarian Activities Subcommittee, the Publications Chair of the IEEE UK and Ireland Industry Applications Chapter, and the Project Liaison Officer of the IEEE UK and Ireland SIGHT Committee. He has also served as the coordinating chair of the local organization of the IEEE-WCCI2020; the General Chair of Brian Informatics 2020 and 2021 editions and 2021 Applied Intelligence and Informatics conference. He also serves as the Program Chair of IEEE-CICARE conference series since 2018. Moreover, he serves as a Section Editor (Big Data Analytics) for the Cognitive Computation journal, an associate editor of the Frontiers in Neuroscience, and a Regional Editor (Europe) for the Brain Informatics journal. He is also the editor of “Smart Healthcare Systems: From Data to Knowledge” book series published by the CRC press.



Early Career Keynote:

Gabriel Silva: “A low-cost web platform for neuro-disorders diagnosis”

Universidade Católica Portuguesa, CBQF - Centro de Biotecnologia e Química Fina -
Laboratório Associado, Escola Superior de Biotecnologia, Porto, Portugal

Contact: g.arsilva@hotmail.com

Abstract: Neurodegenerative diseases continue to affect millions of people around the world every year, and since there is no cure yet, our best approach is to properly diagnose them as early as possible to delay their development by using EEG and speech signals analysis. However, reaching as many people as possible requires a combination of a very effective and inexpensive diagnostic tool and a simple way to deliver it. In this keynote, some previous work done by our team to develop this effective tool will be presented. We can accomplish several things with a digital web platform. One is that it's the most cost-effective way to reach as many people as possible around the world, and the other is that we can also use our tool as a scanning tool to identify people who are at higher risk of developing these diseases.

BIO: Gabriel Silva is winner of the APE2020 Pre-doctoral ECR award. He is a research fellow at CBQF and a PhD candidate in biotechnology at Universidade Católica Portuguesa, where he has focused his work on neurological diseases detection. He completed his master's in biomedical engineering at ESB-UCP where his dissertation work was based on non-linear multi-band EEG analysis for the detection of Alzheimer's and Parkinson's disease in early stages. During this time, he was involved in projects related to artificial intelligence algorithms for neuro-disorders diagnoses, as well as voice disorders.

2. INVITED TALK

Title: Psychological adaptation to hazardous work environments, and the “dual-attention” demand.

Authors: Ted Scharf,¹ and Emily J. Haas²

Affiliation: National Institute for Occupational Safety and Health, (NIOSH)
¹Cincinnati, Ohio; ²Pittsburgh, Pennsylvania, USA

Email: tscharf@cdc.gov; EJHaas@cdc.gov

Abstract: Workers in constantly changing, dynamic and hazardous work environments must be attentive to safety *at the same time* that they must maintain their assigned production activities. As one NIOSH colleague put it, “Miners are not working 300 feet underground to be safe, they are working there to extract coal.¹ This is the “dual-attention demand” that is required of workers in all hazardous work. During the first few hours of a shift, alertness may be high. But what about the eighth, ninth, or tenth hour on that shift?



Many different characteristics of hazardous work environments may be explored. For this presentation, we reference just a few of the conditions to which these workers are subject.² For example, workers in healthcare (including EMT's), construction, mining, agriculture, transport, firefighting, law enforcement, military, and workers in other hazardous work environments will take risks with their own lives to complete their assigned tasks, and to protect co-workers, patients, clients, and bystanders.³

Adaptation to hazardous work environments appears to be no different from any other form of psychological adaptation, excepting the safety-related regulations, and procedures required. But every adult has adapted to day-to-day hazards. For example, highway fatalities in the United States declined below 33K/year following the Great Recession, and have not returned to the pre-Recession numbers of 41-42K/year.⁴ But for 2019, U.S. highway fatalities exceeded 36K. Yet if every person driving a vehicle were to focus on these data, would he/she be able to drive safely? This is a small example of the adaptation that all workers in hazardous environments must perform every day on the job.

This presentation is a blatant appeal for perception and cognitive psychologists and for other neuroscientists to engage their training and experience to assist safety professionals regarding effective adaptation and to distinguish it from dysfunctional adaptation and/or habituation (think of the problems created by the ubiquitous “back-up” alarms in construction).⁵

Notes & References:

1. Wiehagen, Bill, (NIOSH, retired). Personal communication, 1997.
2. Scharf, T., Vaught, C., Kidd, P., Steiner, L., Kowalski, K., Wiehagen, B., Rethi, L., and Cole, H. (2001). Toward a typology of dynamic and hazardous work environments. *Human and Ecological Risk Assessment*. v.7, no.7, pp. 1827-1841. <https://doi.org/10.1080/20018091095429>
3. U.S. Department of Labor, Bureau of Labor Statistics. [National Census of Fatal Occupational Injuries in 2019 \(bls.gov\)](https://www.bls.gov/news.release/archives/osh20190910.pdf). To be sure, these data do not make the case for “highly dedicated” workers as is asserted in this abstract. (This is a related, but separate argument that relies on qualitative data from interviews with workers in hazardous work environments.) However, these data support the assertion that the carnage to our workforce continues, albeit substantially diminished from the estimated fatality data reported at the beginning of the Twentieth Century in the US.
4. [Fatalities and Fatality Rates.pdf \(nhtsa.gov\)](https://www.nhtsa.gov/sites/nhtsa/files/fatalities-and-fatality-rates.pdf)
5. [Quarter2-QDR-2017.pdf \(cpwr.com\)](https://www.cprw.com/quarter2-qdr-2017.pdf)

Keywords: hazardous work environments
dual-attention demand
psychological adaptation

Biographies:

Ted Scharf Research Psychologist, National Institute for Occupational Safety and Health, (NIOSH) 1992- present, Cincinnati, Ohio, USA.
BA: Psychology and political analysis, Antioch College, 1977, Yellow Springs, Ohio, USA.
MA: Psychology, Graduate Faculty of Political and Social Science, New School for Social Research, 1982, New York, NY, USA.
Ph.D. School of Social Ecology, University of California, Irvine, 1995, USA.
Emphasis: environmental and community psychology, quasi-experimental research methods, and program evaluation.



Research interests: Workload, stress, and risks for injury in hazardous work environments. Quasi-experimental research methodology. Program evaluation methodology. Participatory action research. Safety culture / climate and safety management systems. Hazard recognition and interactive safety training for workers in hazardous work environments.

Current project: Responder organizations & COVID-19: Coping with trauma & promoting resilience: A survey of all NIOSH staff, including fellows and contractors.



Emily J. Haas, PhD

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Dr. Emily Haas has worked at the National Institute for Occupational Safety and Health for eight years. She is currently the project officer for multiple projects that are focused on identifying personal, organizational, and environmental risk factors in various workplace settings. Dr. Haas specializes in developing, implementing, and evaluating organizational-level interventions with a present emphasis on improving employee engagement in response to new and evolving technologies, including how workers and managers can better measure and mitigate health hazards in the workplace. Dr. Haas has authored over 75 publications and provided over 100 technical presentations, including workshops and keynotes at international health and safety conferences. Dr. Haas received the Presidential Early Career Award in Science and Engineering in 2016; the Arthur S. Flemming Award in the Social Science, Clinical Trials, and Translational Research in 2018; and, in addition to being a Samuel Hyman Finalist, received the Gears of Government Presidential Award for her research in organizational safety culture in 2019. Dr. Haas received her PhD in Health Communication from the Brian Lamb School of Communication at Purdue University in 2012 and was recently honored with an Emerging Voice Award from her alma mater. She received her BA/MA in Communication from the University of Dayton in 2007 and 2008, respectively.

EXPERIENCE with CDC/NIOSH

2012 – 2014 Associate Service Research Fellow, Human Factors Branch,
CDC/NIOSH/PMRD

2014 – 2016 Research Behavioral Scientist, Human Factors Branch, CDC/NIOSH/PMRD

2016 – 2018 Lead Research Behavioral Scientist, Human Factors Branch,
CDC/NIOSH/PMRD



2019 – 2020 Senior Research Behavioral Scientist, Human Factors Branch,
CDC/NIOSH/PMRD

2020 – Present Research Health Scientist, Research Branch, CDC/NIOSH/NPPTL

EDUCATION

2012 Purdue University, PhD, Health Communication and Research Methods

2008 University of Dayton, MA, Communication and Research Methods

2007 University of Dayton, BA, Communication and Marketing

RESEARCH INTERESTS

- The intersection of health and safety management systems and safety culture
 - Technology integration using socio-technical systems design frameworks
 - Intervention and research designs using formative, process, and outcome evaluations
 - Mixed-methods demonstration projects
 - Health hazard identification and mitigation strategies
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3. SYMPOSIA:

#SYM-01 Convenor: Patricia Oliveira-Silva

Promoting Youth Involvement and Social Engagement (PromISE)

Authors: Raquel Matos.¹ & Mariana Barbosa.¹

Affiliations: 1. Universidade Católica Portuguesa, CEDH-Research Centre for Human Development, Portugal

Corresponding author: rmatos@ucp.pt

Abstract: In this symposium, two international projects will be presented, both focused on promoting prosocial skills in young people. The ‘Heroic Imagination Project’ aims at fighting social indifference and promoting prosocial attitudes through the training of children and young people. Results will be presented on the implementation of the project in Portugal. The EU funded project ‘PROMISE’ aims at understanding how young people’s responses to the challenges they face can provide opportunities for participation and positive social change. In this symposium we will present results from three ethnographic case studies carried out in Portugal, Estonia and the UK.

