انجمن علوم و فن آوری های شناختی ایران
Iranian Society for Cognitive Science & Technology

Shahid Beheshti University

IHBM 2019

6th Iranian Human Brain Mapping Congress

9-11 October 2019

۱۷-۱۹ مهر ماه ۱۳۹۸

مرکز همایش های بین المللی ابوریحان-دانشگاه شهید بهشتی

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Iranian Human
Brain Mapping Congress

ihbm_2019

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Wellcome Message

Mojtaba Zarei
MD, PhD, FRCP (UK)

Dear colleagues,

It is a pleasure to welcome you to the 6th Iranian Human Brain Mapping Congress held in Shahid Beheshti University. Shahid Beheshti is the fastest growing university in Iran with emphasis on human resources and new technologies as well as one of the major centers and pioneers of brain mapping science in Iran. Interest in Brain Mapping has grown considerably since we started this annual meetings. Given the interdisciplinary nature of brain mapping science, each year we welcome scientists with different backgrounds including neuroscience, medical sciences, bioengineering, mathematics, biophysics, psychology, computer science, etc. It has become the highlight of our activity when students and senior researchers, clinicians and scientists, policy makers and policy users are all getting together to discuss new findings and advanced technologies in the field of brain sciences. Our main endeavour is for the younger generation to get inspired by those who dedicated their lives to the advancement of science in order to alleviate human suffering. This year we continue our slogan:"Brain Mapping : From Molecule to Medicine".

We are aspiring to provide a medium for both domestic and world-renowned scientists to discuss and collaborate in order to obtain a better understanding of the nervous system and the related diseases. If brain mapping has taught us only one thing, that would be the importance of networks for optimal functioning. For this reason and many more, we welcome international scientific collaboration. Iran has so much to offer in neuroscience in general, and brain mapping in particular. There is a wealth of talent and energy among our educated youth which should be put into good causes with appropriate mentorship and guidance. In recent years, many high quality clinical researches have been published in prestigious medical journals because of access to wide range of patients and their keen participation in research. We hope that this can be extended into clinical neuroscience as well.

I encourage you to engage with our participants to develop your own line of contact and to establish new networks to enhance your research. If there is anything that I can do to help, do not hesitate to contact me.

I hope you enjoy the program and the social interaction.

Mojtaba Zarei
President of IHBM 2019

Wednesday (9th October)	Thursday (10th October)	Friday (11st October)
7:30-8:30		
Registration		
Welcome	-	-
8:30-9:00		
Welcome speeches		
Chairs: Zilles & Zarei	**Chairs: Genon & Tahmasian**	**Chairs: Schneider & Salamat**
9:00-10:00	**9:00-10:00**	**9:00-10:00**
Karl Zilles (Jülich Research Center): Neural systems revealed by transmitter receptor expression	***Simon B. Eickhoff (University of Dusseldorf/Jülich Research Center):*** Machine-learning for neuroimaging biomakers	***Horst Schneider (Bee Medic GmbH):*** Therapeutic effects of EEG-based Infra-Low-Frequency (ILF-) neurofeedback training on children and adolescents with attention deficit (hyperkinetic) disorder
10:00-10:30	**10:00-10:30**	**10:00-10:30**
Alireza Ghasempour (Shahid Beheshti University): Imaging mass spectrometry and brain mapping	***Sarah Genon (University of Dusseldorf/Jülich Research Center):*** Linking brain to behaviour, a bottom-up approach	***Dominik Güntensperger (University of Zurich):*** Evaluation of a sLORETA neurofeedback protocol for treating chronic tinnitus
10:30-11:00	**10:30-11:00**	**10:30-11:00**
Manoucher S Vafaee/Sasan Andalib (University of South Denmark): Neurobiology of healthy aging studied by PET/MR: A precursor study for Alzheimer's disease/diabetes mellitus type 2 link	***Shahrzad Kharabian-Masoule (University of Dusseldorf/Jülich Research Center):*** Factors influencing replicability of studies reporting associations between brain structure and psychological variables	***Ali Khatibi (University of Birmingham):*** Functional magnetic resonance imaging of spinal cord in human: past, present and future
11:00-11:30	***Break-Time & Poster Presentations***	
Chairs: Afzali & Salehi	**Panel: Application of brain and spinal cord mapping in neurosurgery**	**Chairs: Nejati & Ghazizadeh**
11:30-12:00	**11:30-12:00**	**11:30-12:00**
Maryam Afzali Deligani (University of Cardiff): Comparison of different tensor encoding combinations in microstructural parameter estimation	***Guive Sharifi, Tohid Emami Meybodi Arsalan Amin, Ali Jafari, Ali Arami, HasanAli Zakeri Said Orei Yazdani, Amin Jahanbakhshi, Mohammad Hallaj***	***Ali Ghazizadeh (Institute for Research in Fundamental Sciences):*** Common and dissociable brain networks for perceptual and value-based memories
12:00-12:30		**12:00-12:30**
Mehraveh Salehi (Yale University): Individualized and state-specific human brain parcellation		***Narges Radman (Institute for Research in Fundamental Sciences):*** The interaction between cognitive load and cognitive resilience in bilingual individuals
12:30-13:00		**12:30-13:00**
Javad Hami (Jülich Research Center): Multimodal mapping of the auditory cortex in macaque monkey		***Vahid Nejati (Shahid Beheshti University):*** The neural correlates of emotion-cognition interaction: evidence from transcranial direct current stimulation
13:00-14:00	***Lunch***	

Chairs: Khosrowabadi & Faghihroohi

14:00-14:20

Amir Hosein Hadian-Rasanan (Shahid Beheshti University):
A tensor approach for diagnosing autism spectrum disorder using fMRI data

14:20-14:40

Amir Ebneabbasi (Shahid Beheshti University): Resting state local and global alternations of emotion processing and emotion regulation networks in major depressive disorder

14:40-15:00

Morteza Mohammadzadeh (Tarbiat Modares University): Replicated Gibbs point process to combine functional brain alterations patterns in acute sleep deprivation using coordinate based meta-analysis

15:00-15:20

Amin Saberi (Shahid Beheshti University): The neural basis of late life depression: an ALE meta-analysis

15:20-15:40

Esmaeil Mohammadi (Tehran University of Medical Sciences): Does sleep-disordered breathing accelerate the ageing process of human brain?

15:40-16:00

Nasrin Mortazavi (Shahid Beheshti University): The association between alexithymia and functional connectivity of dorsal anterior cingulate cortex

Chairs: Khatibi & Kharabian-Masoule

14:00-14:30

Masoud Tahmasian (Shahid Beheshti University): All you need is enough sleep

14:30-15:00

Saman Noorzadeh (Shahid Beheshti University): 3D interface for p300-speller brain-computer interface

15:00-15:30

Shahrooz Faghihroohi (Shahid Beheshti University):
Brain MR Image reconstruction and segmentation using compressive sensing and deep learning

15:30-16:00

Somayeh Maleki-Balajoo (University of Dusseldorf/Jülich Research Center):
Metabolic connectivity based parcellation of the Hippocampus in healthy older adults

Chairs: Noorzadeh & Radman

14:00-14:20

Ali Mohazzab Pour (AmirKabir University of technology): Different cortical source activation patterns in children with ADHD using boundary element method

14:20-14:40

Soudeh Seddighzadeh (Shahid Beheshti University): Neuro-Temporal Signature of Low-Level Features in Human Object Vision: an MEG Study

14:40-15:00

Sara Obeydinia (Shahid Beheshti University): Regional and whole-brain assessment of fractional anisotropy on Parkinson'S disease DTI-datasets

15:00-15:20

Mostafa Mahdipour (Shahid Beheshti University): Surface shape differences in subcortical areas of brain may light up our insight about insomnia

15:20-15:40

Narjes Soltani (Shahid Beheshti University): Pre-stimulus effect on face and non-face processing: a case study in individuals with autism using MEG

15:40-16:00

Soheila Veisi (Tarbiat Modares University): Neural correlates of implicit and explicit learning of foreign language syntax: An fMRI study

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16:00-16:30 ***Break-Time & Poster Presentations***

Panel: Brain mapping techniques

16:30-18:00

Karl Zilles,
Sarah Genon,
Ali Khatibi,
Maryam Afzali Deligani,
Shahrzad Kharabian-Masoule,
Mehraveh Salehi,
Javad Hami,
Horst Schneider,
Dominik Güntensperger,
Mojtaba Zarei,
Masoud Tahmasian

Symposium: Women in Neuroscience

16:30-18:00

Sarah Genon (Chair),
Saman Noorzadeh,
Shahrzad Kharabian-Masoule,
Maryam Afzali Deligani,
Khatere Borhani,
Mehraveh Salehi,
Narges Radman,
Somayeh Maleki-Balajoo

Iranian Society for Cognitive Science and Technology (Annual General Assembly)

Program Organizers

Program Chair

Mojtaba Zarei

MD, PhD, FRCP (UK)

Professor, Institute of Medical Science and Technology, Shahid Beheshti University, Iran

Scientific Chair

Masoud Tahmasian

MD, PhD

Assistant Professor, Institute of Medical Science and Technology, Shahid Beheshti University, Iran

Executive Chair

Behrouz Salamat

PhD

Assistant Professor, Institute of Medical Science and Technology, Shahid Beheshti University, Iran

Scientific Committee

Afzali Deligani, Maryam	Brain Research Imaging Center, Cardiff University, UK
Aghamiri, Seyyed Mahmoud	Faculty of Nuclear Engineering, Shahid Beheshti University, Iran
Alavi, Abbas	Department of Radiology, Perelman School of Medicine, University of Pennsylvania, USA
Amin, Arsalan	Department of Neurosurgery, Zanjan University of Medical Science, Iran
Andalib, Sasan	Department of Neurosurgery & Neuroscience Research Center, School of Medicine, Guilan University of Medical Sciences, Iran
Arami, Ali	Neurology and Neurophysiology, Milad General Hospital, Iran
Bigdeli, Mohammadreza	Faculty of Biological Science, Shahid Beheshti University, Iran
Borhani, Khatereh	Institute of Cognitive and Brain Sciences, Shahid Beheshti University, Iran
Eickhoff, Simon B.	Institute of Neuroscience and Medicine (INM-7: Brain and Behaviour), Research Centre Jülich, Germany & Institute of Systems Neuroscience, Heinrich Heine University Düsseldorf, Germany
Emami Meybodi, Tohid	Clinician Scientist Candidate in Neurosurgery and Neuroscience
Faghihroohi, Shahrooz	Institute of Medical Science and Technology, Shahid Beheshti University, Iran
Ganjgahi, Habib	Department of Statistics, University of Warwick and Oxford, England
Genon, Sarah	Institute of Neuroscience and Medicine, Research Centre Jülich, Germany
Ghalei, Mohammad	Institute of Medical Science and Technology, Shahid Beheshti University, Iran
Ghasempour, Alireza	Department of Phytochemistry, Medicinal Plants and Drugs Research Institute, Shahid Beheshti University, Iran
Ghazizadeh, Ali	Department of Electrical engineering, Sharif University of Technology, Iran
Güntensperger, Dominik	Division of Neuropsychology, Department of Psychology, University of Zurich, Switzerland
Hallaj, Mohammad	Department of Neurosurgery, Shahid Beheshti University of Medical Sciences, Iran
Hami, Javad	Institute of Neuroscience and Medicine (INM-1), Research Center Jülich, Germany
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Jahanbakhshi, Amin	Department of Neurosurgery, Iran University of Medical Sciences, Iran
Javaher Haghighi, Sahar	Institute of Medical Science and Technology, Shahid Beheshti University, Iran
Kharabian, Shahrzad	Institute of Neuroscience and Medicine (INM-7), Research Centre Jülich, Germany
Khatibi, Ali	Center of Precision Rehabilitation for Spinal Pain, University of Birmingham, UK
Khazaei, Habibolah	Sleep Disorders Research Center, Kermanshah University of Medical Sciences, Iran
Khosrowabadi, Reza	Institute of Cognitive and Brain Sciences, Shahid Beheshti University, Iran
Latifi, Hamid	Institute of Laser and Plasma Research, Shahid Beheshti University, Iran
Mahdiani, Hamidreza	Computer Science and Engineering Department, Shahid Beheshti University, Iran

