Brain activity linked to the filtering of visual information under uncertain conditions

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The aim of this investigation was to assess brain activity associated with patterns of "bias" in decision-making under conditions of uncertainty. The project employed QASA, a model developed by the investigators, to track both knowledge and bias (i.e., the tendency to accept or reject information) during performance in two category formation experiments. In one study, associated brain activity was monitored in 12 participants (Ps) using 128-channel EEG (EGI) recording, with Geo-source localisation software (Loreta model) then used to indicate task specific areas of EEG activation. Visual displays were presented using E-prime software. Feedback was given to establish the target concept or category, and after this was acquired, the target category was suddenly changed. Shift in bias after target change was assessed. One study (of 47 participants) involved an "abstract" category (a visual pattern defined by a particular colour and shape, etc., such as "red and square") while the second study involved a simulated military scenario with the target being a flag on a building housing suspected terrorists (e.g., "red flag with black cross") and the task being to correctly identify the suspect flag before "bombing" the building. In all cases, once the correct criterion was reached, the target was changed suddenly. The behavioural data indicate that with the change in category, Ps display either a "positive" shift in bias (i.e., more restrictive or discerning) or a "negative" shift (i.e., more lax or accepting). EEG data for the abstract category task indicate that positive bias is linked to more prefrontal activity (frontal polar or orbitofrontal regions: Brodmann areas 10 and 11 respectively) than is the case for negative bias. The results will be considered in terms of brain systems that filter stimulus–response contingencies and may account for bias patterns. The implications for real-world decision-making under uncertain conditions will be discussed.

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Musical training effects on statistical learning of melodies: An MEG study

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The introduction of specific processes, in which musicians differ from non-musicians, enhances our understanding of experience-driven cortical plasticity. Statistical learning is a valuable process aiming to comprehend the environmental stimuli, by extracting its structure and reliable discriminate the new events that need more processing. However, important aspects of the neural correlates of statistical learning remain unknown. The goal of this study was to assess the effect of musical training in statistical learning of tone sequences using MEG. Specifically, MEG recordings were used to investigate the neural and functional correlates of the pre-attentive ability for detection of deviance, from a statistically learned tone stream. The effect of long-term musical training in this ability was investigated by means of comparing musicians to non-musicians. Results revealed a clear mismatch negativity (MMN) response in both groups (musicians and non-musicians) with equal amplitude. Moreover, both groups revealed a significant augmentation of P50 in the deviants and this response was significantly larger in the group of musicians. The behavioral results indicated that the detection of deviance was not explicitly learned, probably due to the lack of attentional resources. The enhancement of the P50 mismatch response in the group of musicians underlies a process that was trained trough intensive, specialized and long term exercise. These findings provide valuable insights on the functional architecture of statistical learning and the use of this process for the detection of new events that need more processing.

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The Berlin ophthalmologist Bernhard Pollack, a forgotten pioneer in neuroscience

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Based on original research, this presentation portrays the pioneering work of Bernhard Pollack (1865–1928) in neurohistology. Pollack published the first standard reference on staining methods for the nervous system in 1897. That compendium went through three German editions, English, French, Russian and Italian translations. It covered most stains known at the time for neurons, fibers and glia, dissection of the central and peripheral nervous system, macroscopic examination and tissue conservation, embedding and sectioning, changes in brain weight depending on fixative, gender, age, and hemispheric dominance, macroscopic and microscopic photographic technique. Born into a Prussian-Jewish family, Pollack was educated in Berlin, Heidelberg and Leipzig. He completed his doctorate in pathology under the supervision of Carl Weigert. Upon returning to Berlin, Pollack practiced ophthalmology as an attending physician in the Polyclinic of Paul Silex. He also worked at the First Anatomical Institute of Wilhelm Waldeyer, the Neuropsychiatric Institute of Emanuel Mendel, and the Institute for Infectious Diseases of the Nobel laureate Robert Koch, and collaborated with Max Bielschowsky and Edward Flatau. Pollack's research dealt with neuroglia and its stains, neuronal damage from botulinum toxin, the innervation of the mammalian eye, optic nerve and optic disc tumors, ocular filariasis, metastatic choroidal carcinoma, spindle cell sarcoma of the frontal sinus, Sjögren syndrome, tuberculous panophthalmitis, optic nerve damage with mental signs resulting from skull fracture, and musical memory. Pollack served on the editorial board of classic journals of neurology, psychiatry and eye diseases. In 1919 he was appointed Professor of Ophthalmology at Friedrich-Wilhelms-Universität, and became well known beyond continental Europe. Besides an acknowledged medical scholar, Pollack was a world-class pianist, pupil of the composer Moritz Moszkowski. In 1911 Pollack founded the Berlin Doctors Orchestra, who this year celebrate their centennial.

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Christfried Jakob's late views on cortical development, localization and neurophilosophy

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This presentation highlights the groundbreaking work of Christfried Jakob (1866–1956), a German-Argentinian neurobiologist with an extraordinary scope of interests. Considering that the utmost problem of intellectual inquiry converges in cerebral function, Jakob studied the brain from the macroscopic to the microscopic level, functionally and structurally, under the spectra of development and evolution, in normality and in pathology. In crediting Jakob as an 'early neurophilosopher' we are justified by two main facts. First, he was in all likelihood one of the first