#SYM-02 Convenor: Nadja Heym

Detection and reporting of child abuse and neglect

Overview: Child abuse and neglect involves physical, emotional abuse, sexual abuse and neglect. Child abuse and neglect is a global issue and huge matter of concern due to its detrimental personal, familial, and societal consequences. Globally it is estimated that one billion children ages 2-17 have experienced physical, sexual, or emotional violence or neglect in the past year (WHO, 2020). Recently, the Domestic Abuse Act 2021 was passed in the house of commons, which recognises children witnessing domestic abuse as victims (Legislation.gov.uk, 2021). Within the UK one in five adults aged 18 to 74 years experienced at least one form of child abuse, whether emotional abuse, physical abuse, sexual abuse, or witnessing domestic violence or abuse, before the age of 16 years (8.5 million people; ONS, 2020). Teachers can be of high importance when it comes down to breaking the cycle of abuse (Yang et al., 2018) especially with the correct training (Swan, 1993). However, studies have found that teachers were more likely to fail to report cases of maltreatment compared to other professional groups (Kenny, 2004; Gilbert et al., 2009; Cerezo & Pons-salvador, 2004). A meta-analysis around child abuse and neglect in England and Ireland showed that non-reporting of child abuse concerns is a key issue (Bunting, Lazenbatt & Wallace, 2010). Research indicates that teachers are more likely to detect and report abuse when they have self-reported confidence of their ability to accurately identify it (Walsh, Schweitzer & Farrell, 2005). Thus, identifying and tackling the barriers and concerns around the identification and reporting of child abuse and exposure to domestic violence is crucial. This symposium will introduce two recent projects by NTU teams examining signs of child abuse and neglect, and domestic violence, to facilitate teachers’ confidence in understanding, recognising and reporting these, as well as teaching domestic violence as part of their curriculum.



Title: The Prochild Project: Empowering Teachers in Detecting and Preventing Child Abuse

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Abstract: The Erasmus+ Prochild project focuses on empowering teachers to detect and prevent child abuse. As the formal project comes to an end, this session will discuss findings from the country report and outputs from the project. The country report highlighted that although there are a range of datasets to estimate prevalence of child abuse in England, there is currently no single source of information (Elkin, 2020) and the variation in prevalence may reflect, in part, the public's and professionals' awareness of abuse. Although a range of statutory and non-statutory guidance inform teachers' response to child abuse and their ability to detect indicators of abuse, there are challenges in determining an accurate prevalence rate of child abuse in England, complexity associated with what constitutes child abuse, and potential complications around multi-agency working and information sharing. Some recommendations are made to facilitate the process management including developing a single method of recording prevalence, ensuring that teachers have a clear understanding of the complexity of defining abuse and the likely variation of experiences, and offering teachers appropriate continuing professional development opportunities. Finally, information about the range of outputs from the Prochild project that can provide support for teachers in detecting child abuse will be highlighted.

Title: Teachers' confidence in detecting and reporting child abuse in the UK

Authors: Heym, N.¹, Bilsby, H.¹, Stevenson, N.¹, Jones, D.¹, Buglass, S.¹, Dillon, G.¹, Abell, L.¹, Ford, C.¹, Mohammed, M.¹ & Betts, L.¹

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Abstract: Teachers undertake annual safeguarding training to detect and report suspected cases of child abuse and neglect (CA&N); however, many consider their knowledge insufficient for effective CA&N detection and reporting. Indeed, pre-service training was shown to be largely inadequate in the field of child abuse and neglect; however, inclusion of further training programmes increases the ability to detect and report (McKee & Dillenburger, 2012). Importantly, the barriers to disclosure and reporting need to be better understood to enable the protection of young people. Our preliminary review of the literature summarises a wide range of barriers. Teachers also indicate uncertainty and lack of confidence in teaching these topics to their student to raise awareness and facilitate disclosure. This project aims to (1) evaluate teachers' knowledge, confidence and barriers to recognising the signs and report CA&N; (2) teach students about CA&N; and (3) support the development of a training program through a 3rd sector organisation (Living Without Abuse; LWA). Effective training and prevention/intervention programmes must empower frontline professionals to confidently



identify and respond to abuse signifiers and disclosure to safeguard victims and promote improved outcomes for survivors of abuse (Lemaigre, Taylor & Gittoes, 2017).

Title: Time 2 Talk – School Program to integrate DVA awareness into the curriculum

Author: Tammy Clinton-Harris, Senior Service Manager Living Without Abuse

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Living Without Abuse have teamed up with a Leicester city school, New College, after identifying a need for a school package, to raise awareness on domestic abuse and sexual violence. We aim to build awareness around domestic abuse and healthy relationships as well as challenge views and behaviours around sexual abuse and rape culture. We consider children and young people who may be witnessing abuse in their home, or victims of abuse from partners, in their own relationships along with recognising and challenging any abusive behaviours they may be using themselves. The aim of this project was to develop a package of classroom materials to be delivered from year 7 through to year 11, building on previous curriculum and covering all appropriate material. The school package covers Domestic abuse and healthy relationships and is designed for teachers to deliver as part of the PSHE sessions in secondary school. The package includes a variety of sessions set out over the years; each year group consists of three 1-hour sessions covering a range of relevant topics. This programme follows alongside a developed online Teacher Training e-learning package consisting of 8 modules with 6-7 lessons each and quizzes. Three schools have been identified for pilot evaluation with a 4th school to be recruited. The programme will roll out in October 2021. This talk will introduce the programme and discuss the challenges and anticipated benefits around such programme.

#SYM-03 Convenor: Nadja Heym

Virtual Reality

Overview: Dr Nadja Heym convenes a series of presentations on Virtual Reality studies in psychological science. VR offers a step towards future interaction online and is becoming more accessible and widely used. The presented studies are examples of work from several labs in UK and NZ, highlighting the utility of VR in understanding psychological phenomena and in interventions.

Title: Effects of system and media driven immersive capabilities on presence and affective experience

Authors: Standen, B.¹, Anderson, J.¹, Sumich, A.¹ & Heym, N.¹

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Abstract: Virtual reality (VR) is receiving widespread attention as a delivery tool for exposure therapies. The advantage offered by VR over traditional technology is a greater sense of presence and immersion, which magnifies user effects and enhances the effectiveness of exposure-based interventions. The current study systematically examined the basic factors involved in generating presence in VR as compared to standard technology, namely (i) system-driven factors that are exclusive to VR devices while controlling general factors such as field of view and image quality; (ii) media-driven factors of the virtual environment eliciting motivational salience through different levels of arousal and valence (relaxing, exciting and fear evoking stimuli); and (iii) the effects of presence on magnifying affective response. Participants (N=14) watched 3 different emotionally salient videos (1x fear evoking, 1x relaxing and 1x exciting) in both viewing modes (VR and Projector). Subjective scores of user experience were collected as well as objective EEG markers of presence (frontal alpha power, theta/beta ratio). Subjective and objective presence was significantly greater in the VR condition. There was no difference in subjective or objective presence for stimulus type, suggesting presence is not moderated by arousal, but may be reliant on activation of motivational systems. Finally, presence did not magnify feelings of relaxation or excitement, but did significantly magnify users experience of fear when viewing fear evoking stimuli. This is in line with previous literature showing strong links between presence and generation of fear, which is vital in the efficacy of exposure therapies.

Title: Self-guided virtual-reality exposure therapy for public-speaking anxiety: stepping into the spotlight

Authors: Premkumar, P.¹, Heym, N.², Brown, D.J.³, Battersby, S.³, Sumich, A.², Huntington, B.⁴, Daly, R.³ & Zysk, E.⁵

Affiliations: 1. Division of Psychology, London South Bank University, UK; 2. Psychology Department, Nottingham Trent University, UK; 3. Department of Computer Science, Nottingham Trent University, UK; Department of Psychology, University of Nottingham, Nottingham, UK; 5. Department of Psychology, University of British Columbia, Vancouver, BC, Canada

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Abstract: Objectives: Self-guided virtual-reality exposure therapy (VRET) is a psychological intervention that enables a person to increase their own exposure to perceived threat. Public-speaking anxiety (PSA) is an anxiety-provoking social situation characterized by fear of negative evaluation from an audience. This study aimed to determine if self-guided VRET (1) increases exposure to PSA-specific virtual social threats, and (2) reduces arousal and PSA over repeated exposure.

Methods: 32 university students (27 completers) with high self-reported public-speaking anxiety attended 2 weekly self-guided VRET sessions. Each session involved the participant delivering a 20-min speech in a virtual classroom. Participants could increase their exposure to virtual social threat through the audience size, audience reaction, number of speech prompts, and their own salience in the virtual classroom at 4-min intervals. Participants' heart rates and self-reported anxiety and arousal were monitored during these intervals. Participants completed psychometric assessments after each session and 1 month later.



Results: Participants increased their exposure to virtual social threat during each VRET session, which coincided with a reduction in heartrate and self-reported anxiety and arousal. Improvement in PSA occurred post-treatment and 1 month later. The in-session improvement in anxiety correlated with reductions in fear of negative evaluation post-treatment and 1 month later.

Conclusions: Increased self-exposure to virtual social threat from self-guided VRET relieves anxiety, shows immediate reductions in psycho-physiological arousal during application, and yields sustained improvement in PSA. Future research will address the psycho-physiological arousal from public speaking in a virtual environment.

Title: Hyperscanning & VR: An Exploration of Neuroscience and Collaborative Virtual Environments

Authors: Gumilar, I.¹, Barde, A.¹ & Billinghamurst, M.¹

Affiliations: 1. Empathic Computing Laboratory, Auckland Bioengineering Institute, University of Auckland

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Abstract: Hyperscanning is a neural monitoring technique that is seeing increased usage in studies exploring social interactions among human beings. The technique has been administered using a range of methods developed to record neural activity including EEG and fNIRS among others. The use of hyperscanning has been vital in being able to demonstrate, empirically, that "connectivity" or inter-brain synchrony between two or more exists.