Maleki-Balajoo, Somayeh	Institute of Neuroscience and Medicine (INM-7), Research Center Jülich, Germany
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Salamat, Behrouz	Institute of Medical Science and Technology, Shahid Beheshti University, Iran
Salehi, Mehraveh	Department of Electrical Engineering, Yale university, USA
Samea, Fatemeh	Institute of Cognitive and Brain Science, Shahid Beheshti University, Iran
Schneider, Horst	Head Research Systems Division, BEE Medic GmbH, Germany
Sharifi, Guive	Neurosurgeon, School of Medical Science, Shahid Beheshti University of Medical Sciences, Iran
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Tehranchi, Mohammad Mehdi	Institute of Laser and Plasma Research, Shahid Beheshti University, Iran
Vafaee, Manouchehr	Department of Nuclear Medicine And Clinical Physiology, University of Southern Denmark, Denmark
Zakeri, HasanAli	Department of Neurology, Tehran University of Medical Sciences, Iran
Zarei, Mojtaba	Institute of Medical Science and Technology, Shahid Beheshti University, Iran
Zilles, Karl	Institute of Neuroscience and Medicine (INM-1), Research Center Jülich, Germany

Executive Committee

- Afshani, Morteza
- Ahadi, Atefeh
- Ahmadi, Reihaneh
- Akradi, Mohammad
- Ameri Far, Mohammadhosein
- Arab, Zahra
- Bagheri, Sara
- Bali lashak, Mohammadjavad
- Ebadi, Aida
- Emami Meybodi, Tohid
- Esfandiari, Taha
- Eskandari, Safieh
- Faghih Roohi, Shahrooz
- Faghihi, Omid
- Farzaneh Daghigh, Tara
- Habibi, Sahar
- Heydarzadeh, Armin
- Izadi Motlagh, Haniyeh
- Khorasani, Mahzad
- Kiamarz, Pouya
- Mahdipour, Mostafa
- Mashayekh, Nikoo
- Mobarakabadi, Mahdi
- Mohammadi, Ehsan
- Mostafavi, Mehdi
- Muhammadi, Reza
- Nazminia, Mahdi
- Nikbakht, Haniyeh
- Noorzadeh, Saman
- Obeydinia, Sara
- Olfati, Mahnaz
- Pirian, Pouria
- Pourasgari, Reyhaneh
- Pourmohammad, Mohammadtaha
- Qaderi, Fatemeh
- Saeidi, Fatemeh
- Salamat, Behrouz
- Saveh, Fatemeh
- Shahmoradi, Negin
- Sharifi, Hamidreza
- Tahmasian, Masoud
- Taki, Amirali

Speakers *(Ordered Alphabetically)*

Maryam Afzali Deligani
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Amin Jahanbakhshi
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Neurosurgeon

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PhD
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HasanAli Zakeri
MD
Neurologist

Mojtaba Zarei
MD, PhD, FRCP (UK)
Institute of Medical Science and Technology, Shahid Beheshti University, Iran

Karl Zilles
MD, PhD
Institute of Neuroscience and Medicine (INM-1), Research Center Jülich, Germany

Workshops

Tehran Brain Hack

Date	Lecturer	Location
13-14 October 2019	**Ali Khatibi** Center of Precision Rehabilitation for Spinal Pain, University of Birmingham, UK	Institute of Medical Science and Technology Shahid Beheshti University

Spinal Cord Imaging

Date	Lecturer	Location
8 October 2019	**Ali Khatibi** Center of Precision Rehabilitation for Spinal Pain, University of Birmingham, UK	Institute of Medical Science and Technology Shahid Beheshti University

Infra-Low Frequency Neurofeedback

Date	Lecturer	Location
14-18 October 2019	**Horst Schneider** **Frank Schmidt-StaubHorst Schneider** **Thomas Theis** **Behrouz Salamat** **Sepideh Farmani**	Institute of Medical Science and Technology Shahid Beheshti University

انجمن علوم و فنون آوری های شناختی ایران
Iranian Society for Cognitive Science & Technology

Shahid Beheshti University

TEHRAN BRAIN HACK

a two-day event to practice openscience in neuroscience

More information and Registration:

www.humanbrainmapping.ir

6th Iranian Human Brain Mapping Congress

ششمین همایش نقشه برداری مغز ایران

13–14 OCTOBER 2019

۲۱–۲۲ مهرماه ۱۳۹۸

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Senior Research Fellow, CPR Spine
University of Birmingham, UK

انجمن علوم و فن آوری های شناختی ایران
Iranian Society for Cognitive Science & Technology

Shahid Beheshti University

SPINAL CORD IMAGING WORKSHOP

More information and Registration:

www.humanbrainmapping.ir

6th Iranian Human Brain Mapping Congress

ششمین همایش نقشه برداری مغز ایران

8 OCTOBER 2019

۱۶ مهرماه ۱۳۹۸

Shahid Beheshti University
Phone: (021) 29905801
Email: ihbm@sbu.ac.ir

Dr. Ali Khatibi, PhD

Senior Research Fellow, CPR Spine
University of Birmingham, UK

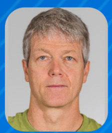
EEGInfo

BEE Medic
Technologies for Mental Health

برای اولین بار در ایران
ارائه مدرک معتبر
بین المللی
EEGInfo

INFRA-LOW FREQUENCY NEUROFEEDBACK WORKSHOP

Scientific Foundations and Clinical Applications
The Newest Method in Neurofeedback Therapy



Dr. Horst Schneider
Specialist in Neurophysiology, Head Research System Division, BEE Medic GmbH, Singen, Germany.

Dr. Frank Schmidt-Staub
Specialist in Psychiatry/Psychotherapy, Consultant Psychiatrist, Neuropsychiatric Practice, Hannover, Germany.

Thomas Theis
Specialist in Occupational Therapy, Certified Neurofeedback Therapist(OMC), REHA Point, Practice for Ergotherapy, Kassel, Germany.

Dr. Behrouz Salamat
Assistant Professor, Specialist in Electrophysiology, Institute of Medical Science and Technology, Shahid Beheshti University, Tehran, Iran.

Sepideh Farmani
Neuroscientist, Institute for Research in Fundamental Sciences
Scientific manager at BasaMed Co., Tehran, Iran.

انجمن علوم و فن آوری های شناختی ایران
Iranian Society for Cognitive Science & Technology

BasaMed Co.

دانشگاه شهید بهشتی
Shahid Beheshti University

در حاشیه ششمین همایش نقشه برداری مغز ایران

6th Iranian Human Brain Mapping Congress
ششمین همایش نقشه برداری مغز ایران

Institute of Medical Science and Technology
Shahid Beheshti University
پژوهشکده علوم و فناوریهای پزشکی
دانشگاه شهید بهشتی

14-18 OCTOBER 2019
۲۲-۲۶ مهرماه ۱۳۹۸

گروه های هدف:
روانپزشکان، روانشناسان، متخصصین مغز و اعصاب، متخصصین گوش و گلو و بینی و سر و گردن،
متخصصین شنوایی شناسی، متخصصین کاردرمانی و متخصصین توانبخشی

More information and Registration:

www.basamed.com

www.humanbrainmapping.ir

انجمن علوم و فن آوری های شناختی ایران
Iranian Society for Cognitive Science & Technology

Shahid Beheshti University

Women in Neuroscience
Symposium

THURSDAY (10TH OCTOBER)
16:30-18:00

Phone: (021) 29905801
Email: ihbm@sbu.ac.ir

در حاشیه ششمین همایش نقشه برداری مغز ایران

6th Iranian Human Brain Mapping Congress

ششمین همایش نقشه برداری مغز ایران

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Shahid Beheshti University

سالن همایش های بین المللی ابوریحان دانشگاه شهید بهشتی

ورود برای علاقمندان آزاد است

انجمن علوم و فن آوری های شناختی ایران

Iranian Society for Cognitive Science & Technology

مجمع عمومی
انجمن علوم و فناوری های شناختی ایران

Annual General Assembly of Society for Cognitive Science

زمان: ۱۹ مهرماه ۱۳۹۸ ساعت ۱۶ تا ۱۸

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در حاشیه ششمین همایش نقشه برداری مغز ایران

6th Iranian Human Brain Mapping Congress

ششمین همایش نقشه برداری مغز ایران

ثبت نام و اطلاعات بیشتر:

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Shahid Beheshti University

سالن همایش های بین المللی ابوریحان دانشگاه شهید بهشتی

Presentations

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103	Mohammad	Shafieifar	The Involvement of Medial Septum in Ghrelin Effects on Morphine Amnesia in Male Wistar Rats	Poster
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112	Somayeh	Maleki Balajoo	Metabolic Connectivity Based Parcellation of the Hippocampus in Healthy Older Adults	Oral
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115	Malihe	Moghadami	The Correlation Between Fixation Frequencies with Alpha Power Spectra in Mild Alzheimer Disease (AD)	Poster
116	Esmaeil	Mohammadi	Does Sleep-Disordered Breathing Accelerate the Ageing Process of Human Brain?	Oral
117	Morteza	Mohammadzadeh	Replicated Gibbs Point Process to Combine Functional Brain Alterations Patterns in Acute Sleep Deprivation Using Coordinate Based Meta-Analysis	Oral
118	Mostafa	Mahdipour	Surface Shape Differences in Subcortical Areas of Brain May Light Up Our Insight About Insomnia Disorder	Oral

Presentations

Number	Name	Last Name	Title	Presentation
119	Ali	Mohazab Pour	Different Cortical Source Activation Patterns in Children with ADHD Using Boundary Element Method	Oral
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ABSTRACTS

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Abstract No. 101

The Effect of Sleep Deprivation on Empathy Using fMRI Study of Hands Experimentations

Zahra Arab[1], Pouria Pirian[1], Fardin Bayrami[1], Elham Latif[1], Niloufar Kamalkhani[1], Mostafa Mahdipour[1], Mojtaba Zarei[1].
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Introduction

Empathy is the Emotional processes that rely on adequate sleep and change with aging. In young adults, sleep deprivation has shown changes in the activation of the amygdala and prefrontal cortex [1]. It was demonstrated that seeing other people in pain gives rise to an emotional response and innervated the anterior insula and anterior midcingulate cortex bilaterally that they're the core of empathy in the brain. In the early studies, activity in anterior insula was found correlated to self-rated trait empathy [2]. We attempt to investigate the effects of sleep deprivation on neural substrates of empathy.

