Since January 2020 Elsevier has created a COVID-19 resource centre with free information in English and Mandarin on the novel coronavirus COVID-19. The COVID-19 resource centre is hosted on Elsevier Connect, the company's public news and information website.

how saccades and cognitive deficits affect reading in cerebellar tumor survivors.

Methods: Fifty four children who survived posterior fossa tumors and fifty five age-matched healthy children (8-17 y.o.) participated in the study. Study design consisted of reading seven texts (36-45 words) extracted from Russian language textbook for schoolchildren. The eye movements were recorded every 1/60 s monocularly with an Arrington eye tracking system. We analyzed the following measures (average for 7 texts): average fixation duration; number of fixations per word; prosaccadic amplitude; percentage of saccadic regressions; total reading time for each text. Also, we performed Rapid Visual Information Processing (RVP), Spatial Working Memory (SWM), Spatial Span (SSP), Spatial Recognition Memory (SRM) from Cambridge Neuropsychological Test Automated Battery (CANTAB). Mann-Whitney U-test was performed to compare the cancer survivors and healthy controls, and Spearman's rank correlation was performed to investigate the relations among the measures.

Results: We revealed pronounced reading impairments in patients: longer reading time ($U = 405$, $p = 0.002$), more fixations ($U=446.5$, $p=0.008$), longer fixation durations ($U=471$, $p=0.018$), as well as a larger number of fixations per word ($U= 393$, $p = 0.001$), as compared to healthy children. The patients also had a significantly higher percentage of saccadic regressions ($U = 224$, $p < 0.001$). Patients had larger latency in RVP ($U=541$, $p=0.002$) and SSP span length ($U=650$, $p=0.05$) than the control group. Patients had more errors in SWM ($U=516.5$, $p=0.001$) and they had a less effective strategy ($U=585.5$, $p=0.01$). Productivity in SRM test was less in patient group ($U=649.5$, $p=0.04$) and latency was higher ($U=652$, $p=0.025$), as compared to healthy children. We also found significant correlations between RVP latency and slow reading time ($r=0.539$, $p<0.05$), as well as more fixations ($r=0.505$, $p<0.05$) and prosaccades ($r=-613$, $p<0.05$) that mark patients' difficulties in reading. Also, there have been found significant correlations between SWM and reading time ($r=-0.428$, $p<0.05$), between SRM and reading time ($r=-0.399$, $p<0.05$), total fixations ($r=-0.438$, $p<0.05$), and percentage of saccadic regressions ($r=-0.494$, $p<0.05$).

Conclusions: Our findings reveal pronounced reading deficits in cerebellar tumor survivors. These results emphasize the necessity to consider them when designing the cognitive rehabilitation protocols for cerebellar tumor survivors.

doi:10.1016/j.ijpsycho.2023.05.340

Eye tracking pilot study of approximate number sense

A. Kotyusov[a], A. Kosachenko[a], S. Mironets[b], Y. Kuzmina[c]
[a]*Ural Federal University, Department of Psychology, Ekaterinburg, Russian Federation*
[b]*Dmitry Rogachev National Medical Research Center Of Pediatric Hematology, Oncology, and Immunology, Neurocognitive Laboratory, Moscow, Russian Federation*
[c]*National Research University Higher School of Economics, Moscow, Russian Federation*

Introduction: The ability to perceive and process "quantitative" information, such as size or distance, is a prerequisite for successful human interaction with the environment. The aim of the study is to assess differences in the perception and processing of quantitative visual information.

Methods: This pilot study was conducted using data obtained from eleven subjects (10 females, age: 21 ± 0.2). Participants had to determine which colored array, blue or yellow, had more circles in it.

The experiment consisted of two blocks with 256 trials in total. The figures were the same in both blocks, but in the first block half of them were presented for 800 ms, in the second – 1200 ms.

Participants were provided with 8 different types of stimuli with different conditions of access to comparison of visual parameters: complexity for comparison, congruence and presentation format. Parameters of interest were following: number of fixations; total fixation time; average fixation duration; total saccadic amplitude; average saccadic amplitude. Eye movements were recorded with Pupil Labs wearable eye-tracker (Pupil Lab GmBH, Germany) with 120 Hz sampling rate. One-point calibration preceded each recording. For statistical analysis, Wilcoxon signed-rank test was performed in R Studio.