Virtual Reality (VR) is an emerging technology that hold great promise. We have already seen that its applications extend to a large number of domains spanning entertainment, business and communication among others. Its ability to make people feel like they are co-located despite geographical separation is one its major advantages. One of the major uses of VR over the last year and half has been to enable and encourage remote collaboration in as natural a manner as possible.

The work being undertaken at the Empathic Computing Laboratory (ECL) seeks to use the hyperscanning technique in an effort to understand the drivers of social interactions in a collaborative virtual environment. To this end, we are carrying out studies that can help us identify the components of social interactions (eye gaze, hand gestures etc.) and environmental factors that can affect how people collaborate in virtual spaces. Our initial forays into this domain comprise of replicating existing hyperscanning studies carried out in the real world. Results demonstrate that virtual environments are capable of eliciting similar levels of inter-brain synchrony as seen in the real-world. We are currently in process of conducting studies that help us identify how individual elements of social interactions affect inter-brain synchrony in virtual environments.

**Title: Using Virtual Reality with people with intellectual disabilities to reduce social isolation****Authors:** Matthew Harris¹., Pratik Vyas¹., James Lewis¹. & David Brown.¹**Affiliations:** 1. Computer Science (CMP), Nottingham Trent University, UK**Corresponding Author:** matthew.harris@ntu.ac.uk

People with developmental and learning disabilities are usually one of the last groups to benefit from advances in technology yet special education was quick to adopt information technology even providing exemplars for mainstream education. Virtual environments have many characteristics that suited them perfectly to applications for people with developmental disabilities. More recently, advances in technology (including the release of the first Oculus Rift developer kit in March 2013; AR technologies; and many exciting recent commercial developments) have refreshed our interest in the promise of these technologies to support the inclusion of adults with a learning disability in society. These new technologies also more easily facilitate studies taking place in the home. We have been using elements of co-design in approaches to reducing social isolation of adults with a learning disability using AR and VR over the past two years. We are currently devising a methodology using co-design principles which will be used to design a shared virtual reality environment with these individuals. This will be based on the model described by Herbert Spencer González et al. (2020), which identifies 4 phases: the preparation phase, fieldwork phase, ideation phase and then finally the validation phase. This methodology will be used to design a shared virtual environment to reduce social isolation with these individuals.

#SYM-04 Convenor: Kirsty Hunter**Havening**

Overview: Havening is a psychosensory technique that integrates psychological techniques, such as positive self-affirmations with nurturing touch. Nurturing touch stimulates the release of oxytocin which supports physical and psychological health. Havening uses the power of touch to cultivate healthy processing of traumatic events, distressing memories and/or disturbing thoughts in order to cultivate a sense of wellbeing. This therapeutic method was first developed by Dr Ron Ruden, and involves application of gentle touch, particularly to the face, tops of the arms and palms of the hands. Havening is currently practiced worldwide with anecdotally impressive outcomes. However, only a few studies have evaluated its efficacy empirically. This symposium will present on the use of Havening in the clinic and some initial work from our team.

Title: Havening: What is it and How is it applied?**Author:** Kate Truit.¹**Affiliation:** 1. Trauma Counselling Center of Los Angeles, US



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Dr. Kate Truitt will talk on the clinical perspective of Havening as applied to trauma counselling from her experience as an internationally recognized Havening practitioner, with expertise fear, information processing, and nervous system regulation. She has developed a proactive program for self-intervention in moments of “Amygdala Hijack.” that integrates Havening Techniques, Psychophysiology, and Cognitive Reframing. CPR for the Amygdala is an innovative and effective way to immediately soothe the amygdala and bring the brain and heart into a state of harmonious coherence.

Title: The power of touch: The effects of Havening on subjective distress, mood, brain function and wellbeing

Authors: Sumich, A.¹, Heym, N.¹, Tony Burgess², Julie French², Sarkar, M.³, & Hunter, K.³

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Abstract: Havening is a psychosensory therapeutic technique that harnesses the power of touch to stimulate oxytocin release and facilitate adaptive processing of distressing thoughts/memories. Whilst Havening is used in clinics worldwide, with anecdotal evidence, very few empirical studies exist to support its efficacy. The current study is the first to investigate the effect of Havening touch on subjective distress, mood, brain function and wellbeing. Participants underwent a single session of Havening, in response to a self-reported distressing event. Mood and resting-state electroencephalography were assessed prior to, and immediately following, the session. Psychological health was assessed at baseline and 2 weeks follow-up via an online self-report questionnaire. Results suggest a greater reduction in subjective units of distress during Havening sessions that included Havening Touch (H+) than sessions that did not include Havening touch (H-). H+ also showed an increase in beta and reduction in gamma activity. Both groups showed improved negative mood immediately following the session and better psychological health at follow-up. Findings suggest both touch and non-touch components of Havening have therapeutic potential, and that Havening Touch may accelerate a reduction in distress during a single Havening session.

Title: The use of the Havening Technique to support athletes’ mental health

Authors: Johal, K.¹, Sakar, M.¹, Sumich, A.² & Hunter K.¹

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Abstract: Previously, it has been suggested that athletes competing at the highest level were ‘mentally and emotionally strong’ (Moesch et al., 2018). However, evidence suggests that the athlete population are actually at an increased risk of developing mental ill health symptoms and disorders compared to the general population (Castaldelli-Maia et al., 2019). This data has informed the agenda for a number of regulating bodies of sport such as the International Olympic Committee (IOC) with the management of athletes’ mental health being a priority for both applied practitioners and researchers (Henriksen et al., 2019). Following this, there has been a growing demand for interventions and strategies to meet the increasing prevalence of mental health disorders in sport and a greater responsibility to ensure they are effective and feasible for applied sport practitioners (Pitt et al., 2020).

In this talk, I will introduce the proposal that the Havening Technique, a psychosensory therapy which is claimed to promote the healthy processing of traumatic events, distressing memories and/or disturbing thoughts, may be a useful tool for applied sport practitioners to support athletes’ mental health.

#SYM-05 Convenor: Zohreh Dobarjeh

Neuroinformatics

Overview: Many machine learning methods for brain data separate analysis of spatial and temporal information, rather than incorporating these aspects into one unifying computational model. However, more contemporary methods integrate the dynamic patterns of spatiotemporal brain data. Some of these methods have been inspired by knowledge of neuronal functioning, and moreover offer interpretability and discoverability of causal interactions. Our symposia will present a novel computational framework based on one of the most promising trends of artificial neural networks (ANN), called spiking neural networks (SNN). SNN models have been developed with a neurobiologically-plausible computational architecture that incorporates both spatial and temporal characteristics of data into one unifying model and can be applied for pattern recognition, classification, and prediction of different mental and neurological cognitive states. They are considered a suitable tool for the analysis of the spatiotemporal brain data (STBD), where both space and time components are crucial to be learnt.

Title: Early Diagnosis and Prognosis of Ultra High Risk of Psychosis in Young Adults Through Neuromorphic Computational Modeling of Longitudinal Cognitive Data

Authors: Dobarjeh, Z.¹, Dobarjeh, M.², Sumich, A.³, Goh, W.⁴, Lee, J.⁵, William, M.⁶, Lai, E.⁷ & Kasabov, N.⁷

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Abstract: Early identification and intervention in individuals at Ultra High Risk (UHR) for psychosis is critical for maximising key clinical outcomes. Recent advances in Artificial Neural Network (ANN) and Machine learning are making such detection possible. However, many of the existing analytical computational methods are seen as black-box information processing systems that solve a problem without discovering the causal interactions that have resulted in the output. This study proposes a novel mathematical connectionist processing framework based on Spiking Neural Networks (SNN) for modelling of longitudinal behavioural data, and to improve the understanding of cognitive trajectories of individuals at UHR for psychosis. Moreover, SNN allows for examination of the dynamic inter-relationship between cognitive measures and domains, through use of connection weights. Here we also capitalize on these advances to show how latent features of UHR's cognition may be mined to predict the later emergence of psychosis for UHR. Analysis of the changes in the connection weights in the SNN models over time suggest increased changes in social and perceptual closure variables. Greater connection weights were seen in healthy controls compared to UHR' individuals across cognitive features, and was particularly seen for verbal memory, semantic fluency, reaction time, and perceptual closure. SNN models were superior to other machine learning methods in classification of cognitive data (81.07%) used for diagnosis and in prediction accuracy of (77.27%) used for prognosis. Findings support the proposed SNN approach in distinguishing cognitive states of individuals at UHR's subtypes of psychosis for diagnostic purposes. The results also demonstrated the feasibility of the SNN approach as a dynamic risk prediction model using longitudinal data to better understand psychosis risk and improve prognosis. The results of this study can be further extended through developing a mixed-model observation and integrating the behavioural data with other datasets (genetic, neuroimaging) collected from the same individuals to create a personalised profile modelling for each individual, and progress precision medicine for psychosis.

Title: Personalised Prediction of Tinnitus Therapy Success using AI decision Tool: Integrated Neurological, Clinical, and Psychological Data

Authors: Doborjeh, Z.¹, Doborjeh, M.², Shen, Y.², Liu, X.², Wang, G.³, Yan, W.², Kasabov, N.², Sumich, A.⁴, William, M.⁵ & Searchfield, G.⁶

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Abstract: Tinnitus (“ear and head noise”) is a highly prevalent condition affecting between 5-20 % of the world’s population. Tinnitus can have a catastrophic effect on the quality of life and is strongly associated with poor mental health and wellbeing. Whilst currently available treatment is not able to eliminate the perception of tinnitus, reducing its impact through the management of associated depression and anxiety “tinnitus distress” is possible. However, such treatment is complicated by the heterogeneity of tinnitus, and concomitant variability in treatment response. The understanding of the underlying psychological and neural mechanisms of tinnitus subtypes and their response to treatment is currently limited. We propose a novel personalised predictive model based on the advanced brain-inspired artificial intelligence analytical tools for an early prediction of an individual response to tinnitus therapy. We applied this model through a mixed model observation (multimodal datasets-behavioral, clinical, EEG data) from tinnitus patients while they underwent common therapeutic approaches in NZ to i) delineate neurobiological heterogeneity of tinnitus and ii) investigate the effect of different therapies on tinnitus and associated symptoms. EEG was related to clinically significant changes in the behavioral data using the computational AI model. Based on baseline EEG, the AI framework was able to predict good responders (93% accuracy) from non-responders (100% accuracy). The results will be used to develop a diagnosis and prognosis software that can assist clinicians in a personalised treatment approach for tinnitus patients.