Methods

6 healthy volunteers were assigned two fMRI sessions. The second session was followed by one-month limitation of sleep in the last three hours of sleep. This study was designed to investigate the effect of sleep deprivation on the empathy of people. 'HANDS' Experimentation is one of the best experiments to do this review [3]. In Fixed-effect of the GLM models, the contrasts of pain>no pain, no pain> pain, pain>baseline and no pain>baseline was applied. A paired T-test was used at 2nd level to check the effect of different types of these tasks. In the mixed effect model, the mean of the contrasts in different modes was extracted for individual and session.

Results

In older participants, activity had grown in comparison with young adults during the state of pain>no pain, pain>baseline, and no pain>baseline. Z (gaussianised T/F) statistic images were thresholded non-parametrically using clusters determined by Z>3.1 and a (corrected) cluster significance threshold of P=0.05 (Fig. 1).

Conclusion

Sleep deprivation increases the unpleasant pain seen in the elderly temporal-parietal junction. In second session, no effect of sleep deprivation was found in the core empathy network, and we didn't observe any statistically significant results (corrected p-value <0.05). These results are consistent with the ones reported in [3].

Thresholded activation images 3.1 12.2

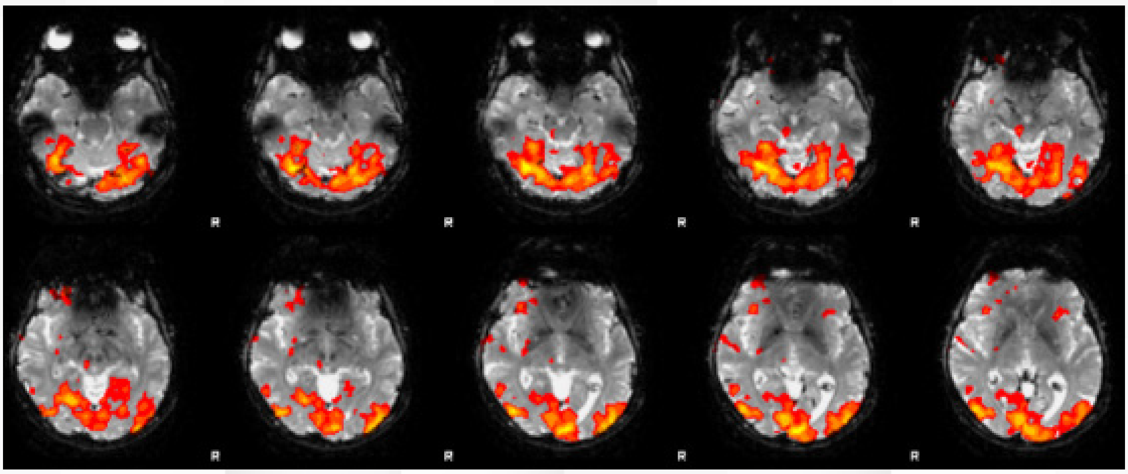

Fig. 1 activated area in elderly case in ses2 in 1st level.

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Abstract No. 102

Comparison of the Efficacy of ILF Neurofeedback and EEG Neurofeedback on Tinnitus: In Terms of Alterations in Anxiety, Depression Intensity and Quality of Life

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Introduction
The purpose of this study was to compare the efficacy of ILF Neurofeedback and EEG Neurofeedback on tinnitus, anxiety and depression intensity and quality of life in patients with tinnitus through a quasi-experimental design of two groups included pre-test and post-test.

Methods
Among the patients with tinnitus referred to Tehran Tinnitus and Hearing Center, 50 persons (22 females and 28 males) who met the inclusion criteria were randomly assigned into two groups (each group consists of 25 person). the tinnitus handicap inventory (THI), the Beck Anxiety inventory (1996) and the Short Form of Quality of Life Scale (1998), were used to measure the research variables. At first, both groups completed the pre-test questionnaires, and participated in a 20-day course of intervention under neurofeedback with a T3 / T4 protocol. After performing the post-test, the data were analyzed by covariance analysis.

Results
Results showed that both treatments were effective and the effect of the two neurofeedback methods on anxiety was not statistically significant, but the effect of ILF Neurofeedback on tinnitus, depression and quality of life was more effective than EEG Neurofeedback.

Conclusion
Accordingly, the neurofeedback exercises used in this study can be used as a complementary and effective treatment to decrease the tinnitus, anxiety and depression intensity and improve the quality of life in patients with tinnitus.

The Involvement of Medial Septum in Ghrelin Effects on Morphine Amnesia in Male Wistar Rats

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Introduction
The medial septum (MS) region plays a key role in learning and memory mechanism. Memory deficit is one of the side effects of morphine. Ghrelin hormone increases memory retention. The aim of the present study is the investigation of the role of medial septum in ghrelin-induced improvement effect on morphine-induced amnesia.

Methods
In this experimental study, 119 male Wistar rats (220-250 gr) were randomly divided into 17 groups including: saline (1 ml/kg), morphine treated groups (0.5, 2/5, 5,7.5 mg/kg), ghrelin treated groups (0, 0/3, 1/5, 3 nmol/µl) plus saline (1 ml/kg) or morphine (7.5 mg/kg) and groups treated with lidocaine (1 µl/rat) or saline (1 µl/rat) + ghrelin (3 nmol/µl) or saline (1 µl/rat) + morphine (7.5 mg/kg). The rats were implanted by two separate cannulas into the MS and lateral ventricle regions. Morphine was injected subcutaneously, ghrelin and lidocaine were locally injected into the ventricle and MS regions, respectively. Data were analyzed using ANOVA (one way and two ways) analysis followed by Tukey's multiple comparison test ($p< 0.05$).

Results
Post-training administration of morphine dose-depndently reduced the step-through latency and induced amnesia ($p< 0.001$). Post-training intra-ventricle administration of ghrelin prior to morphine (7.5 mg/kg) decreased prevented the improving effect of ghrelin on amnesia induced by morphine ($p< 0.001$). Injection of lidocaine intra medial septum prevented the effect of ghrelin on morphine amnesia ($p< 0.001$).

Conclusion
These finding indicate that the MS is involved in mediating the modulatory effect of ghrelin on morphine-induced amnesia.

Abstract No. 104

The Effect of Pentoxifyllin on Zno Nps-Induced Memory Deficits and Hippocampal Ca1 Cells in the Male Wistar Rats

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Introduction
In recent years, the use of nanoparticles has rapidly expanded and oxidized elements such as zinc oxide have entered the environment and human life. Zinc oxide nanoparticles, due to their smaller size can easily enter the brain and have irreparable effects on the memory and learning system, oxidative damage and cell death. Antioxidants are essential to reduce the harmful effects of zinc oxide nanoparticles. Pentoxifyllin has pharmacological effects, including improved blood circulation in small vessels, decreased blood viscosity, anti-inflammatory and anti-proliferative properties. Pentoxifyllin has also gained considerable interest as a reactive oxygen species cleanser have shown, that is the potential for its antioxidant effect. This study has evaluated the effect of zinc oxide nanoparticles and pentoxifyllin on memory retrieval and number of CA1 pyramidal cells in the hippocampus of male Wistar rats.

Methods
The experiment groups consist of control group (saline, 1 ml/kg), group treated with Zno NPs (1/25 mg/kg), group treated with PTX (50 mg/kg) and group treated with Zno NPs (1/25 mg/kg) + PTX (50 mg/kg). Intraperitoneal administration of saline or ZnO NPs was down 30 minutes before training. The animals memory were examined with passive avoidance test and the number of intact neurons in CA1 area in experimental groups were counted. The statistical analysis was performed using SPSS software and one-way analysis of variance and Graph Pad prism software.

Results
Injections of ZnO NPs (1.25 mg/kg) significantly reduced memory retention ($p < 0/001$) and intact neurons in CA1 area ($p < 0/001$) compared to the control group. In the group of ZnO NPs (1.25) + PTX (50 mg/kg), PTX improved the effect of ZnO NPs on memory retrival and intact neurons in CA1 area ($p < 0/01$).

Conclusion
ZnO NPs lead to memory deficiency and reduced hippocampal CA1 neurons. Pentoxifyllin infusion improved memory and increased hippocampal CA1 neurons.

Local and Global Alternations in the Intrinsic Networks of Emotion Processing and Cognitive Emotion Regulation in Major Depressive Disorder

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Introduction
Depression is a psychological disorder with the debilitating social, personal and medical consequences. Neuroscientific evidences implied that the main depression symptoms – depressed mood and anhedonia – is associated with the abnormality in the emotion processing and the cognitive emotion regulation brain networks. The current study aimed at (1) comparing the local (ALFF) and global (FC) alternations of emotion processing (visual, auditory, attention, evaluation and response) and cognitive emotion regulation networks (evaluation, initiation and execution) in MDDs and HCs, (2) investigating the correlation of depression severity with the ALFF and FC of emotion processing and cognitive emotion regulation networks.

Methods
In this study, 37 HCs and 27 MDDs were selected through convenient sampling and underwent resting-state fMRI scan. The GLM used to compare the ALFF and FC of emotion processing and regulation in MDDs and HCs, and the Pierson correlation used to investigate the relationship of depression severity with the ALFF and FC of emotion processing and regulation.

Results
Results showed the differences of the emotion processing (ALLF of response and FC of visual, auditory, attention) and the cognitive emotion regulation networks (ALFF of initiation and FC of appraisal, initiation and execution) in MDDs and HCs, and the correlation of depression severity with the emotion processing (FC of attention) and the cognitive emotion regulation networks (FC of appraisal, initiation and execution).

Conclusion
The current study expands the biological etiology of MDD, and showed the prominent role of cognitive control in the abnormalities of emotion processing and cognitive emotion regulation.

Abstract No. 106

Comparing the Activity of Different Regions of the Brain During Overt and Covert Verb Generation, Word Repetition, and Finger, Foot, and Lip Movement

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Introduction
In this study we compared the activity of the brain during covert verb generation (CV) vs. overt verb generation (OV), overt word repetition (OW) vs. OV, and OW vs. finger, foot, and lip movement (FFL) to understand the underlying mechanisms of speaking.

Methods
Our dataset was obtained from the OpenfMRI Database [1]. Its accession number is ds000114 [2]. This dataset included T1-weighted structural images and fMRI images of 10 healthy subjects (6 females and 4 males, mean age: 52.5). Images were acquired during 2 sessions with 2-3 days interval. Data was analyzed using FSL software [3] on 3 levels: session level, subject level, and group level. Paired t-test was used to compare the brain activity between different conditions (corrected p-value<0.05).

Results
Anatomical regions were derived using SPM Anatomy Toolbox in MATLAB. Comparing CV vs. OV, results showed that Wernicke's area, secondary somatosensory cortex, and ventral parietal cortex are significantly more active during OV (Figure 1). Comparing OV vs. OW, results showed that intraparietal sulcus is significantly more active during OV. Comparing OW vs. FFL, results showed that superior parietal lobule, ventral parietal cortex, and primary auditory cortex are more active during OW.

Conclusion
Comparing CV vs. OV showed that in the OV condition, Wernicke's area, which is responsible for the comprehension of speech, is more active. This indicates that individuals try to speak more meaningfully when they are speaking out loud and they hear they voice than the time they speak with themselves. Comparing OV vs. OW condition highlights the role of intraparietal sulcus in tracking the number of items stored in memory and choosing one of them. The higher level of activation of ventral parietal cortex in OW condition vs. FFL condition is due the importance of this region in language processing.