Results: We found statistically significant differences in the number of fixations, the total duration of fixations, the average duration of fixations and the total length of saccades ($p<0.05$), but not the average length of saccades ($p = 0.3125$) for a for a mixed format of presentation for either 800 or 1200 ms. Significant differences were found for the number of fixations, the total duration of fixations, the average duration of fixations and the total length of saccades ($p<0.05$), but not the average length of saccades ($p = 0.3125$) for a separate arrangement of stimuli.

Comparison of eye movements obtained for mixed and separate presentation of stimuli of the same duration showed the following results: for stimuli presented for 1200 ms, significant differences were found for the average duration of fixations, the total length of saccades and the average length of saccades (all $p=0.031$) but not for the number of fixations ($p=0.063$) and the total duration of fixations ($p=0.063$).

Conclusions: Understanding of mechanisms will enable us to identify factors of individual differences in perception of space and numerosity.

This study was supported by a grant (22-18-00500) from the Russian Science Foundation.

doi:10.1016/j.ijpsycho.2023.05.341

The determinants of covid-induced brain disorders after covid-19 infection

S. Yasir[a], Y. Jin[a], F.A. Razzaq[a], R. Rodriguez-Labrada[c], P.A. Valdes-Sosa[a], M.L. Bringas-Vega[a], A. Caballero[b]
[a]*The Clinical Hospital of Chengdu Brain Science Institute, School of Life Science and Technology, University of Electronic Science and Technology of China, Chengdu, China*
[b]*Servicio de Psiquiatria Galigarcia, Hospital Nacional, La Habana, Cuba*
[c]*The Cuban Neuroscience Center, La Habana, Cuba*

Introduction: We study the potential causal relations between determinants of COVID-Induced Brain Disorders, analyzing gender, pre-health conditions (PHC), severity, and post-COVID long-term neuropsychiatric symptoms (post-COVID NPS).

Methods: A cross-sectional three-month's post-COVID study of 178 Cuban subjects (75 males & 103 females) aged 20-85 years, where 91 patients had COVID (PCR positive) and 87 patients with no COVID (PCR negative) coded as '0'. Patients with COVID had distinct degrees of severity. There were 44 asymptomatic patients coded as '1', 37 mild symptomatic patients coded as '2', and 10 severe symptomatic patients coded as '3'.

We obtained a latent variable for PHC and pre-COVID NPS by Item Response Theory (IRT). Factor analysis was done for post-COVID NPS to explain the largest common variance of all variables. Finally, we explored the relations of factors that affect COVID-19 severity and post-COVID NPS with Structural Equation Modeling (SEM). The whole analysis was performed using R packages.

Results: All items loaded well onto the latent factors produced by IRT analysis. For PHC, the highest loadings were for chronic obstructive pulmonary diseases, renal diseases, and immunodepression, with 47% of the variance. For pre-COVID NPS, psychosis and neurological disorders loaded highly with 54% of the variance, but the pre-COVID NPS had very few subjects with positive results, which may explain the lack of significant effects on post-COVID NPS. For post-COVID NPS, the highest loadings were for pain, cardiovascular diseases, and fatigue, explaining 63% of the variance.

The output of the SEM model has significant values. The Comparative Fit Index (CFI) is 0.983, and SRMR is 0.025, which shows that our model is a good fit with maximum loadings for latent variables. We got four significant paths and p-values, respectively, for age and severity $p=0.043$, for severity and NPS $p<0.001$, for gender and NPS $p=0.005$, and for PHC and severity $p=0.001$. This result shows that age and PHC affect the severity of COVID-19 patients. At the same time, only gender and severity significantly affect post-COVID NPS. So, people with a history of any prior health condition will have a substantial risk of getting severe COVID, eventually resulting in more neuropsychiatric symptoms.

Conclusion: The study showed that the COVID-19 severity affects long-term neuropsychiatric symptoms in COVID-19 patients.