Title: A New Interpretable Machine Learning Methodology for Diagnosis and Prognosis of Psychosis Using Genetic Features

Authors: Singh, B.^{1*}, Budhaha, S.¹, Dobarjeh, M.¹, Dobarjeh, Z.², Goh, W.W.B.³, Lee, J.⁴, William, M.⁵, Lai, E.¹, Limson, W.⁶, Sumich, A.⁷ & Kasabov, N.¹

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Abstract: The Ultra-high risk (UHR) stage of psychosis is characterised by psychotic-like symptoms and deterioration in functioning. Individuals are currently identified as being at risk for psychosis based on a variety of clinically assessed features. However, the aetiology of schizophrenia is complex with both genetic and environmental factors at play. Given the high heritability of the condition, genetic factors have yet to make a significant impact in triggering the condition as well as the clinical practice. The conventional machine learning methods used to analyse high-dimensional gene datasets are often black-boxes and lack explainability. This research suggests a new methodology for developing an interpretable machine learning system and personalised modelling to provide new insights into the pathophysiology, and possibly improve psychosis diagnosis and prognosis. The methodology is applied to high-dimensional



gene pathways and achieved a high accuracy of UHR classification (98%) and identified top informative gene pathways as biomarkers.



4. PRESENTATIONS:

#PRES-01

Title: Psychometric evaluation and validation of the Beck Anxiety Inventory in a New Zealand Sample of Young Pacific Adults

Authors: Siegert, R.¹, Narayanan, A.², Gossage, L.², Wrapson, W.³, Dipnall, J.⁴, Tautolo, E.⁵, Sumich, A.⁶, Merien, F.⁷, Paterson, J.⁵, Berk, M.⁸, Balalla, S.⁹, Cornthwaite, K.⁹ & Guy, S.⁹

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Corresponding author: Richard Siegert, richard.siegert@aut.ac.nz

Abstract: Background: The Beck Anxiety Inventory (BAI) is a widely used self-report questionnaire to measure anxiety symptoms. We report its psychometric evaluation in young Pacific adults in New Zealand.

Methods: In 2020/2021 376 Pacific adults born in Auckland in 2000 (156 M, 218 F) completed an online survey comprising the BAI and standardised measures of depression, hopelessness, perceived stress, self-compassion and Pacific cultural identity/wellbeing. We calculated internal consistency, correlations with relevant measures, explored its factor structure and examined the symptom network.

Results: BAI Internal consistency was high ($\alpha=0.942$). Corrected item-total correlations ranged from 0.35 to 0.76. Principal axis factoring with varimax rotation suggested two factors, Cognitive and Physiological Anxiety. Correlations with measures of depression, hopelessness, stress, self-compassion and Pacific identity/wellbeing were significant, low-moderate, and in the expected direction. Females had higher mean anxiety and a much sparser symptom network compared with males.

Discussion: The BAI is a reliable, valid measure of anxiety for young, English-speaking Pacific adults. Gender differences were observed mean scores and symptom networks and should be considered in developing assessment and intervention for anxiety in Pacific youth.



#PRES-02

Title: Risk factors for depression in Pacific adolescents in New Zealand: a network analysis

Authors: Gossage, L.E.¹, Narayanan, A.², Dipnall, J.F.³, Iusitini, L.⁴, Sumich, A.⁵, Berk, M.⁶, Wrapson, W.⁷, Tautolo, E.⁸ & Siegert., R.¹)

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Corresponding author: Lisa Gossage, lisa.gossage@aut.ac.nz

Abstract: Background: Adolescent depression is a serious and growing health issue. A recent report on youth mental health in New Zealand found it was declining and its impact on certain groups, including female, Māori and Pacific youth was disproportionate.

Motivation for study: As with adult depression, heterogeneity of cause and symptom presentation makes full understanding of adolescent depression challenging. Network analysis provides opportunities to gain a greater understanding of the complex interplay of risk factors for depression, including at the symptom level. This study used network analysis to discover risk factors associated with both depression severity and depression symptoms amongst Pacific adolescents in New Zealand.

Methods: A Mixed Graphical Model with regularization was fitted to data from a community sample of New Zealand born Pacific adolescents (n=561; 51% male; Mean age=17) and associations between a wide range of potentially explanatory variables and depression severity and depression symptoms investigated.

Results: In the networks, the explanatory variables that shared an edge with both depression severity and depression symptoms were those related to quality of the relationships with mother or friends, school connectedness, and self-assessed weight, but the symptoms they were associated with varied substantially.

Conclusions: The results illustrate the heterogeneous way that adolescent depression can manifest itself in terms of symptoms suggest specific items on the depression scale that might be suitable targets for prevention strategies and interventions.

#PRES-03



Title: Motivations for COVID-19 prevention behaviour vary across Dark Triad and Vulnerable Dark trait traits

Authors: Blanchard, A. E.¹, Heym, N.² & Sumich, A.²

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Abstract: The COVID-19 pandemic has inspired a plethora of research examining individuals' motivations to engage in COVID safety behaviour such as adhering to lockdown rules, social distancing and wearing masks. The non-agreeable and low empathy profile of those that are high in "dark" traits such as psychopathy and narcissism suggests that they are less likely to comply with restrictions, and research has demonstrated to be as such although the reasons why remain relatively uncharted. Furthermore, it is not known whether people who are high in the vulnerable Dark Traits of secondary psychopathy, vulnerable narcissism and borderline personality disorder are likewise affected. 263 participants were recruited from Amazon MTurk for this online psychometric study. SEM confirmed contrasting results for traditional "dark" traits and those of the vulnerable Dark Triad. Specifically, high primary psychopathic, and grandiose narcissistic individuals engaged in less disease prevention behaviours because they did not take the threat of COVID-19 seriously. Grandiose narcissists were also motivated by COVID-19 conspiracy theories. By comparison, individuals high borderline personality traits reported being fearful of catching the virus which prompted in engagement with disease prevention behaviours. No such relationships were indicated in secondary psychopathy or vulnerable narcissism. The current study dovetails with findings from the current literature, but also demonstrates the need to examine sub-facets of the DT separately to present a more comprehensive understanding of the different motivations for engagement in disease prevention behaviour (or not) of those high in "dark" traits.

#PRES-04

Title: The distinguishing role of empathy in understanding motivations for direct and indirect aggression, across the Dark Tetrad traits.

Authors: Fleet, M.¹ & Heym, N.¹

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Abstract: The Dark Tetrad traits (Psychopathy, Sadism, Machiavellianism and Narcissism) have been associated with lower empathy and greater preference for aggression, both direct and indirect forms. However, uncertainty remains regarding the role that empathy plays in the DT traits both engaging in and deriving enjoyment from vicariously viewing these forms of aggression. Likewise, there is a significant lack of research investigating sadism and its facets in relation to aggression and empathy. This study examines (i) the propensity for engaging in



direct and indirect aggression, (ii) the derivation of enjoyment or heightened positive affect when watching both direct (physical) and indirect (verbal) aggression, and (iii) the role of empathy in underpinning these associations. Participants (N = 354, 120 males, 218 females) completed self-report measures of the DT traits, empathy (cognitive, affective resonance, affective dissonance), direct aggression (proactive, reactive) and indirect aggression (social exclusion, malicious humour, guilt induction). Furthermore, participants viewed four video clips depicting aggression and reported their affective responses. Results demonstrated that psychopathy and sadism were the strongest predictors of engaging in and enjoying watching direct and indirect aggression. Notably, psychopathy was driven by deficits in affective empathy, whereas sadism was driven primarily by increased affective dissonance and positive affect. Implications of these findings in relation to contemporary theories explaining DT traits with aggression are discussed, and recommendations for future research are made – with a particular focus on utilising other experimental methods to study DT traits and aggression.

#PRES-05

Title: Dysfunctional Reinforcement Sensitivity (rRST) underpinning Psychopathic (PP) and Callous-Unemotional (CU) traits: A Latent Profile Analysis (LPA) approach

Authors: Firth, J.¹, Sumich, A.¹ & Heym, N.¹

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Abstract: The revised-Reinforcement Sensitivity theory (rRST; Gray & McNaughton, 2000) is a neurophysiological framework of personality, comprising three systems of Behavioural Activation (BAS; reward sensitivity), Behavioural Inhibition (BIS; anxiety) and Fight-Flight-Freeze (FFFS; fear). Psychopathic (PP) variants have been characterised by either hypo- or hypersensitivity BIS/BAS under the original RST (oRST), however, limited research has considered the nuances of the rRST. Two cohorts: (total n= 1284) completed the rRST and a latent profile analysis (LPA) identified a four-class solution: Typical (n= 421, average-anxiety/fear, low-reward); (ii) Anxious-Fearful (n= 364, high-anxiety/fear, average-reward; (iii) Fearless-Reward (n= 322, high-reward/anxiety, low fear); and (v) Non Anxious-Fearless (n= 174; low-anxiety/fear, average-reward). Both cohorts completed the Self-Report Psychopathy (SRP-III; Williams et al., 2003); Inventory of Callous-Unemotional Traits (ICU; Frick, 2004) and the Reactive-Proactive Aggression Questionnaire (RPAQ; Raine et al., 2006). Cohort 1 completed Levenson Self-Report Psychopathy (LSRP; Levenson et al., 1995) and cohort 2 completed the Triarchic Psychopathy Measure (TriPM; Patrick et al., 2009). Fearless-Reward and Non-Anxious-Fearless reported higher PP traits, however, Non-Anxious-Fearless was uniquely associated with callous-affective PP/CU deficits. Typical and Anxious-Fearful did not differ on PP traits, though Typical reported higher Uncaring, while Anxious-Fearful reported lower Uncaring and Unemotional (CU) traits. Fearless-Reward and Anxious-Fearful showed higher reactive aggression, whereas Non-Anxious-Fearless reported higher proactive aggression. These findings illustrate how different combinations of high, low and average rRST systems relate to distinct PP/CU deficits and aggression.



