

(Doricchi et al., 2010; Dragone et al. 2013; Silveti et al., 2015) che mostrano una forte dominanza dell' emisfero destro, area IFG-MFG, nella reazione di novelty ed una dominanza relativa, area TPJ, per i processi relativi alle funzioni segnalate dalla P3b, con l' emisfero sinistro in grado di svolgere tali funzioni per gli stimoli presentati nell' emisfero destro (Dragone et al. 2013).

Excess Motor Activity in Adult ADHD: Support for Alerting Model and Lifelong Alerting Deficit

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The majority of research on Attention-Deficit/Hyperactivity Disorder (ADHD) has supported the executive control theory of ADHD but due to methodological limitations the findings do not preclude support for theories of impaired alerting and arousal. The present study systematically examined alerting to cued and non-cued stimuli and compared the performance of adults diagnosed with ADHD and controls. It was hypothesized that adults with ADHD have alerting deficits and would show improved performance when they received a warning cue that stimuli would be presented. A secondary aim of the proposed study was to use an Actigraph to objectively measure and compare the amount of gross motor activity expended by adults with ADHD and controls. Prior research has suggested that children with ADHD make more gross motor movements because they are less cortically aroused than controls. However, research also suggests motor over activity typically remits in adult ADHD. It was hypothesized that there would be significant motor movement differences between ADHD individuals and controls during the non-cued trials. The finding of greater motor activity in an adult ADHD population will further support a lifelong alerting deficit in ADHD.

The sample consisted of 60 adults (30 diagnosed ADHD and 30 controls) between the ages of 18-40. For the experimental task participants were instructed to focus on a central fixation point (a 9 mm yellow crosshair) on a gray background screen throughout the experiment. A black dot appeared in one of four positions in peripheral vision (45, 135, 225, and 315, degrees). Participants were asked to report when the black dot in their peripheral vision faded from awareness by pressing a button. The black dot was presented in a stationary, moving, or validity condition. A warning signal, which consisted of an auditory tone (500 Hz sine wave tone) was presented before half of the stationary, moving, and validity stimuli to measure alerting. An Actigraph, worn on the non-dominant ankle, was used to objectively measure physical activity at 30 Hz.

The results indicated that adults with ADHD performed significantly better on trials that included a warning cue and there were no significant differences between control and ADHD group performance on cued trials.

Adults with ADHD exhibited significantly more activity than the control group on non-cued trials. No significant difference in activity level was observed between the groups on cued trials. The findings indicate support for an alerting deficit model of ADHD and suggest that motor over activity is a compensatory mechanism to aid individuals with ADHD to remain alert to stimuli in the external environment.

Relationship between cerebello-cortical connectivity and social behavior in Autism Spectrum Disorders: a resting-state fMRI study

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Autism spectrum disorders (ASDs) are neurodevelopmental disorders characterized by stereotyped pattern of behavior and core deficits in social communication and interaction, mainly including impairment of Theory of Mind (ToM) processes. ToM refers to the ability of attributing mental states to self and other in order to predict and explain complex behaviors. The cortical underconnectivity theory has been proposed as an explanatory model for ASDs suggesting that an abnormal functional connectivity among cortical and subcortical brain areas may be responsible for ASDs' social deficits. Since the cerebellum has also been suggested to be part of the distributed neural circuits that may be dysfunctional in ASDs, in the present study, we investigated the Resting-State functional connectivity (FC) between the cerebellar Dentate Nucleus (DN), the main cerebellar output channel, and the cerebro-cortical targets, in order to assess Dentate-Cerebral FC changes that might account for social deficits in ASDs patients. Eight adults with ASDs [mean(SD) age=23.7 (6.3); M/F=4/4] were included in the study and 36 typically developing adults (TDA) [mean(SD) age = 26.5 (3.83); M/F = 18/18] were recruited as control group. All participants underwent a 3.0T MRI acquisition protocol, including T1 and BOLD resting-state Functional Magnetic Resonance Imaging (rs-fMRI) scans. The left and right DN masks were separately extracted according to the spatially unbiased atlas template of the cerebellum and brainstem and resliced in EPI standard space. The mean time course of the voxels within each ROI was used as a regressor in a 1st level SPM analysis while at second level, a two-sample t-test model was used to