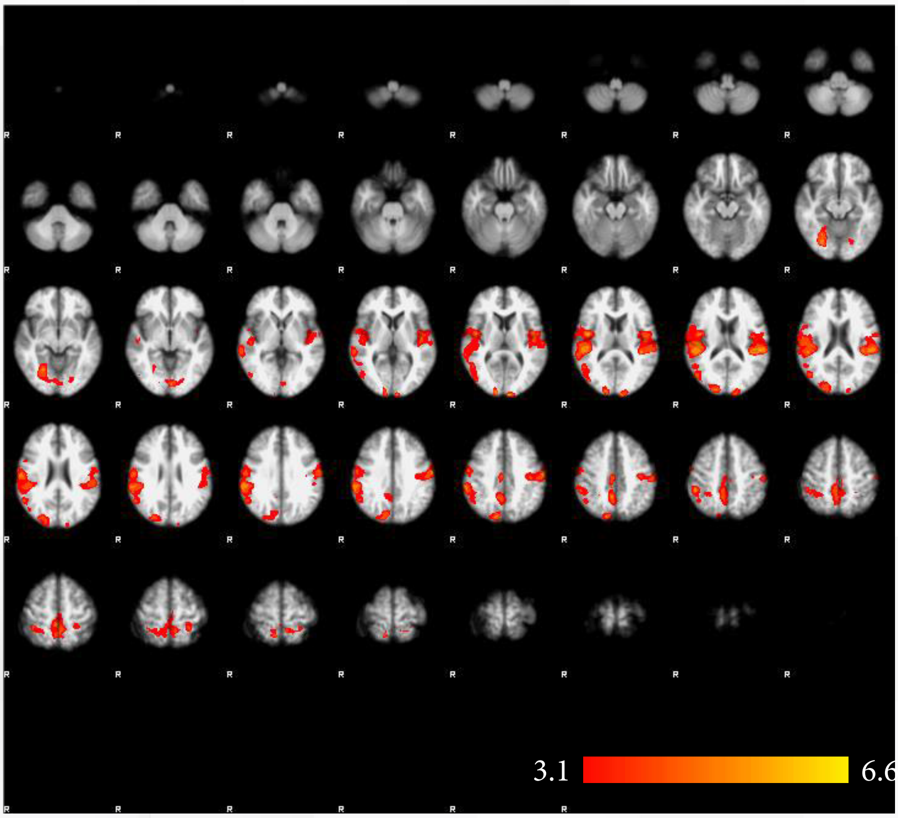

Figure 1- Overt and Covert Contrasts (CV<OV).

Table 1 – Cluster List (CV<OV)

Cluster Index	Voxels	P	-log10(P)	Z-MAX	Z-MAX X (mm)	Z-MAX Y (mm)	Z-MAX Z (mm)	Z-COG X (mm)	Z-COG Y (mm)	Z-COG Z (mm)	COPE-MAX	COPE-MAX X (mm)	COPE-MAX Y (mm)	COPE-MAX Z (mm)	COPE-MEAN
5	8135	1.14e-19	18.9	5.42	46	-6	12	41	-34.3	29.9	50.1	64	-6	10	21.1
4	3442	4.6e-11	10.3	5.41	-64	-14	40	-51.6	-18.9	21.2	63.2	-62	-18	10	27.8
3	1094	3.98e-05	4.4	5.04	16	-98	8	18.7	-87.7	26.5	40.6	12	-100	4	25.2
2	766	0.000495	3.31	4.79	28	-76	-12	14.1	-73.4	-8.3	42.2	2	-84	-6	22.2
1	303	0.037	1.43	5.38	-6	-104	8	-11	-102	13.1	45.4	-10	-102	12	29.3

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Abstract No. 107

Steady State Visual Evoked Potentials for a Brain-Computer Interface by Fuzzy Logic

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Introduction
Sensory stimulation of human body causes Evoked potentials in the human brain. These signals have been used for multiple applications over the past few decades. The purpose of this study is to classify the EEG signals extracted from a number of healthy volunteers using a fuzzy classifier and compare the result obtained with several other classifiers.

Methods
In this study, EEG signals are recorded from the subjects. In the method of execution, the EEG signals are initially called and pre-processed. In the second step, appropriate characteristics of these signals are extracted. The extracted features are included in Tabel1.Then the labels associated with these signals are attributed and eventually the tagged feature matrix is generated. This matrix is used as the input matrix of the classifier. The main classifier that is used in this study is fuzzy classification, while Bayes, SVM, PNN, MLP and KNN classifiers have also been used to compare the results.

Results
The accuracies of each classifier with different properties are presented in Table 1. In this work, classifier accuracy is defined as prediction capability of new input data for its corresponding class.

Conclusion
In this paper, it was shown that using fuzzy method for classification of EEG signals results in very good accuracy in comparison with other classifier methods such as KNN, MLP and PNN.

features			
Classification method	All extracted features	Time features	Power characteristics of alpha and beta bands
KNN	50%	90%	80%
MLP	30%	45%	40%
PNN	50%	50%	61.7%
Bayes	-	100%	86.5%
SVM	66.6%	100%	97.2%
Fuzzy	91.6%	98.1%	97%

Abstract No. 108

Evaluation of a sLORETA Neurofeedback Protocol for Treating Chronic Tinnitus

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Introduction
Alpha/delta neurofeedback has been shown to be a potential treatment option for chronic tinnitus. Traditional neurofeedback approaches working with a handful of surface electrodes have been criticized, however, due to their low spatial specificity. The purpose of this study was to evaluate a tomographic neurofeedback protocol that combines activity measured across the whole scalp with sLORETA source estimation.

Methods
Forty-eight chronic tinnitus patients participated in 15 weekly neurofeedback training sessions and extensive pre, post, as well as follow-up testing. Patients were randomly assigned to a tomographic (ToNF) or a traditional electrode-based neurofeedback (NTNF) group. The main outcome measures of this study consisted of tinnitus distress, loudness, and pre- and post-training EEG activity in trained frequency bands on surface and source level.

Results
For both groups a significant reduction of tinnitus distress and loudness was found. While distress changes seemed to persist, loudness levels returned to baseline in the follow-up period. Furthermore, the trained alpha/delta ratio increased significantly during the training and remained stable in the follow-up period. No between-group differences between the two groups (ToNF or NTNF) were found, which suggests a similar contribution to symptom improvement and changes in EEG patterns.

Conclusion
This study shows that a tomographic alpha/delta protocol should be considered a valuable addition to tinnitus treatment with neurofeedback. More knowledge about distinct tinnitus subtypes and their manifestation in respective brain activity patterns is necessary in order to develop more individually specific neurofeedback approaches.

Abstract No. 109

A Tensor Approach for Diagnosing Autism Spectrum Disorder Using fMRI Data

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Introduction

Autism Spectrum Disorder (ASD) is a mental disease which effects on social skills of the person. ASD has many sub-types in which each of them has its own markers, But most of the time a person with ASD is recognized by repetitive behaviours, speech and nonverbal communication. Based on recent report of Center for Disease Control, ASD is growing. Indicators of ASD usually become visible by age 2 or 3. Moreover, some of its markers can appear even earlier. Researches indicate that early treatment has many positive effects in the life of people with ASD [1]. So early diagnosing the ASD is very important. On the other hand, fMRI is one of the most applicable and accurate instruments of the imaging. Despite of the fMRI benefits, we have some challenges in working with its data. The biggest challenge that we are dealing with is the volume of the data. The volume of fMRI data is very huge and it makes the procedure of the data analyzing, time consuming.

Methods

Recently, machine learning(ML) is used to analyze fMRI data and it got good results. The ML algorithms can establish a trade off between running time and accuracy. In this research, we are going to present a tensor decomposition algorithm [2] for identifying ASD from fMRI data. The recent work on this topic was done in 2018 [3].

Results

The researchers obtained the average accuracy of 70% using a deep neural network method [2]. But by applying tensor method on ABIDE data set the obtained average accuracy is about 80%.

Conclusion

As the results show, the presented method is more efficient than the state-of-the-art methods in characterizing the ASD and we expect that this method can be employed for other fMRI data analysis tasks.

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Abstract No. 110

Where is the Difference? Brain Region Affected in ADHD Using Seed-based Connectivity Analysis

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Introduction
Attention-deficit/hyperactivity disorder (ADHD) is a behavioral disorder in which children lose the ability of concentration. ADHD is the Mostly affects children and teens and can continue into adulthood. Problems occurred in the functional connections between different parts of brain can conduce to ADHD. The aim of this study is to analyze the seed-based connectivity of different seeds in the brain and detect the differences between ADHD patients and control participant.

Methods
The ADHD-200 dataset was used and 6 ADHD subjects along with 6 control subjects were studied. The subjects aged between 7-12 years. Acquisition parameters and morphometry information of data are specified in [1]. Functional images were pre-processed to remove artifacts and noise. Then the connectivity process was done for studying seed-based connectivity. Different seeds and their connectivity with other parts of the brain were studied and the T-test was performed in which the voxel threshold P-value was 0.001 and the cluster threshold was 0.05.

Results
Seed-based connectivity indicated that there is a statistically significant difference in the PITGl (inferior temporal gyrus, left posterior division) seed functional connectivity to the left middle frontal gyrus and the left superior frontal gyrus between two groups in resting state. In which the p-value was less than .05 for cluster-threshold and less than .001 for voxel-threshold for the case control > ADHD these differences are shown in figure1.

Conclusion
The function of the PITGl is to receive information and the MFGl and SFGl have the inhibitory functions in controlling behaviors [2]. Missing functional connection between these regions in ADHD patients may be the reason why they cannot control their behaviors.