#PRES-06

Title: Analyzing The Discursive Psychology Used Within Digital Media To Influence Public Opinions Concerning Female Child-Killers

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Abstract: It is known that discursive psychology, as defined by Edwards & Potter (1992), is used to invoke emotion and social action within receivers, and widespread media is notorious for utilizing these linguistic features to negatively skew the public opinion of an individual or group (de Goede, 1996; Thornton & Wahl, 1996), such as criminal offenders (Wilczynski & Sinclair, 1999; Berrington & Honkatukia, 2010). This study aims to investigate through discursive thematic analysis the ways in which digitised media articles utilise linguistic features and discursive devices to invoke emotion within readers, and in turn influence their opinions concerning female child-killers. The data gathered for this piece of research were 9 digital newspaper articles published between 2017 and 2021 by any of the top 10 most-read titles according to YouGov (2021) and were sourced using Google Chrome. The key terms used to locate these articles were the names “Rachel Henry”, “Tracey Connelly” and “Louise Porton” followed by the names of the top 10 most-read titles (e.g. “Rachel Henry Daily Mail”). The discursive devices discussed in this study are in line with those identified by Wiggins (2016). The themes identified suggest a consistent aim within the media to negatively influence the public opinion of the offenders by portraying them as evil, inhuman, delusional individuals who are inherently different from “normal” members of society, to invalidate them and reinforce societal norms and values. These findings may have wider implications for the ethical considerations of using such influential linguistic features within widespread media.

#PRES-07

Title: Impact of media exposure on body perception and emotional regulation: A racial-ethnic study

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Abstract: The present research aims to assess the impact of media exposure to standardized beauty ideals and how this affects body satisfaction and emotion regulation, considering four



racial-ethnic categories in a group of young women in Portugal. To answer the research question and investigate this impact, it was used self-report instruments compiled in a virtual questionnaire administered to 124 women between 18 and 39 years old. The main results point to a high level of media exposure and high body satisfaction, regardless of racial-ethnic category. Regarding emotion regulation ability, the results show a frequency of emotional suppression as a prioritized strategy of emotion regulation. From a practical point of view, this exploratory study was conducted to fill the lack of studies in this area in Portugal and presents as future recommendations to prioritize increased research to implement strategies to mitigate the deleterious impact that the dissemination of beauty ideals may have on individuals of various racial-ethnic origins. This line of research seeks to raise awareness about the importance of literacy related to the risks and potentialities of media and its impact on body satisfaction in young women.

#PRES-08

Title: Characterization of caffeine consumption in the Portuguese population

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Abstract: Caffeine is one of the most used psychoactive substances with impact in multiple spheres (individual, social, and economic). Also, there is evidence of the physiological, cognitive, and emotional effects after its consumption. Objective: The objective of this study is to characterize the consumption of caffeine in a sample of the Portuguese population. Method: The sample was obtained using convenience sampling (non-probabilistic) on both 'Study 1' (n = 216) and 'Study 2' (n = 223). The exclusion criteria were to be under 18 or over 35 years old, not to have Portuguese nationality, or to have a health problem that impedes caffeine consumption. Results: The results point to higher consumption in males (when compared to females) and in the group of subjects aged between 31 to 35 years, which represents results like another study conducted with the Portuguese population. Was also possible to identify the 50ml coffee (also known as "espresso") as the most consumed source of caffeine in the Portuguese population. Finally, it proved that among the reasons given by individuals for consuming caffeinated products are the improvement of alertness and the taste of products with caffeine. Conclusions: The availability, the expected cognitive and physiological effects, and the social impact associated with caffeinated products, particularly coffee, seem to be translated into a vast consumption in Portuguese society. This work demonstrates the importance of assessing caffeine intake in routine psychological assessment since this substance's effects can be translated into behavioural changes or worsening symptoms associated with certain disorders.



#PRES-09

Title: Can motivation and parental support predict musical achievement?

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Abstract: Selection of candidates to elementary level is done by public music conservatoires in Portugal through the assessment of aural capacities. However, the literature in the field points out that other dimensions exert a stronger influence than skills over the learning process. The aims of this research were to investigate if the aural capacities assessment predicts the candidate's future musical achievement, and to probe whether information on the candidate's motivation to learn how to play a musical instrument and parents' intentions of provision of support, both collected during the admission procedure, could be predictors of the candidate's future musical achievement. For that purpose, we created two questionnaires, one to be administered to the candidates with the help of a researcher, and the other to the parents. We also collected the grades awarded to students every term during the academic years 2019/2020 and 2020/2021. Our sample includes the 60 candidates that were invited to enrol in 2019/2020. Results will be discussed and suggestions for future research will be given.

#PRES-10

Title: Psychological trauma, Mood and Social Isolation do not explain elevated Dissociation in Functional Neurological Disorder (FND)

Authors: Blanco, S.R.^{1,2}, Mitra, S.¹, Howard, C.J.¹ & Sumich, A.^{1,3}

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Abstract: Functional Neurological Disorder (FND) results in altered motor, sensory and cognitive function in the absence of evident organic disease. It often co-occurs alongside dissociative disorders and dissociation has been found to be high in patients across FND subtypes (particularly in those with Non-Epileptic Attack Disorder; NEADs). However, the presence of dissociation in FND is varied and there are contradictory definitions and suggestions for elevated levels. Here, four studies are presented; three studies show that dissociation is a prominent, defining feature of people with FND compared to those who are healthy or have other, similar long-term health conditions, and that this heightened dissociation



is not explained by a history of trauma (study 1), mood (study 2) and is not associated with social isolation/social exclusion (study 3). A further study (study 4) was conducted using Electroencephalography (EEG) to explore brain activity in participants with FND (N = 17) in comparison to a healthy control group (N = 18). The findings from this study suggest that elevated levels of dissociation in the FND group may be underpinned by mechanisms reflected in N100 and P300 amplitudes. As dissociation appears to occur in FND in the absence of the usual contributing factors, and a higher level of it is associated with increased disability, illness impacts, altered cortical activity and patterns of activation, understanding its role is of fundamental importance to developing our understanding of FND. These findings have further applications, beyond the theoretical, in clinical settings and in research.

#PRES-11

Title: Interoception as a superglue interlinking mindfulness, emotion regulation and mental health

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Abstract: One prominent hypothesis explaining the mindfulness - mental health link is that mindfulness results in better emotion regulation which in turn improves mental health. There is also some evidence suggesting that mindfulness practice is associated with increases in interoceptive accuracy and/or awareness. Given that interoception also correlates with emotion regulation and mental health, it may be the super-ordinate common factor underlying the mindfulness - mental health relationship. We tested this speculation in 128 healthy adults who were assessed on self-report measures of trait mindfulness, interoceptive accuracy and awareness (IAA), emotion regulation difficulties (ERD) and mental health problems (MHP). Consistent with earlier findings, IAA was found associated with greater trait mindfulness, fewer MHP and ERD. Mindfulness also correlated with fewer ERD and MHP. When the IAA was controlled, the relationship of mindfulness with MHP reduced substantially but remained statistically significant. Similar reduction was noted in the strength of relationship between mindfulness and ERD as well as ERD and MHP. However, when both ERD and IAA were controlled the strength of relationship between mindfulness and MHP became statistically non-significant for all the domains except obsessive compulsive disorder, interpersonal sensitivity, hostility and paranoid ideation. The findings suggest that interoception (and associated neurophysiologic mechanisms) may be a common but not the only underlying factor linking mindfulness, emotion regulation and mental health.

#PRES-12



Title: The Portuguese paradigm regarding pre and probiotics as health management tools

Authors: Soares, J.¹, Ferreira, M.¹, Freitas, S.¹, Oliveira-Silva, P.¹, Pintado, M.¹ & Batista, P.¹

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Abstract: Probiotics and prebiotics are microbiota management tools at the forefront of different industries such as food, nutraceuticals and pharma. They can be used to battle healthcare costs acting on prevention and treatment of various conditions and management of health status in general. The pandemic situation enlightened the need and demand for products that aim to maintain or improve mental wellbeing and health in general. Following this trend, it becomes clear the importance of pre and probiotics, which establish a clear connection between gut and brain as portrayed by scientific data. Since probiotics' effectiveness can be species-, dose-, and disease-specific, it's vital to provide adequate tools to consumers and health care professionals (HCP) to assess the available options. This study aims to present a review of the Portuguese paradigm about pre/probiotic products, focusing primarily on the familiarity of HCP with these tools, the gap between current health benefits explored and emerging/potential, and the delay of information between the scientific community and practitioners and consumers.