explore differences in connectivity between patients and controls in each ROI. In order to explore the relationship between DN FC and social cognition processes, the patients were administered with an extensive social cognition battery investigating different aspects of social behavior. When looking at the FC between the DN and the cerebral cortex, differences in FC were evidenced in patients compared to TDA. Specifically, significant FC decrease was found between the left DN and cerebral regions of the social brain networks, such as the Default Mode network, strongly implicated in ASDs. Interestingly, a positive correlation was found between areas of altered FC and social cognition scores in ASDs patients. The present data provide the first evidence that DN FC is altered in ASDs patients. We suggest that the cerebellum may contribute to social perception in ASDs via interaction with key cortical social brain regions, such as Default Mode structures. Our conclusion is that the dysfunction reported within the cerebral-cortical network typically related to social features of ASDs may be, at least partially, related to an impaired cerebellar modulation that prevent the cerebral cortex from receiving those cerebellar feedback inputs necessary for a successful adaptive social behavior.

Activation of motion area V5 is sufficient for discrimination of the orientation of moving stimuli but not for their conscious perception

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Hemianopsia is a visual field defect characterized by decreased vision or blindness in the contralateral visual field of both eyes following a unilateral lesion along the post-chiasmatic visual pathway. Despite this loss of vision, some unconscious visual abilities ("blindsight") could be present in the blind field. The probability of finding this phenomenon can be increased by presenting moving stimuli in the blind field as those stimuli can activate subcortical pathways that convey visual information to extrastriate visual areas (e.g. the motion area V5), bypassing the primary visual cortex. Therefore, the aim of this project was to assess the role of area V5 in yielding conscious or unconscious perception of moving visual stimuli. To do that we tested one hemianopic patient with a right lower quadrantanopia, in behavioral experiments as well as in a 3T-fMRI session including Retinotopic Mapping (polar angle), V5 Localizer and DTI (performed to compare the structural connectivity and the integrity of white matter fibers, eg. optic radiation). We assessed fMRI activation of V5 by contrasting full field moving random dots with full field static random dots to evaluate cortical activation due to the pure moving condition.

We found that this patient showed activation of extrastriate visual areas including V5 when presenting moving visual stimuli, despite no activation of dorsal V1 when presenting the stimulus in the blind quadrant. Interestingly, he performed above chance, albeit unconsciously, only in an orientation discrimination task with moving but not static stimuli presented in the blind area. In conclusion, this preliminary result in a single case provides evidence that in the absence of V1 the presence of V5 activation is necessary for above-chance performance with moving stimuli but is not sufficient for perceptual awareness. This has relevance for understanding the neural bases of perceptual awareness.

Family history of dementia impairs memory-guided attention in middle-aged individuals

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Long-term memory combined with the current task goals prepares neural activity guiding our perception. As a result, spatial attention is tuned to expect events occurring in the environment according to the memory trace, from the early stages of visual perception (Stokes, Atherton, Patai, & Nobre, 2012; Summerfield, Lepsien, Gitelman, Mesulam, & Nobre, 2006; Summerfield, Rao, Garside, & Nobre, 2011). In our previous studies we have shown that the identification of a target is enhanced when it appears in a previous learnt location within repeated contextual configurations, optimizing perception for goal-directed behaviour (Summerfield 2010; 2011). This effect is consistent in young people, but there is no evidence for a deficit of the ability to benefit from learned contextual associations in middle-aged people at risk for developing dementia. Memory impairments represent the key feature of dementia, a neurodegenerative disease affecting about 10% of the ageing worldwide population (Subramaniam et al., 2015). Although its nature is still unclear, a number of possible risk factors have been identified (Knopman, Mosley, Catellier, & Coker, 2009). Pure genetic aspects, such as the possession of the Apolipoprotein ε4 genotype (APOE ε4), and more composite factors, such as having a positive family history for dementia may increase the odds for developing this disease (Small, Rosnick, Fratiglioni, & Bäckman, 2004; Wisdom, Callahan, & Hawkins, 2011; Donix, Small, & Bookheimer, 2012). One of the main challenges for neuroscientists is to identify early cognitive markers of dementia before its plain clinical manifestation. The pure genetic combined with gene-environment interaction risk factors may represent the possible hallmark for earlier intervention