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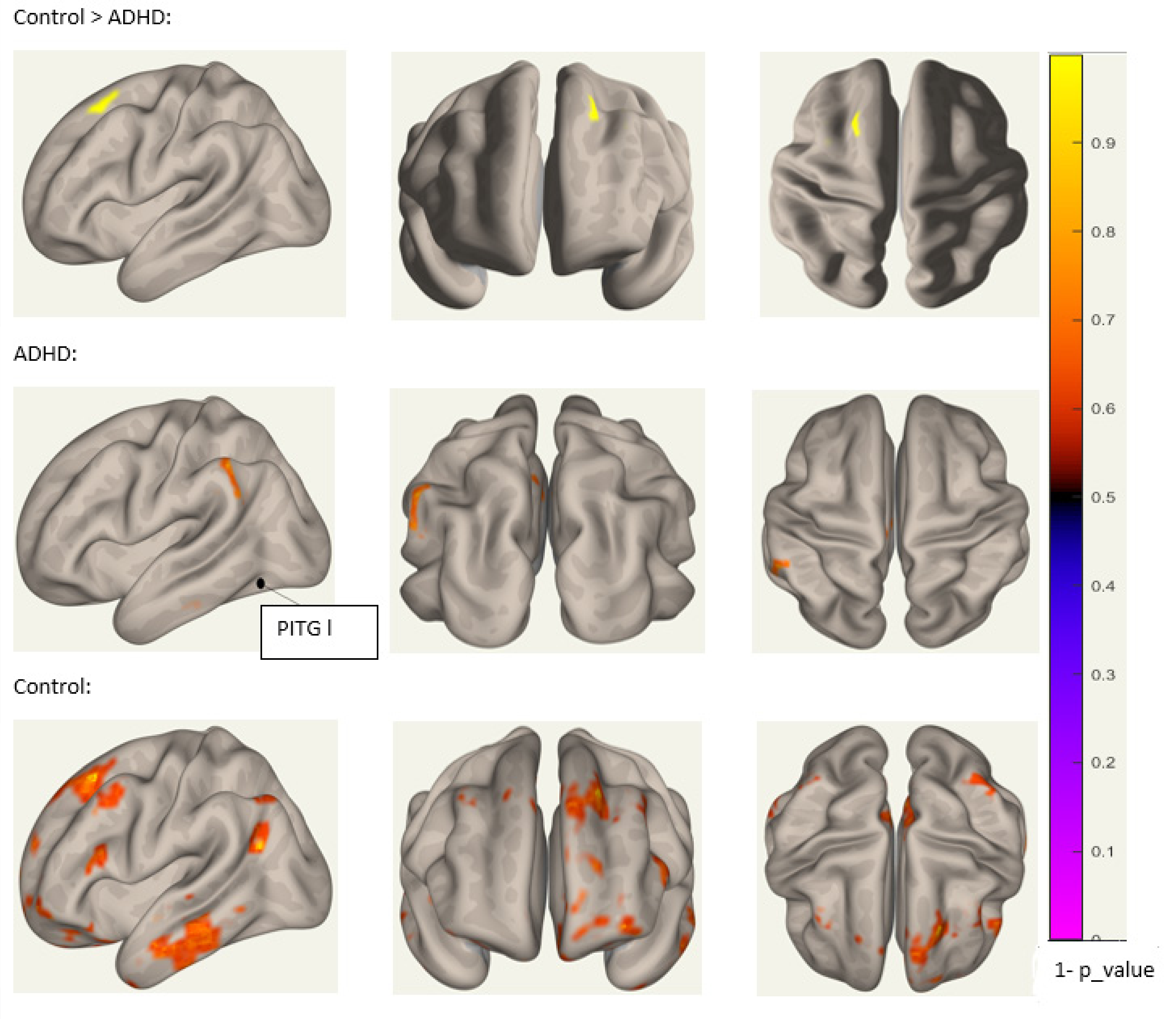

Figure 1 : pITGl seed and its connectivity to other brain regions

Evaluation of Olfactory Activation Patterns in Anosmic Patients with Peripheral and Central Injuries as Compared to Healthy Subjects with fMRI

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Introduction
Functional study of brain using fMRI as a method for evaluating important regions of brain and determining the exact locations of activities and their response to the different disorders is not only helpful in medical diagnosis of neurological diseases but also is substantial in studying the functions of different brain areas.

Methods
This is a clinical study on unaffected volunteers as well as patients who have a damaged olfaction after a head trauma. First, we performed fMRI on 20 healthy volunteers after olfactory stimulus using an Olfactometer device. Of total 60 patients, 28 had confirmed anosemia using standard diagnosis tests. Finally in individual-level analysis, we did statistical hypothesis testing and multiple comparisons error correction to identify active brain regions during olfaction. In last stage, the images and located regions were compared to functional and anatomic atlas provided by other researchers and we also compared brain activity patterns in normal subjects to patients with Anosmia due to head trauma to recognize possible differences.

Results
Comparing the brain activity level in two groups revealed meaningful differences. The following images show regions controlling olfactory cognition in normal subjects which include piriform cortex, enthorhinal cortex and amygdalae. There were also several secondary regions that olfactory projections seem to enter them over time. These secondary regions include orbitofrontal cortex, hypothalamus, thalamus, hippocampus and insular cortex. In patient's group, no activity noted on above-mentioned olfactory controlling regions of brain.

Conclusion
This study shows brain's function in sensing smells is also different in patients with anosmia after head injury and healthy subjects. We also found that primary and secondary olfactory controlling regions are easily recognizable in normal healthy subjects.

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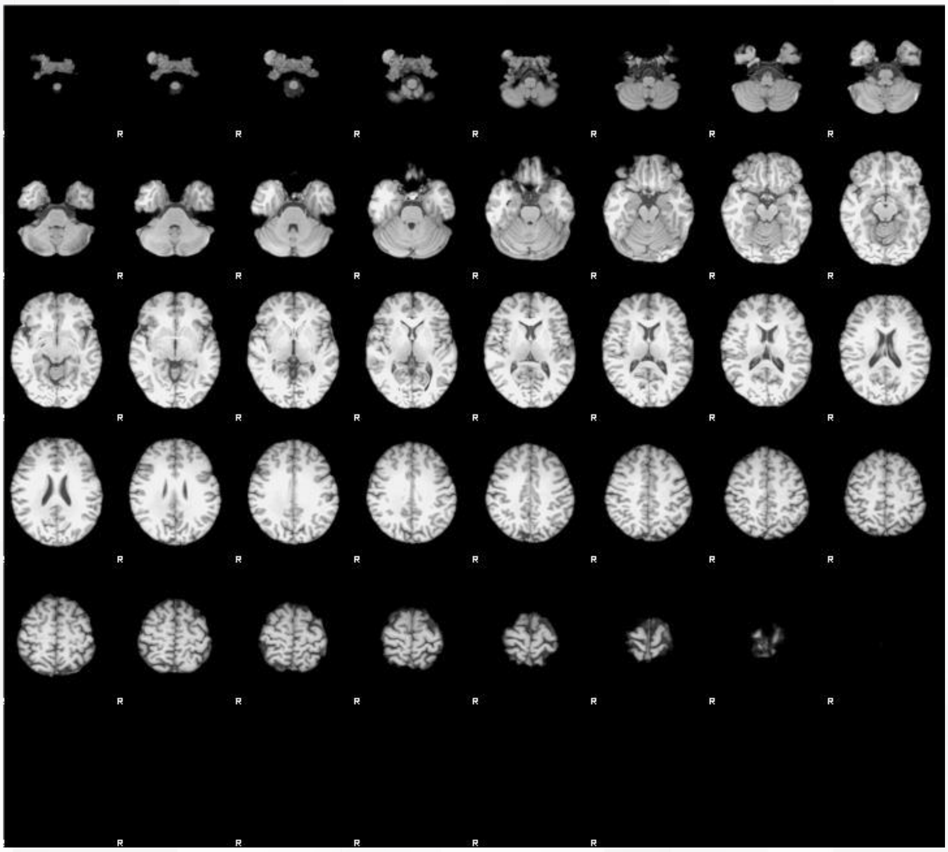

Figure 1:Patient

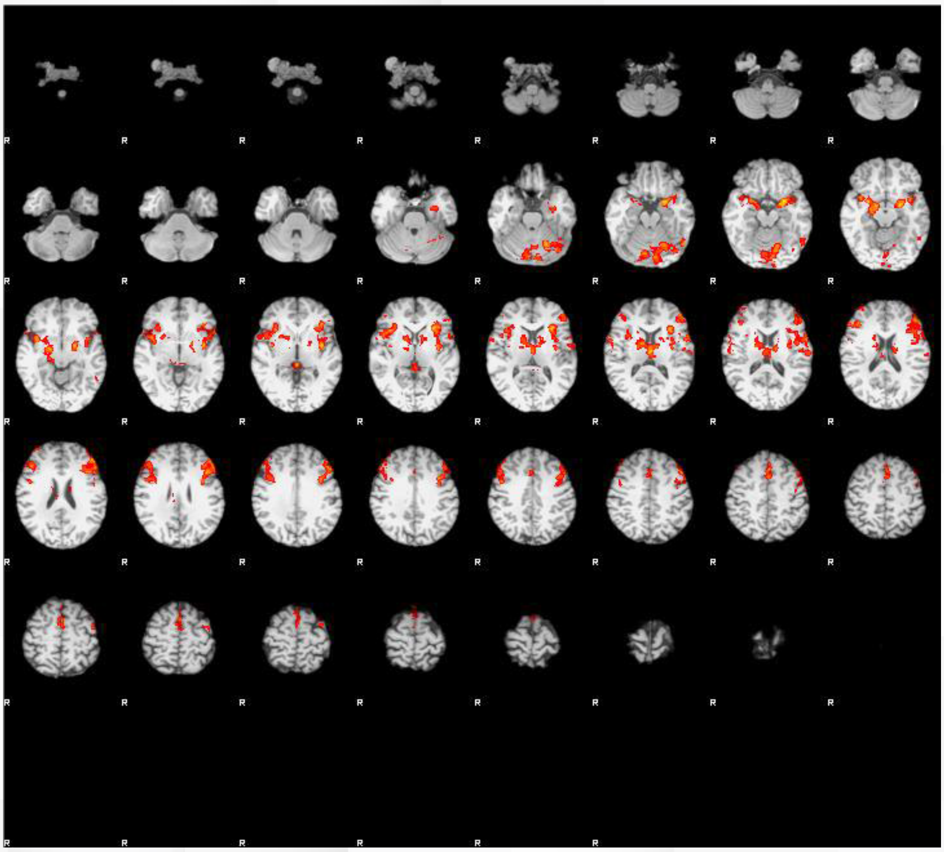

Figure 1:Normal

Abstract No. 112

Metabolic Connectivity Based Parcellation of the Hippocampus in Healthy Older Adults

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Introduction

The hippocampus is a core component of the human cognitive system whose connectivity and function are altered in the most frequent neurocognitive disorders. Accordingly, hippocampus' structure and function have been characterized using parcellation approaches based on local microstructural properties and MRI-based connectivity [1,2,3]. In the present study, for the first time, we aimed to complement these findings from insights of molecular imaging by implementing parcellation based on metabolic connectivity (MC-CBP) using FDG-PET data.

Methods

The bilateral hippocampi were parcellated using a standard hippocampus mask, as well as connectivity based parcellation (CBP) pipeline used in a recent study [3]. FDG-PET data of 263 older adults (age: (74.39 ±5.95years, 48.28% females) from the ADNI cohort were normalized, partial volume corrected and smoothed. MC was measured by computing the Pearson's correlation in metabolism between hippocampus voxels (seed voxels) and all other brain voxels (target voxels) across the whole sample. This procedure yielded a seed voxel by target voxels connectivity matrix at the group level that was then used for clustering. For stability and consistency of parcellations, bootstrap resampling was utilized and the clustering was performed by assigning the hippocampal voxels to its most frequent cluster's label (i.e., by using the mode) across bootstrapping samples.

Results

We examined 6 levels of partitions ranging from k = 2 to 7 since previous work has reported stable cluster solutions at different level of partitions and compared them with previous studies [2, 3]. Organization of the hippocampus based on MC revealed primarily an anterior-posterior differentiation, but also a medial-lateral distinction in line with MRI-based parcellation in healthy adults.

Conclusion

In the future, MC-CBP could contribute to a better understanding of brain organization and to the ability to derive robust maps for FDG-PET data analyses.

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Abstract No. 113

Role of Oxytocin in Moderating Autistic-Like Behaviors and Hippocampal Plasticity in Maternal Separated Rats

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Introduction

Autism spectrum disorder (ASD) is the complex neurodevelopmental disorder. It is assumed that maternal separated rat model could be an appropriate environmental-based animal model for ASD to identify promising therapeutic for ASD. In terms of treatment, no specific medication for the core symptoms of ASD has been established. Oxytocin has been suggested as the potential therapeutic agent for the social behavior deficits. While, several issues regarding doses, onset of treatment, route and duration of treatment remain unclear. The main objective of this study was to investigate the effect of maternal separation on the induction of autism-like behaviors in male rats and to examine the therapeutic effect of oxytocin on the behavioral symptoms and associated hippocampal structural plasticity.