#PRES-13

Title: Identifying Influential Symptoms and Covariates in Problematic Internet Use Development and Maintenance

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Abstract: A partial correlation Network is used to represent the symptoms of problematic internet use (PIU), problematic smartphone use, problematic general internet use, problematic internet gaming, problematic social media use, problematic pornography use and the relationships with covariates FOMO, Loneliness and Wellbeing in students. The nodes on the network represent symptoms of the disorder and the covariates and the edges represent their inter-relationships. The network can be used not to identify a latent common cause but explains the disorder through the symptoms' dynamic causal interactions. The network topology can identify influential nodes, with nodes central to the network having the greatest influence on the development and maintenance of PIU. Using the I-PACE model and the partial correlation network of PIU symptoms and covariates, the development and maintenance of PIU can be



explained by pre-disposing biological and psychological variables which when interact with moderating and mediating variables can develop and maintain PIU in an addiction process. Variance partitioning is used to determine the extent of the influence of PIU moderators or mediators. The partial correlation network and variance partitioning can be used to gain insight into the relationships between symptoms and covariates of PIU and their level of influence.

#PRES-14

Title: Interplay between the salience and the default mode network in a social-cognitive task towards a close other

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Abstract: Social cognition relies on two main subsystems to construct the understanding of others, which are sustained by different social brain networks. One of these social networks is the default mode network (DMN) associated with the socio-cognitive subsystem (i.e., mentalizing), and other is the salience network (SN) associated with the socio-affective route (i.e., empathy). The DMN and the SN are well-known resting state networks that seem to constitute a baseline for the performance of social tasks. We aimed to investigate both networks' functional connectivity (FC) pattern in the transition from resting state to social task performance. A sample of 42 participants involved in a monogamous romantic relationship completed a questionnaire of dyadic empathy and underwent an fMRI protocol that included a resting state acquisition followed by an fMRI task in which subjects watched emotional videos of their romantic partner and elaborated on their partner's (Other condition) or on their own experience (Self condition). Independent component and seed-based analysis were used to assess alterations in task-independent (Rest condition) and task-dependent (Self and Other conditions) FC. We found that the spatial FC maps of the DMN and SN evidenced the traditional regions associated with these networks in the three conditions. Some DMN regions exhibited increased FC during the social task performance in comparison to resting state. The Other condition revealed a more limited SN's connectivity in comparison to the Self and Rest condition. The results revealed an interplay between the DMN and SN which was particularly evident in Self and Other conditions.

#PRES-15

Title: Right Bundle Branch Block detection by Convolution Neural Networks



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Abstract: With the exponential growth of cases number for cardiovascular diseases, the idealization of an algorithm that can distinguish pathologies is a great ally in the diagnosis. The Right Bundle Branch Block (RBBB), although a disease that may never present symptoms, it is an excellent indicator for future cardiovascular diseases that have a much higher degree of severity. To detect the appearance of RBBB in the early stages, in this work the Discrete Wavelet Transform was applied to the raw ECG signals, which allowed to extract features such as energy, entropy and coherence for three different levels of signal decomposition. The signal discrimination was performed through CNN in the 30-fold cross-validation process. The discrimination accuracy between RBBB and a large set of other cardiovascular diseases, present in the same database, ranged from 64,31% and 100%, with the best results appearing when presented small portions ECG signals to the CNN entries.

#PRES-16

Title: Boosting Attention in scholar aged children with Subclinical ADHD through Near-Infrared Spectroscopy-based Neurofeedback Intervention

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Abstract: Attention-Deficit/Hyperactivity Disorder (ADHD) is one of the most prevalent neurodevelopmental disorders in children, with significant individual, social and economic burden. Subclinical ADHD (sADHD) has also been recognized as a significant problem, but fail to meet current criteria for diagnosis. Individuals with sADHD are significantly functionally compromised in several areas of life. Non-pharmacological interventions are of particular importance for sADHD, as they are unlikely to be recommended a pharmacological treatment, and appropriate intervention is necessary to prevent further functional decline. A novel approach to an existing intervention is proposed to strengthen brain development in sADHD children. This study is original because it optimizes and evaluates an alternative treatment approach for school-aged children with sADHD using a randomized control trial design, which compares two types of neurofeedback with cognitive training, in order to establish efficacy and test a new clinician tool.





5. POSTER BLITZ:

#POSTBL-01

Title: Shades of Darkness: Individual Differences in Adult Attachment across Dark Personality and Dark Empathy Latent Profiles

Authors: Fino, E.¹, Sumich, A.¹, Bloxsom, C.² & Heym, N.¹

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Abstract: Recent studies suggest the role of empathy in preserving individuals' social adaptability and interpersonal functioning, even in presence of "dark" personality traits, namely Machiavellianism, narcissism, and psychopathy. Four latent "dark" profiles have been recently identified, distinguishing individuals scoring highly in dark traits and either lowly (Dark Triad) or highly in empathy (Dark Empath), from individuals scoring lowly in dark traits and either averagely (Typical) or highly in empathy (Empath). The present study aimed to test differences in experiences in close relationships with the partner, best friend, and parents, as measures of adult attachment, across the four latent profiles, in 264 individuals from the community. The results showed non-significant differences in anxiety, whereas significant differences were found in avoidance: For partner, Dark Triad scored significantly higher than Typical, Empath, and Dark Empath. For friend, Dark Triad scored significantly higher than Typical, Dark Empath, and Empath; Typical scored significantly higher than Empath; Dark Empath scored significantly higher than Empath. For parents, Dark Triad scored significantly higher than Typical and Empath. These results support the protective role of empathy in adults' ability to bond, contributing to advance a theoretical model of individual differences in attachment, dark personality traits, and empathy.

#POSTBL-02

Title: An increased functional connectivity between several posterior brain regions is detected in patients with late mild cognitive impairment and Alzheimer's disease

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Abstract: Alzheimer's disease (AD) is the most common age-related neurodegenerative disorder. In view of our rapidly aging population, there is an urgent need to identify AD at an early stage, differentiate stages of the disease, and explore compensatory mechanisms that



might be present even in well established (long-term) illness. A potential way to do so is by assessing the functional connectivity (FC) (i.e. the statistical dependency between two or more brain regions) using new approaches. Here, a rsfMRI dataset from the Alzheimer's disease neuroimaging initiative (ADNI) was used (n= 128). The blood oxygen level-dependent (BOLD) signals of 116 regions of 4 groups of participants i.e. healthy controls (n=35), early mild cognitive impairment (EMCI) (n= 29), late mild cognitive Alzheimer's (LMCI) (n= 30), and Alzheimer's disease (AD) (n= 34) were extracted and analyzed. FC and dFC were computed using widely used Pearson correlation and sliding-windows correlation (SWC) analyses respectively. More specifically, for FC pairwise correlations of the whole signal and graph theory measures were computed, then, for dFC, SWC analysis approach was employed to detect variability amongst windows. Our results showed a hypoconnectivity FC pattern in several regions, most of them in posterior areas in EMCI in contrast to LMCI and AD. Moreover, a longer characteristic path length in EMCI and an increased variability across windows in EMCI were detected. These FC and dFC connectivity features, although based on Blood Oxygen Level Dependent (BOLD) and not on the anatomy or direct neural activity, suggest an increase in excitatory neurotransmitters such as glutamate in a late prodromic AD stage i.e. LMCI and in mild AD, that could be explained as a mal-adaptive mechanism to maintain cognition.

#POSTBL-03

Title: Artificial Intelligence System for the Automatic Detection of Alzheimer Disease through Electroencephalographic Signals

Authors: Araújo, T.¹, Teixeira, J. P.² & Rodrigues, P. M.¹

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Abstract: Nowadays, as a result of medical improvements, people are living longer. Elderly people have a greater propensity to develop neurodegenerative diseases such as dementia. Alzheimer's disease (AD) is known as the most common form of dementia and methods capable of assisting this disease on its early stages (MCI) are still needed. In this study, it was performed an EEG nonlinear multiband analysis by Wavelet Packet in order to extract a set of features. Regarding Machine Learning binary classifications, C vs MCI, C vs ADM, C vs ADA, MCI vs ADM, MCI vs ADA, ADM vs ADA and All vs All provided maximum accuracy values of 78.9% (Decision Tree), 81.0% (Cubic and Fine Gaussian SVM), 84.2% (Linear SVM and Gaussian Naive Bayes), 88.9% (Cosine KNN), 93.8% (Decision Tree), 77.8% (Ensemble Subspace Discriminant and Fine KNN) and 56.8% (Medium Gaussian SVM), respectively.



#POSTBL-04

Title: Machine learning models for automatic detection of Alzheimer's Disease using Magnetic Resonance Imaging (MRI)

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Abstract: Alzheimer's (AD) disease is a neurodegenerative disease and one of the main causes of dementia affecting millions of people. Its initial stage - Mild-cognitive impairment (MCI) - is asymptomatic and although several studies have been made, no cure is yet available. Thereby, there is an increased need to perform an early diagnosis to minimise the AD impact by delaying it. In this work, a set of MRI images were analysed in the sagittal, frontal, and horizontal anatomical planes, and features have been extracted to feed different machine learning algorithms. For comparison between: (1) AD vs Control (CN) a Bagged Trees Classifier reached a discrimination accuracy of 93.3%; (2) AD vs MCI, Quadratic SVM classifier got a discrimination accuracy of 87.7%; (3) CN vs MCI, Fine KNN and Subspace KNN classifiers achieved 88.2% of discrimination accuracy, respectively; and (4) All vs All, the Subspace KNN classifier provided 75.3% of discrimination accuracy.