This study was funded by the National Nature Science Foundation of China NSFC grant No. 61871105 and CNS Program of UESTC (No. Y0301902610100201).

doi:10.1016/j.ijpsycho.2023.05.342

Ventral-temporal\parietal neural circuitry for holistic face- and object- perception: evidence from a case of prosopagnosia

M.A. Bobes Leon[a], B. de Gelder[b], A. Castro Laguardia[a], D. Gongora[b], Y. Santos[a], M. Poyo Solanas[a], M. Valdes Sosa[a]
[a]*Cuban Neuroscience Center, Havana, Cuba*
[b]*Maastricht University, Maastricht, Netherlands*

Introduction: Face recognition depends on holistic processing of faces, which is clearly disrupted by brain dysfunction in many cases of developmental prosopagnosia (DP) and some cases of acquired prosopagnosia (AP). However, the impaired cortical circuitry is difficult to pinpoint because lesions in DP are diffuse, and whereas in AP they are more localized they are also variable in extent and have been insufficiently characterized. Here we describe EP, a case of AP, with a deficit in holistic processing and overreliance on local details for both faces and non-face object recognition. We asked three questions related to this case: 1) Do the lesions encroach on face-specific cortical areas or on those carrying information about visual object global/local levels in VTC? 2) Are VTC face- and scene- specific areas functionally preserved? 3) Do the lesions interrupt connections between nodes in the face processing network?

Methods: To determine if EP's lesions encroached on face-specific cortical areas, we performed voxel-based morphometry (VBM). The anomalous regions identified in the volume were then projected to the cortical surface and compared with reported locations of category-selective regions in recently released population probabilistic maps.

Searching for converging evidence that EP's lesions did not implicate face-specific cortex, we measured BOLD activation during a face and house localizer paradigms. To characterize white matter damage in EP we analyzed the overlap of the lesion estimated with VBM with the territory occupied by large white matter tracts as estimated in tractography-based population maps (Yeh et al., 2019). We also estimated the integrity of long fiber tracts in EP by using tractography, and compared his results from typical controls, as well as the possible effects on potential cortical targets of these tracts.

Results: Neuroimaging showed that EP presents a small cortical lesion in the right hemisphere that spares structure and function of the occipital and fusiform face-selective cortical areas. Instead, the lesion disturbs the structure and function of ventromedial temporal areas (V8, VMVC) considered to be scene-selective, and that were recently implicated also in processing information about the global/local levels of compound objects. EP also presented damage to white matter connecting these areas with the parietal lobe, an area implicated in simultanagnosia (a severe failure to integrate local elements into a visual whole).

Conclusions: These results suggest that a circuit involving the ventromedial temporal cortex, parietal lobe, and connecting fibres enables holistic perception for faces and non-face visual objects.

doi:10.1016/j.ijpsycho.2023.05.343

Physical exercise influences attentional orientation towards emotional stimuli

N. Mansouri[a], A. Coutté[a], V. Dru[a], D. Bayle[a]
[a]*LICAE lab, UFR STAPS, Université Paris Nanterre, Nanterre, France*

Attention is preferentially directed towards particular stimuli in the environment, such as information related to potential danger. This involuntary preferential allocation of attention would allow for an adapted response. Studies have shown that patients suffering from chronic pain have an enhanced attentional bias towards pain related stimuli (word, picture or face). Similarly, this bias is also demonstrated in participants suffering from acute pain or receiving experimentally induced pain.

Since intense physical effort can be perceived as painful, we were interested in physical effort as a potential source of attentional bias. Does physical effort influence attentional orientation towards emotional stimuli, and in particular towards stimuli representing pain, as it does for chronic or induced pain?

In order to provide a more accurate measure of attention, we recorded eye movements while participants ($N = 37$) performed a dot-probe task. The latter consisted of the simultaneous presentation of two facial expressions (pain-neutral or neutral-neutral), one on the left and the other on the right of the screen, for 700 ms, followed by the appearance of a target at the location of one of the two stimuli. Participants were asked to freely move the eyes during the presentation of stimuli, and to manually respond as quickly as possible by pressing the mouse button corresponding to the target location. Participants first completed the task at rest, then they had to complete the task by performing the wall sit test, then once more at rest.

Eye-tracking data showed that the percentage of first fixations was higher for pain faces at rest (52% for pain vs 48% for neutral) and higher for neutral faces during effort (52% for neutral vs 48% for pain). Fixation time was higher for pain faces at rest (202ms vs 188ms for neutral) and higher for neutral face during effort (197ms vs 184ms for pain). Overall, physical effort leads to avoidance of pain related stimuli, contrary to pathological or experimental pain.

These findings lead to new issues. Is it an avoidance of pain faces or an attraction to neutral faces? If there had been happy faces, would there have been an attraction to them?

Since these attentional biases are complex phenomena depending on many factors, future studies are needed to characterize more precisely the extent to which physical effort could influence attentional orientation. We are currently conducting new studies to answer these new questions.

doi:10.1016/j.ijpsycho.2023.05.344