Methods

During the first 2 postnatal weeks, pups were separated from mother 3 hours per day. After weaning, rats were treated with oxytocin at a dose of 1 mg/kg (intraperitoneal) for 10 days. In adolescence age, social interaction and stereotypic behaviors were tested with three-chamber and marble-burying tests respectively, and the volume of the hippocampus and its sub-regions were investigated doing the 3-D quantification by applying Cavalieri estimator method using newCAST software.

Results

Maternal separation induced autistic-like behaviors ($p<0.05$) (Fig.1) associated with bigger volume of the hippocampus ($p<0.05$) (Fig.2).And oxytocin contributed to the improvement of the behavioral deficits but not to the modification of the hippocampal volume.

Conclusion

Findings of the current study showed that early life maternal separation impacts social and stereotype behaviors associated with increasing the hippocampus volume. And the oxytocin could act as a potential therapeutic agent for the autistic-like symptoms with no significant modulatory effect on the volume of the hippocampus.

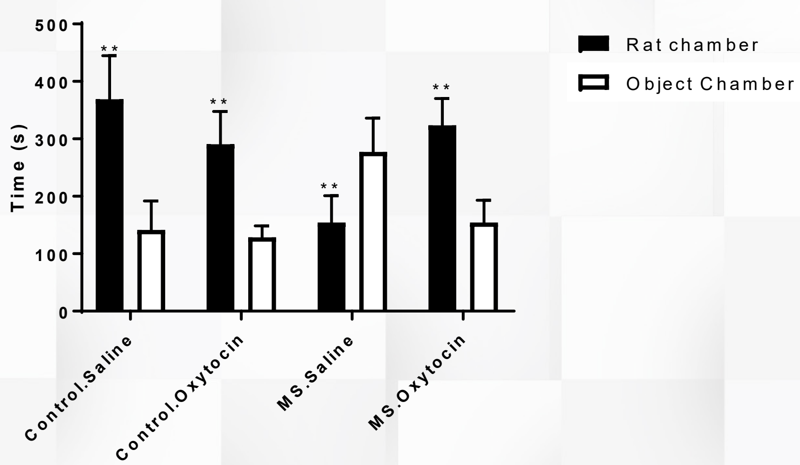

Fig 1. Effect of maternal separation and oxytocin treatment (1mg/kg) on social behavior. MS: Maternal separation **$p<0.01$

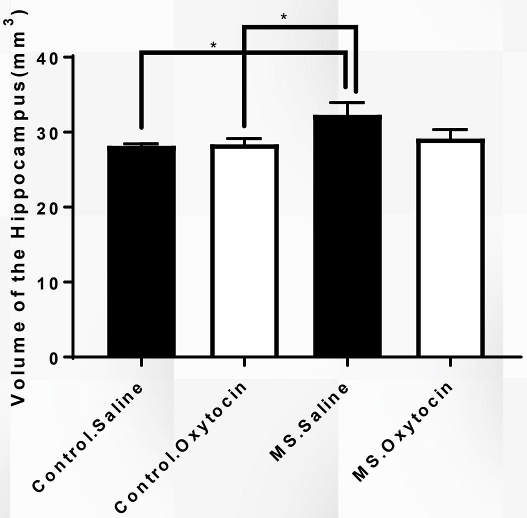

Fig 2. Effect of maternal separation and oxytocin treatment (1mg/kg) on hippocampus volume. *$p<0.05$

Abstract No. 114

ERP Components During Instructed Deception: A Case Study

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Introduction

Deception or lie is a cognitive process that involves the participation of different parts of the brain [1]. Liars have to inhibit truthful responses and generate a reliable false one [2]. The designed task in deception researches based on ERP components could be with or without crime content. In the present study, a task without crime content was designed.

Methods

In this study, a simple classification task was designed based on [3]. The stimuli were 10 pictures (five animals and five plants). Before the test, the participant should select an envelope from two boxes, including 5 animal and 5 plant pictures, view the pictures and intentionally misclassify them during the experiment. The experiment comprised 3 main blocks, each containing 60 trials (48 non-target pictures and 12 target ones). 32 channel EEG signal was recorded with the sampling rate of 512 Hz. After preprocessing (1- 80 bandpass and notch filters, ICA- Correlation method for EOG reduction) the clean EEG signal was segmented into 2- seconds (-400, 1,600 ms) intervals, time-locked to stimulus onset and averaged for ERP calculation.

Results

The average of target and non-target epochs was calculated. Fig. 1 shows the ERP wave for both target and non-target stimulus in the Fz channels. P300 component is evident in about 500 msec after stimulus onset. It can be observed that the amplitude of P300 is larger for target stimuli rather than non-targets ones.

Conclusion

The present study investigates the ERP components of instructed deception. The larger P300 amplitude for target stimuli may be due to more attention on the target stimuli rather than non-target ones.

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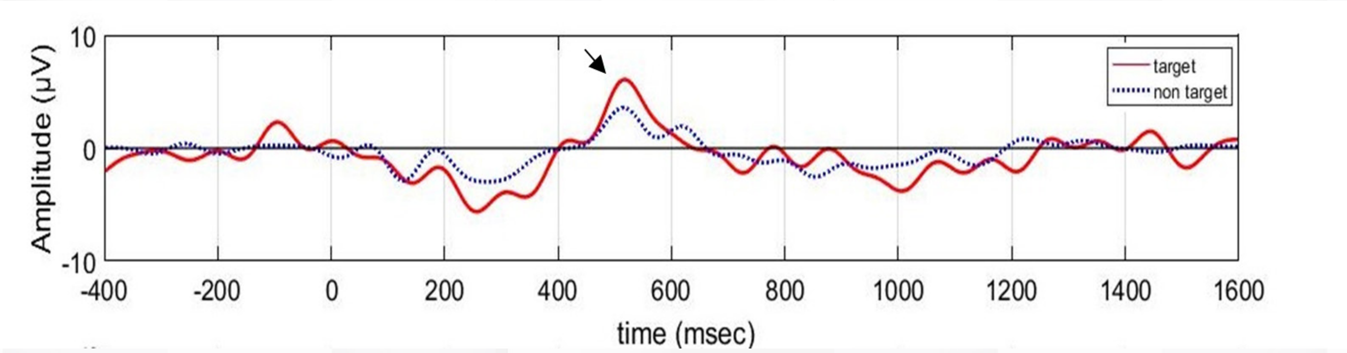

Figure 1: ERPs of target and non-target stimuli at Fz. The p300 amplitude for target stimuli is larger.

Abstract No. 115

The Correlation Between Fixation Frequencies with Alpha Power Spectra in Mild Alzheimer Disease (AD)

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Introduction

Alzheimer's disease (AD) is a major cognitive disorder in the elderly that affects millions of people and their families around the world. This disorder may occur many years before the first clinical symptoms. Recent studies have shown that in the early stages of disease, neuronal degeneration occurs even without clinical signs. Electroencephalography (EEG) and eye tracking biomarkers would provide non-invasive and relatively inexpensive tools for early detection and prediction of AD. Therefore, we examined the simultaneous changes between EEG and eye tracking in mild AD patients.

Methods

19 patients with mild Alzheimer's disease (AD) compared to 19 gender and age matched normal subjects without any history of cognitive, neurological or psychiatric disorders. EEG and eye-tracking data were concurrently acquired in both groups in the fixation task.

Results

Our results proved that destroyed correlation among fixation frequency with alpha power spectra in AD compared to controls. Increased theta power and also decreased alpha power in the AD group observed. Fixation duration was significantly shorter for AD patients and fixation frequency and count was more than control in AD patients.

Conclusion

Therefore, our results may suggest that AD patients recruit more neural networks to fixate. It is assumed that, they might use compensatory mechanisms to encode fixation.

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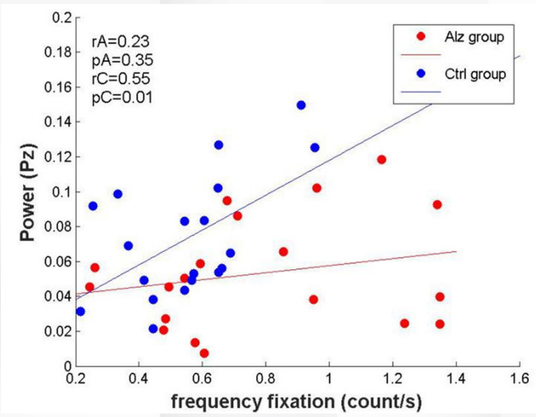

Figure 1: Pearson'r correlation coefficient analyses. The correlations sorted by the most significant on top ($p < 0.05$). Panels show scatter plots between normalized alpha power (8-12 Hz) and frequency fixation (count/s) in AD and healthy groups separately.

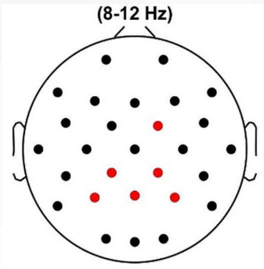

Figure 2: Channels with the same pattern in the relationship between fixation frequency and alpha power in the control group shown in red.

Abstract No. 116

Does Sleep-Disordered Breathing Accelerate the Ageing Process of Human Brain?

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Introduction

It is suggested that sleep-disordered breathing (SDB) may contribute to cognitive decline and advanced aging as present in Alzheimer's diseases (AD)[1]. Hereby we used a machine learning approach to assess the ageing properties of participants brain with history of self-reported SDB.

Methods

A total of 330 participants, matched for age and gender, from Alzheimer's Disease Neuroimaging Initiative (ADNI), were used. Further, cognitive status of them was taken into account to divide them into AD, mild cognitive impairment (MCI), and healthy controls (HC). Each group was further divided to SDB+ or SDB- based on self-reported history of SDB. As a result, participants were assigned to one of the six groups of study. First, we used conventional automated methods to evaluate the regional gray matter volumes. Next, BrainAge was utilized to estimate each case's brain age [2]. It has been practically designed based on a separate dataset's brain images and was trained to correlate the combination of 637 cortical parcels volume to the chronological ages of the six groups of study. A BrainAge score was calculated for each case based on the difference between the chronological and brain ages.

Results

Cognitive impairment and advanced age were associated with lower gray matter volume in various regions, particularly in the bilateral temporal lobes. Brain's age was well predicted from the morphological data in HC and as expected elevated in MCI and particularly AD. However, there was neither a significant difference between regional gray matter volume in any diagnostic group related to the SDB status nor SDB-by-cognitive interaction. Also, we found neither a significant difference in BrainAge score related to SDB nor SDB-by-cognitive status interaction for this measure.

Conclusion

In summary, SDB seems to not accelerate the ageing process of brain. Also, SDB did not compromise the ageing pattern seen in the AD.