#POSTBL-05

Title: Portuguese perception of psychological impact of COVID-19 vaccines

Authors: Batista, P.¹, Menezes, B.², Pereira, A.² & Oliveira-Silva, P.¹

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Abstract: In view of the pandemic situation experienced, the scientific knowledge was exponential to finding solutions, namely in COVID-19 vaccines development. The efforts for developing a vaccine have reached unprecedented levels, and doubts and the faster applications were some reasons that condition vaccine adherence in the world. In this study we intended to contribute to increasing the knowledge about the perception of Portuguese people's about the levels of anxiety regarding the development, availability and adhesion to COVID-19 vaccines. In this cross-sectional study, we applied the Generalized Anxiety Disorder scale (GAD-7) to evaluate the COVID-19 vaccine's anxiety disorders. The data were analysed by SPSS statistical software. The results showed that the participants reported mild to severe anxiety symptoms. Similar results were reported by general anxiety felt towards the disease and the anxiety associated with the availability and effectiveness of a COVID-19 vaccines. This study intends



to pay attention to anxiety related COVID-19 vaccine the consequences on mental health. The increase in anxiety can condition not only mental health but also vaccine decision-making. This is an emerging health public problem that needs to be discussed, in order to find potential solutions for health quality improvement by increase health literacy in this area.

#POSTBL-06

Title: Detection of cardiomyopathy activity through deep learning algorithms

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Abstract: Cardiomyopathies are a heart pathology hard to diagnose through the typical diagnosing methods, as it is ECG. In this sense, algorithms are still needed to improve the capacity of early detection for medical diagnosis support. In this study, an ECG multiband cepstral analysis of pathological (Dilated Cardiomyopathy - DCM and Obstructive Hypertrophic Cardiomyopathy - HOCM) and non-pathological (control - CL) was performed for extraction cepstral distances, in each level of decomposition and in each lead of the ECG. The cepstral distances serve as features to feed convolutional networks (CNNs) for getting the ability to identify pathological DCM and HOCM typical sequences. The CNNs achieved a discrimination accuracy for DCM vs CL of 92,39% and for HOCM vs CL of 92,58% and DCM vs HOCM of 99,64%. The high rates of accuracy show that CNN was able to identify typical pathological events characteristic of each cardiomyopathy activities.

#POSTBL-07

Title: Detection of Myocardial infarction activity through Convolution Neural Networks

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Abstract: The Electrocardiogram is the first-line exam in what concerns the diagnosis of cardiovascular diseases. Myocardial infarction is one of the electrocardiographic changes that detected in a timely manner can have a huge impact at the physiological and anatomical level of the cardiac muscle itself. The existing need for a fast and correct decision-making has led to the development of algorithms capable of detecting pathologies in the electrocardiographic signal. To maximize the discriminative capacity of the different types of myocardial infarction,



specific time-frequency patterns have been extracted from the ECG signals for feeding Convolution neural networks (CNN). CNN presented 99.39%, 99.64%, 97.76% and 98.98% of accuracy levels for identifying Anterior, Anterolateral, Inferior and Inferolateral, respectively. The promising discriminative results prove that the CNN model is ready for detecting pathological activity over time as a new ECG signal is presented to its entries.



6. POSTERS:

#POSTER-01

Title: The Utility of Specialist Algorithms in Distinguishing Neurodivergent Children in a Domestic Violence Cohort

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Abstract: Neurodiversity encompasses autistic, callous-unemotional and attention deficit hyperactivity disorder traits. Neuro-minorities experience divergent thoughts, experiences, and perceptions yet remain uncharacterised across public services where this hinders the implementation of remedial interventions tailored to their unique profiles. However, various Strengths and Difficulties Questionnaire (SDQ)-derived algorithms appear effective in characterising neurodivergent and at-risk groups. Seven algorithms (five for neurodiversity and two for dysregulated behaviour) were tested using secondary data of the parent rated SDQ-P (N = 222; with N=121 impact supplementary scale completions) of children referred to a domestic violence and abuse (DVA) service provider to validate and explore i) whether neuro-minorities could be characterised within the cohort; ii) risks of developing inter-relational aggression, iii) dysregulated behaviour iv) different types of DVA exposure; and v) wellbeing and intervention outcomes. Clustering techniques (on the SDQ-subcales) and a multivariate analysis of variance (MANOVA) with post-hoc analyses revealed five naturally occurring, significantly different groups in the data mapping on neurotypical (58%), ADHD (5%), conduct problems either with (18%) or without (9%) callous-unemotional traits and autism (9%) profiles. Correlational analyses, t-tests and chi-square tests revealed anticipated significant relationships between the algorithms, DVA indices, aggression, wellbeing and intervention outcomes. The neurodiversity algorithms lacked additional utility over the SDQ-P-subcales for establishing DVA risk but were effective in delineating children who made poor interventional progress. The relationship between dysregulation and aggression was significant and can be exploited to identify vulnerable at-risk sub-cohorts of children. Recommendations for the algorithms and implications of the cluster-groups are further discussed.

#POSTER-02

Title: Gut microbiota modulate electrophysiological correlates of feedback processing

Authors: Lenzone, S.^{1,2}, Hunter, K.³, Heym, N.¹, Blanco, S.¹, Heasman, B.¹, Gibson, G.⁴, Mograbi, D.^{5,6} & Sumich, A.^{1,7}

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Abstract: Evaluative processing of action feedback is considered crucial for learning and adaptive adjustments of behaviour. Impaired self-monitoring is reported in several clinical conditions. The feedback-related negativity (FRN) is an event-related potential elicited by feedback presentation and generated in the anterior cingulate cortex. Although previous studies have extensively investigated external factors modulating the FRN, limited research explored the contribution of peripheral interoceptive signals. Recent research suggests that bidirectional communications within the brain-gut-microbiota axis can modulate cognitive functioning and behaviour. Emerging evidence suggests that microbial levels are associated with medial prefrontal cortex function. The present study investigates the association between gut microbiota and the FRN. 29 healthy participants completed self-report measures of depression and a Feedback and Faces task. Microbiota (Clostridium, Lactobacilli) and inflammation (C-reactive protein) were assayed from faecal and blood samples, respectively. FRN amplitude was positively correlated with microbiota and depression. Association between microbiota and FRN was confirmed using multilevel modeling (MLM). Depression did not have an independent effect on the FRN. Findings suggest that gastrointestinal tract signals may modulate central self-monitoring processes. The current work provides relevant insights into peripheral mechanisms underlying FRN generation and highlight the possible benefits of therapeutic interventions, such as prebiotic treatments.

#POSTER-03

Title: New insights into neural networks of error monitoring and clinical implications: A systematic review of ERP studies in neurological diseases

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Abstract: Error monitoring allows for efficient performance of goal-directed behaviors and successful learning. Furthermore, error monitoring as a metacognitive ability, is thought to contribute to the emergence of self-awareness, and may play a crucial role for neuropsychological interventions, such as rehabilitation. In the past decades, research has suggested two electrophysiological markers for error monitoring: the error-related negativity (ERN) and the error positivity (Pe), thought to reflect, respectively, error detection and error awareness. Studies on several neurological diseases have investigated the alteration of ERN and Pe. A systematic review was conducted to understand what neurological conditions present



alterations of error monitoring event-related potentials (ERPs) and their relation with clinical measures. Additionally, we explored the contribution of different brain structures to neural networks underlying error monitoring, also discussing domain-specific mechanisms of error processing and clinical implications of findings.

#POSTER-04

Title: The impact of the COVID-19 pandemic on the risk of exposure to domestic violence and abuse and mental health problems in vulnerable mothers and their children

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Abstract: The current COVID-19 pandemic initiated a silent domestic violence and abuse (DVA) epidemic that emerged from the prolonged periods of distress and uncertainty within high-risk cohorts (WHO, 2020; Refugee, 2020; UN Women, 2020). There is a gap in knowledge and data regarding this silent epidemic and its wider collateral damages, especially for vulnerable children who have been exposed to DVA (Dickinson & Yates, 2020; Chandan et al., 2020). This two-part pilot study examined the impact of the COVID-19 pandemic on the risk of DVA and mental health issues on at-risk women (N=35) and their children (N=61). Part 1 used a phone call survey, investigating mothers' risk of DVA and their children's externalising and internalising behaviours. Part 2 comprised of an online questionnaire which assessed women's cognitive flexibility, anxiety, depression and trauma impact, and their children's anxiety, depression, and impact of trauma. The study was the first to use the COVID-19 amended version of the DASH and the results indicated that 20% of the sample encountered DVA during the pandemic, from which 55% of the participants (N=11) who completed the second part of the study scored moderate to severe levels of anxiety, 36% scored moderate to severe levels of depression and 91% scored moderate to severe levels of trauma. The results also found that 18 at-risk children showed aggressive behaviours during the pandemic, from which 50% were exposed to COVID-19 DVA trauma, and 25% (N=12) recorded borderline and abnormal levels of anxiety and depression. The research revealed valuable novel data regarding the risk of DVA and mental health consequences in vulnerable mothers and their children during the pandemic.

#POSTER-05

Title: An exploratory study of the relationship between continued consumption of Kombucha and cognitive and affective functioning

Authors: Fraga, J.¹, Ferreira, M.¹, Soares, J.¹, Pintado, M.¹ & Oliveira-Silva, P.¹



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Abstract: The short- and long-term health-promoting effects of fermented food have been known for thousands of years in the East. However, a fermented beverage has only recently become extremely popular in western cultures. Kombucha is a slightly sweet fermented beverage made from brewed tea and sugar, which results from a symbiotic culture of bacteria and yeast. Within the functional food movement, many health benefits have been alleged to Kombucha, including benefits at the cognitive and affective levels. This study compares the short-term effects of consumption of Kombucha on the cognitive and affective functions and at the peripheral neurophysiological response (electrodermal and cardiac activities) compared to a control group. The sample was between 18 and 25 years old who consumed Kombucha or green tea for 30 days, being assessed in 4 different points. In this talk, the author will discuss results, implications, and suggestions for future studies.