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Abstract No. 117

Replicated Gibbs Point Process to Combine Functional Brain Alterations Patterns in Acute Sleep Deprivation Using Coordinate Based Meta-Analysis

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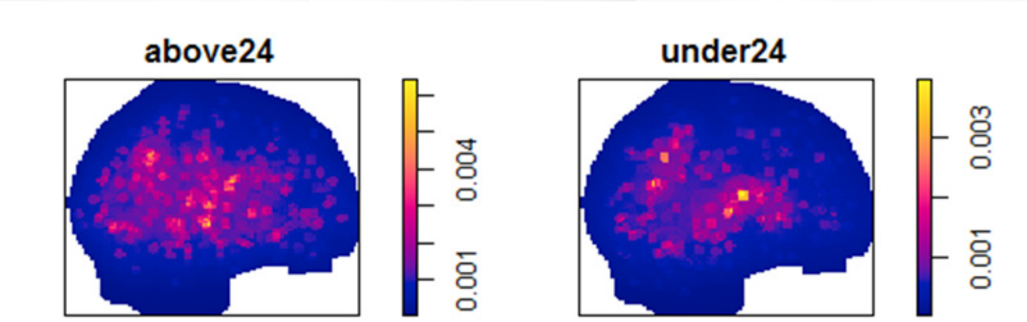
Introduction
Neuroimaging studies on the brain activation patterns in acute sleep deprivation (SD) are conducted with different conditions of experiment and have reported inconsistent results. Thus replicability of meta-analysis results might be questionable if the effect of confounders be ignored. Our goal is firstly, to improve replicability of our meta-analysis by considering the heterogeneity between the results of SD studies in framework of mixed effect modeling. Secondly, involving interactions between reported foci in our analysis.

Methods
Conditional intensity function (CIF) is a conventional tool for modeling in Gibbs point process. CIF defined as the average number of foci at a desired pixel, given the rest of the reported foci. If acquired functional brain alterations patterns from each study be considered as a realization of brain activity at the population level, one could account unobserved variability due to different studies as a random effect and use mixed effect model to estimate CIF. Geyer saturation process with variational Bayes technique is used to compute posterior estimate of parameters [1].

Results
Our investigations are motivated by data from [2]. The data have been retrieved from 31 publications on SD. Main covariates are: average of age and hours of SD per each study. Our results provide evidence that hours of SD has an important effect on the function of SD. Thus it's expected that total number of foci for an study with above 24 hours of SD be 2.12 times more than if it was under 24 (p-value=0.016). Figure1 shows predicted CIF as measure of activity pattern for hours of SD. The average of age has no significant effect (p-value=0.21).



igure 1. Average of estimated Conditional intensity function as brain activity measure by hors of SD covariate (Sagittal view at MNI origin)

Conclusion
In this work, a replicated model was used to separate different sources of variability in activity pattern of SD. Also we find that CIF give a better capture of brain activity than estimated intensity which is a conventional measure in model based meta-analysis.

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Surface Shape Differences in Subcortical Areas of Brain May Light Up Our Insight About Insomnia Disorder

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Introduction
Many people suffer from insomnia disorder nowadays. It is mostly described by initiating or continuing sleep problems that cause abnormal sleep duration or quality. In spite of the high rate of such disorder and its adverse effects, pathophysiology of insomnia disorder is poorly understood. Thus, we applied the shape analysis methods to investigate shape differences of subcortical nuclei between healthy subjects and patients.

Methods
Fifty-five patients with insomnia disorder and 49 healthy subjects were selected from the sleep research center at Kermanshah University of Medical Sciences. For every participant, T1-weighted high-resolution MPRAGE pulse sequence collected. After quality assurance and pre-processing, surface-based analysis applied using FIRST algorithm in FSL [1,2]. This algorithm automatically segments subcortical nuclei and models surface by triangular meshes (vertices). To estimate group differences, vertex-wise GLM was applied using nonparametric permutation testing with family-wise error correction. Intracranial surface changes were considered significant at $p < 0.05$.

Results
Neuroanatomical alterations were found in bilateral hippocampus, bilateral amygdala, left putamen in participants with insomnia disorders compared to healthy subjects. In addition, in individuals with a subtype of insomnia disorder (i.e., paradoxical insomnia) shrinking were found in left amygdala, left putamen, bilateral hippocampus, and bilateral thalamus comparing to controls (Figurs 1-2).

Conclusion
Our group comparison demonstrated significant difference in amygdala that plays an important role in emotional reactions, hippocampus which engages in memory coding and consolidation and thalamus and putamen that are effective in regulating the pattern of sleep and wakefulness. Our results shed light for better understanding the pathophysiology of insomnia disorder.

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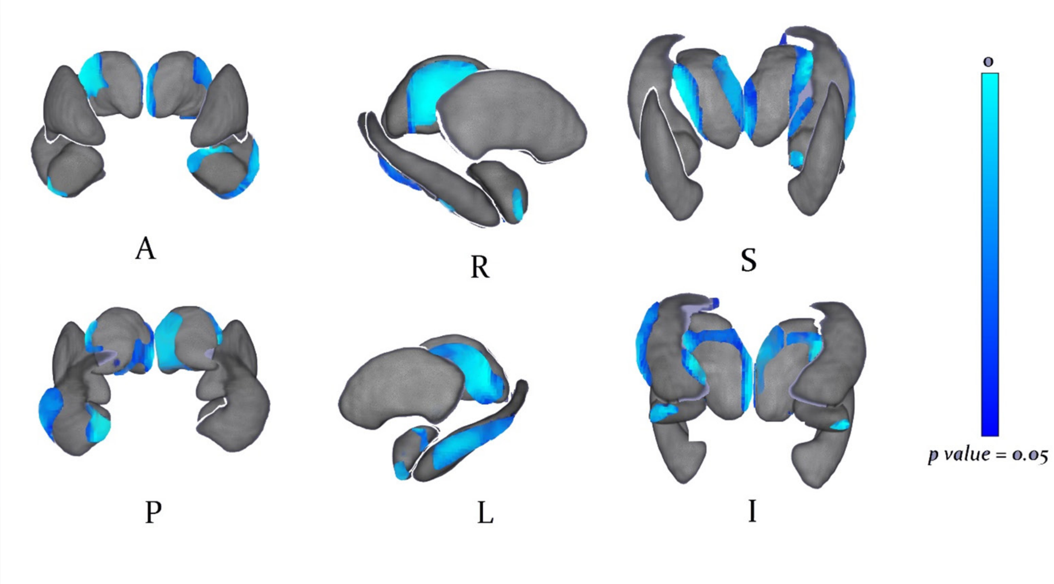

Figure 1: Control vs. Insomnia (p < 0,05, FWE correction).

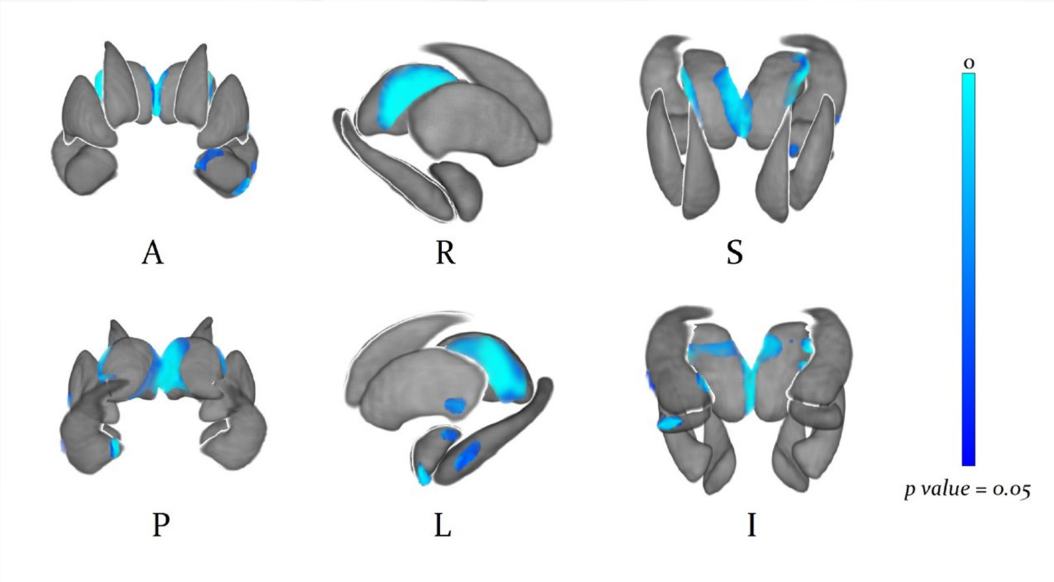

Figure 2: Control vs. Paradoxical insomnia (p < 0,05, FWE correction).

Abstract No. 119

Different Cortical Source Activation Patterns in Children with ADHD Using Boundary Element Method

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Introduction

Attention is one of the most attractive aspects of cognitive activity in the brain, and its evaluation in many disorders, such as Attention Deficit/Hyperactivity disorder, has been investigated. Several neurocognitive studies have indicated that children with attention-deficit/hyperactivity disorder (ADHD) exhibit cognitive deficits in executive functions [1]; however, only a few electroencephalographic studies have investigated their deficiency in executive functions such as inhibition[2][3].

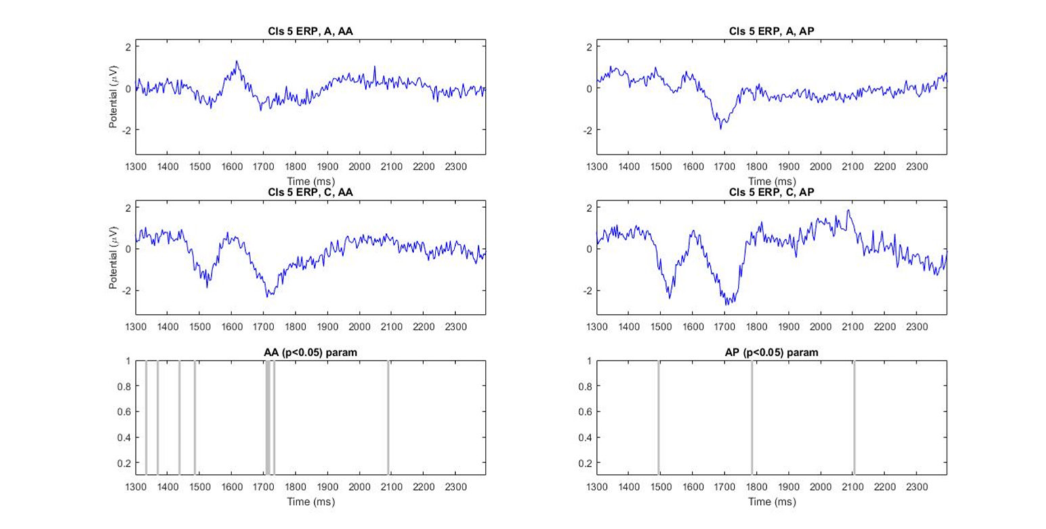
The purpose of this study was to investigate the various patterns of brain activity of 15 children aged 6 to 12 (8.4 years old on the average) with hyperactivity disorder compared to 15 control children (9.2 years old on the average) while performing a GO/NOGO task using EEG.

Methods

To achieve this goal, we used the Independent Component Analysis method for the analysis of brain-dependent potentials along with the use of mean model of children's MRI image in creating real head model using boundary element method and solving the forward problem. A 23-channel NeuroAmp device and a 19-channel electrode cap was used according to the 10-20 international standards to record the brain signals. In addition, the EOG signal, occurrence of stimuli and participant responses were recorded.

Results

With the use of mean model of children's MRI image in creating real head model in order to solve the Forward Problem using boundary element method in the IC space and then solving the Inverse Problem using the MNE method, we have tried to study patterns of brain activity in different P3 and N2 waves in this statistical society.