#POSTER-06

Title: The impact of social media exposure during COVID-19 lockdown on body satisfaction

Authors: Nóbrega, S.C.¹ & Oliveira-Silva, P.¹

Affiliation(s): 1. HNL | CEDH (Human Neurobehavioral Laboratory | Research Centre for Human Development), Universidade Católica Portuguesa, Porto – Portugal

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Abstract: Contemporary media have been repeatedly criticized for conveying unrealistic appearance ideals and over-emphasizing the importance of physical beauty, thinness, and attractiveness, especially for women, which has been related to an increase in women's body dissatisfaction. Furthermore, during the COVID-19 pandemic, an unprecedented and massive disruption of our daily life dragged almost all the population to home, further increasing screen time and social media exposition. The present study explored whether the abrupt working and social changes after the COVID-19 outbreak (resulting in significantly more screen time, with more exposure to the own face and more concerns related to their appearance) have aggravated the consequences and idealization of a standard/ideal of beauty leading to greater body/ facial dissatisfaction. For this, 148 women between 18 and 35 years old responded to a questionnaire exploring media consumption and body satisfaction, pre and during the pandemics. Outcomes and future implications will be discussed.

#POSTER-07

Title: Relationships of psychopathic and callous-unemotional traits with proactive and reactive aggression



Authors: Firth, J.¹, Sumich, A.¹ & Heym, N.¹

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Abstract: There are several subclinical adult psychopathic trait (PP) inventories in operation with distinctive conceptualisations of psychopathy – from classic to triarchic conceptualisations. Youth inventories focus on callous-unemotional (CU) traits as potential precursors to adult psychopathy. Prior research has associated CU traits with affective psychopathy deficits (e.g., Cold-heartedness), however, limited research has examined how the underlying constructs of CU and different PP inventories map. Two independent samples: (1) $n = 519$ adults ($M = 23.69$; $SD = 9.24$) completed the Self-Report Psychopathy (SRP-III; Williams et al., 2003), Levenson’s Self-Report Psychopathy (LSRP; Levenson et al., 1995), Inventory of Callous-Unemotional Traits (ICU; Frick, 2004) and Reactive-Proactive Aggression Questionnaire (RPAQ; Raine et al., 2006); and (2) $n = 592$ adults ($M = 21.96$; $SD = 7.24$) completed the SRP-III, Triarchic Psychopathy Measure (TriPM; Patrick et al., 2009), ICU and RPAQ. Two SEM path models indicated the presence of two latent variables comprising affective-interpersonal PP deficits and CU traits (AFFECT) and impulsive-irresponsible PP deficits (IMPULSE). AFFECT was a predictor of proactive aggression and IMPULSE was a predictor of reactive aggression in both models. Nevertheless, there was some variability between models indicating that the relationship between PP traits and aggression may vary depending on the inventory used. Overall, this research highlights the necessity for replication of models.



7. OTHER SESSIONS:

CHARITY & ACADEMIA ROUND TABLE DISCUSSION

Invited Speakers:

Tammy Clinton-Harris, Senior Service Manager, Living Without Abuse (LWA),
tammy@lwa.org.uk, Twitter [@lwacharity](https://twitter.com/lwacharity)

- [Living Without Abuse](#) offer help and support for anyone suffering from abuse, in particular families and children from domestic violence background.

Steven Webster, Chair and Founder of FND Dimensions,
steve@fnddimensions.org, Twitter [@FNDDimensions](https://twitter.com/FNDDimensions)

- [FND Dimensions](#) provide support for people diagnosed with Functional Neurological Disorder (FND) as well as carers, families, and medical professionals with a focus on peer and individual support sessions.

David Kosson, Professor of Psychology at Rosalind Franklin University of Medicine and Science, President and Founder of Aftermath, Moving-on-support@rosalindfranklin.edu,
Twitter [@AftermathFDN8](https://twitter.com/AftermathFDN8)

- [Aftermath](#) support the families and victims of those with psychopathy. Surviving Psychopathy is dedicated to educating the public regarding the nature of psychopathy and its cost to individuals and society. They support research that aims to: prevent or



minimize the development of psychopathic traits, reduce the impact of psychopathic traits, and understand and treat the aftermath of psychopathy.

Working with charities & 3rd sector Organisations

Working with charities or 3rd sector organisations is a symbiotic process – it allows us to conduct really meaningful research (for example through recruiting hard to reach populations or tackling actual problems out there), whilst simultaneously supporting and facilitating their goals. This work entails a strong commitment from both sides to ensure mutual benefit. It can be a truly intrinsically rewarding experience as we can foster collaboration with our external partners, see real world impact in their sector on the basis of our supporting work, whilst at the same time substantially contributing to the academic community and knowledge with applied research. Projects can be cocreated with maximum user/stakeholder involvement and incorporation of true lived experience. As such, this process allows us to draw out strong pathways to impact – a clear narrative essential in funding applications. Funding bodies and policymakers have systematically encouraged taking on and fostering this approach, some making it an explicit requirement.

Whilst it is clearly a positive undertaking for both sides, it can also be hard work taking up additional time on both sides. Researchers and organisations may have distinct motivations, goals and constraints within such partnerships, which sometimes require careful negotiation to avoid complications. External partners may be confronted with administrative and time constraints faced by academia – as we often cannot commit full-time and have processes to follow to conduct our research that may delay anticipated outcomes. Getting extra funding to support the projects, adhering to ethics, procedures and methodologies, and finally conducting research (especially without funding) to get the answers sought, all takes time.

In this session, we have the pleasure to host several of our partner charities and 3rd sector organisations to discuss their experience and lessons learnt from working and collaborating with academics. We will discuss advantages of working together and what could be achieved that otherwise maybe wouldn't have been.

Questions to be discussed:

- What does your charity do/your work involved?
- Why and how have you worked with academics together?
- What were the advantages of working with academics?
- What makes university-charity collaboration successful?
- What are the key factors to foster mutual trust and understanding to positively influence the collaborative partnership?
- What has been gained by working together?
- What are the barriers and issues of working with academia?
- How could these be overcome?

We anticipate that this informal exchange of ideas will:

- Facilitate the understanding of the distinct perspectives on university-charity partnerships
- Offer advice to researchers at universities on how to build bridges, overcome constraints and maintain healthy and mutually beneficial relationships;
- Stimulate new approaches within such collaborations;



- Highlight the critical advantages and consequences of such collaborations to the applied field.
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8. WORKSHOPS

Impact!

Grace Harvey, Nottingham Trent University, UK

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Essentially, impact is the provable difference research makes in the real world. Pathways to impact can be as vast and varied as the areas in which impact occurring from research can have a change, benefit, or effect in society and the economy. There is no ‘one size fits all’ approach to impact, but instead enables researchers from different disciplines and specialisms to engage with discussions of impact over different time scales – in some instances impact occurs quickly, and in others occurs over longer periods of time. In all contexts, impact reflects the effective mobilisation of research into the non-academic world. This session will cover a broad introduction to impact including an overview of the different areas in which impact can occur from research. In addition, the session will highlight the importance of planning for impact and will share tips, advice, and resources that can be used to think through and map out impact plans and ambitions.

Dr Grace Harvey is the Impact Development Officer at NTU Psychology. Before joining the psychology department, Grace worked in the Centre for Student and Community Engagement at NTU and has a long standing commitment to ensuring that research has demonstrable effects on society outside of Higher Education. She was awarded her PhD in 2019 and has published research on late-eighteenth century ideas of family and friendship.

Bayesian models of perception

Darren Rhodes, Nottingham Trent University, UK

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In the last 20 years or so, there has been an explosion of work and interest in Bayesian models of perception. But what are Bayesian models? And why are they interesting? These models are elegant descriptions of how an organism might perceive or make decisions about the world. The brain, is locked inside a bony skull, and therefore has to create a controlled hallucination about the world around it, in order to effectively act and survive. The central tenet of these models, is that perception and action (and subsequent decisions) are not just based on current sensory information, but also prior knowledge about the world. Dr Darren Rhodes will demonstrate the application Bayesian models in the realm of timing and time perception, and show how they can capture behavioural data in a series of experiments and situations.

Darren teaches Research Methods and Statistics at Nottingham Trent University. A substantial amount of his work focuses on application of Bayesian approaches to perception and action. His main research area is in timing and time perception. Darren is also the lead for Open Research at NTU.



The new Doctoral program in Emotion Psychology – Big old questions and fresh new approaches

Authors: Augusta Gaspar, Cátia Reis, Francisco Esteves, Patrícia Oliveira-Silva

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Abstract: In this Symposium, we will briefly introduce the new Doctoral program in Emotion Psychology at Universidade Catolica in Lisbon (<https://fch.lisboa.ucp.pt/doutoramentos/programas/phd-psychology-emotion-and-wellbeing>), which is altogether new in Portugal and in the European landscape of Ph.D. programs. It is indeed the first of its kind. This gives us the opportunity to claim the study of Emotion as one of the most relevant areas across domains in Psychology and across scientific disciplines and to briefly show how knowledge in this area contributes to Psychologists working in a wide array of contexts. The program timely meets a great interest in emotion that has been building up over the last 30 years, along with scientific breakthrough research and exponential growth in scientific publications. We will briefly overview three “hot topics” in emotion Psychology that bring fresh data and new methods – Emotion and Facial Expression, Empathy and, the relation between Emotion Regulation and Sleep.



CONTACT LIST

Human Neurobehavioural Laboratory
<http://www.fep.porto.ucp.pt/en/HNL>

International Affect, Personality and Embodied Brain (APE) research network
<https://apenetwork.wordpress.com/>

NTU APE research group
<https://www.ntu.ac.uk/research/groups-and-centres/groups/affect,-personality-and-the-embodied-brain-ape>