The ERP clustering diagram of the anterior mid-lobe in both GO (AA) and NOGO (AP) tests for both infertile (A) and control (C) groups plus a significant level graph of each of them

Conclusion

We found a significant difference in the mean of the P3 and N2 amplitudes between the two groups ($p \leq 0.05$). These results indicate electrophysiological evidence for Attention Deficit/Hyperactivity disorder, executive function abnormalities and attention deficit disorders in children with ADHD, which can be used to evaluate children affected.

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Abstract No. 120

The Association Between Alexithymia and Functional Connectivity of Dorsal Anterior Cingulate Cortex

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Introduction
The aim of this study was to examine the association between alexithymia components (difficulty identifying feelings (DIF), difficulty describing feelings (DDF), and externally-oriented thinking (EOT)) and resting state functional connectivity (FC) of left and right dorsal anterior cingulate cortex (dACC) in an fMRI study to investigate the underlying neural mechanisms of different features of alexithymia.

Methods
Our dataset was obtained from Otto von Guericke University [1]. T1-weighted structural images and fMRI images of 32 healthy subjects were analyzed. Images had been acquired by a 7T scanner. Alexithymia scores had been studied by Toronto alexithymia scale (TAS-20) [2]. Preprocessing was performed by DPARSF toolbox. Regression analysis with TAS subscale were conducted for each seed (left dACC and right dACC) using SPM12 (corrected FDR p-value<0.05).

Results
Results showed that DDF had a positive association with FC of left dACC to right frontal pole (FP) and left superior frontal gyrus (SFG). DDF had a positive association with FC of right dACC to right FP, left SFG, right superior temporal gyrus (STG), and left posterior temporal fusiform cortex (pTFC). There was a significant positive correlation between DIF and FC of left dACC to right FP. There was no significant association between EOT and FC of any of the seeds.

Conclusion
Since superior frontal gyrus processes the language, the association between DIF and FC of left dACC to right SFG shows that inability to differentiate emotions is linked to limited capacity for language processing. FP processes higher-order relations between mental representations. The correlation between DDF and FC of right dACC to left STG approves that one characteristic of alexithymia is difficulty in understanding the meaning of emotional words. Another aspect of insomnia is difficulty in recognition of facial expressions (reflected in the correlation between DDF and FC of right dACC to left pTFC)

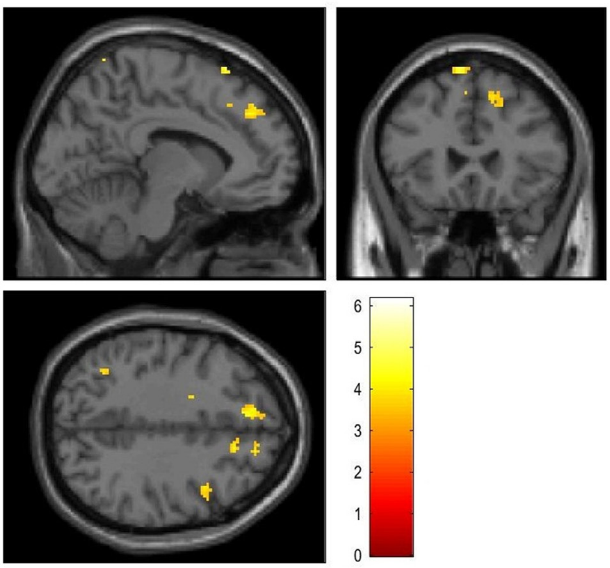

Figure1. Correlations of difficulty describing feelings scores and functional connectivity of right dACC.

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Abstract No. 121

Internet Addiction, Personality Traits and Emotion Regulation in Young Adults

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Introduction
Internet addiction is defined as an uncontrollable use of the internet or excessive preoccupation with an internet that cause impairment or distress (Shaw & Black, 2008). Since the late 1990s, as the consequences of overuse of the internet increased, it has been introduced as a mental disorder (Young, 1996). The present study aimed to investigate internet addiction in relation to emotion regulation and personality traits in a sample of 289 Iranian young adults to present a psychological model.

Methods
Participants completed an online survey including the Difficulties in Emotion Regulation Scale (DERS), Emotion Regulation Questionnaire (ERQ), Young's Internet Addiction Test (IAT) and the NEO Five-Factor Inventory (NEO-FFI) through a Google Docs' link. Considering the subject of the study and the nature of the variables, it is possible to investigate the research hypotheses by presenting a conceptual model for the mediation analysis. The adjusted model was examined using Lisrel.

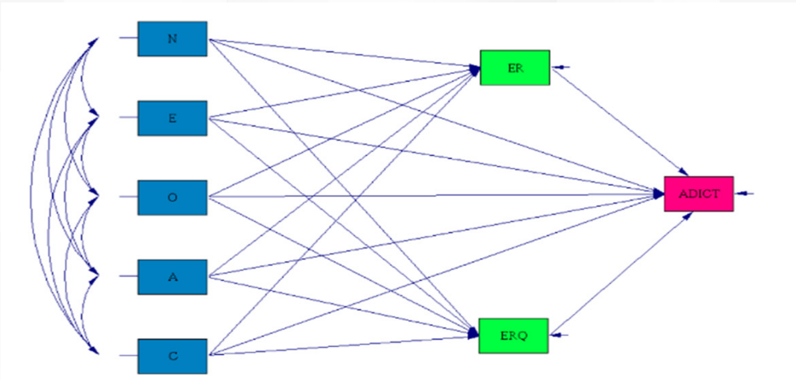

Fig 1. In the above conceptual model, internet addiction (ADICT) has been the main dependent variable, the difficulties in emotion regulation (ER) and cognitive emotion regulation strategies (ERQ) were considered as the mediator variables, and the personality traits of neuroticism (N), extraversion (E), openness to experience (O), agreeableness (A), and conscientiousness (C) were the independent variables.

Results
Results suggested that neuroticism, agreeableness, and consciousness may be underlying factors in Internet addiction, with an indirect effect for openness to experience through the emotion regulation. Contrary to expectation, no effect has been reported for extroversion. On the other side, difficulties in emotion regulation could increase compulsive internet usage.

Conclusion
Based on the findings of the current study and some other researches it can be concluded that probably the most effective way of preventing internet addiction would be trying to improve positive emotion regulation's skills during childhood, because prevention is better than cure. While the result of this study could contribute to our psychological understanding of the internet addiction, it could be integrated to other cognitive and neural correlates of the disorder in a cognitive neuroscientific model in further studies to add on our view to the subject.

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Abstract No. 122

Effects of Partial Sleep Deprivation on the Resting-State Dynamic Functional Connectivity

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Introduction

Sleep deprivation (SD) affects many cognitive and emotional functions [1]. While conventional resting state fMRI studies have shown changes in the overall functional connectome of the brain following SD [1], the dynamic characteristics of these changes have barely been examined. Dynamic functional connectivity (DFC) has recently been proposed to study the instantaneous co-activation of different brain regions and many mathematical methods have been developed to assess it including phase coherence [2].

Methods

We used the resting state fMRI data of 61 healthy subjects. The data included two sessions that were recorded with an interval of one month; in one the subjects underwent partial SD (3h sleep) and in the other they had full sleep [3]. Data was preprocessed with DPARSF. We computed the instantaneous phase from the Hilbert transform of the BOLD signal for each region at each TR and then calculated dFC using Eq1. (ni is a brain region, t is a TR, φ is the phase of the signal) [2]. This leads to an N×N dFC matrix for each TR (N = number of regions). The leading Eigenvectors of each matrix was extracted, k-means was used to cluster the vectors and FC states were reconstructed using the cluster centroids. Probability of occurrence and lifetime of the states were calculated and a permutation-based paired t-test was applied to test for between-group significance.

Eq1. $dFC(n_1,n_2,t)=\cos(\varphi(n_1,t)-\varphi(n_2,t))$

Results

The results showed significant difference in the lifetime of three FC states and the probability of occurrence of one FC state between the SD and full sleep conditions. These three states, their probability and lifetime for the two conditions, and the p values are shown in Figure 1.

Conclusion

SD affects the temporal behavior of FC patterns in the brain, including how often a certain FC state occurs and how long it lasts before another state dominates the patterns.

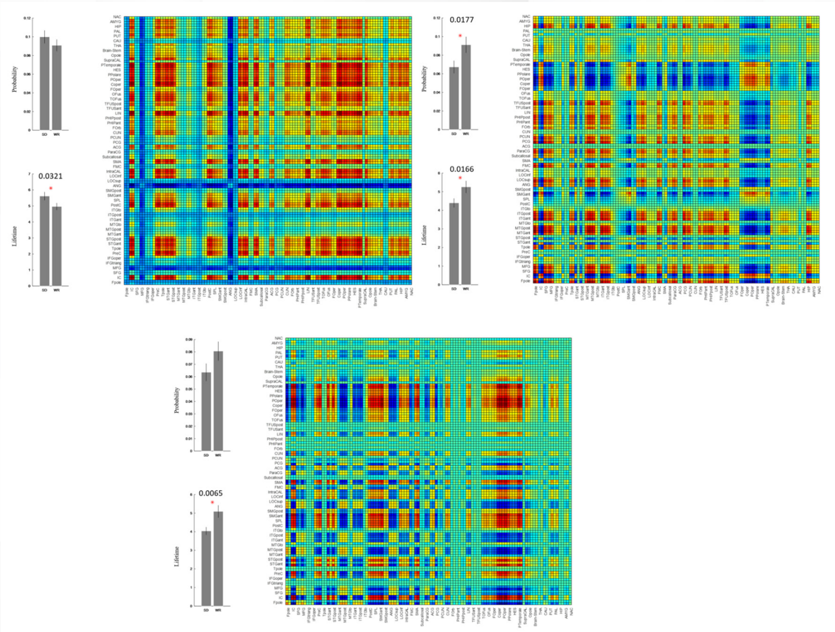

Figure 1: The three FC states with significant difference between SD and full sleep (WR) conditions and the Probability (of occurrence) and (mean) lifetime of these state. (The error-bars indicate the standard error). (* indicates $p < 0.05$).

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Neural Correlates of Narcolepsy Disorder: An Activation Estimation Likelihood Meta-Analysis

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Introduction
Narcolepsy, a second prevalent sleep disorder, is characterized by excessive daytime sleepiness, lack of muscle tone triggered by strong emotions that is called cataplexy, sleep paralysis and hallucinations. [1] Narcolepsy also impairs the quality of life and productivity of patients, and increases the risk of accidents. [2] Several structural and functional neuroimaging studies have been conducted in patients with narcolepsy, but they have reported diverse results. Thus, we aimed to determine convergent patterns of abnormal brain function and structure of narcolepsy disorder.

Methods
Based on the preferred reporting for systematic reviews and meta-analyses statement, we had studied 1931 papers from PubMed, Scopus and Ovid databases and retrieved 19 eligible neuroimaging studies. Then, we performed activation estimation likelihood (ALE) meta-analysis to test the convergence among their findings. [3]

Results
We mainly found a cluster of 73 voxels that shows structural atrophy and dysfunction in frontal orbital cortex, right amygdala and Parahippocampal gyrus - anterior division
(p-value 0.007).

Conclusion
These regions are associated to processing of memory, emotion and decision making. Therefore, these regions and functions play a key role in pathophysiology of narcolepsy.

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Abstract No. 124

Ascertainment of Full Sleep and Partial Sleep Deprivation Effects on the Brain Function by Resting State Network Templates

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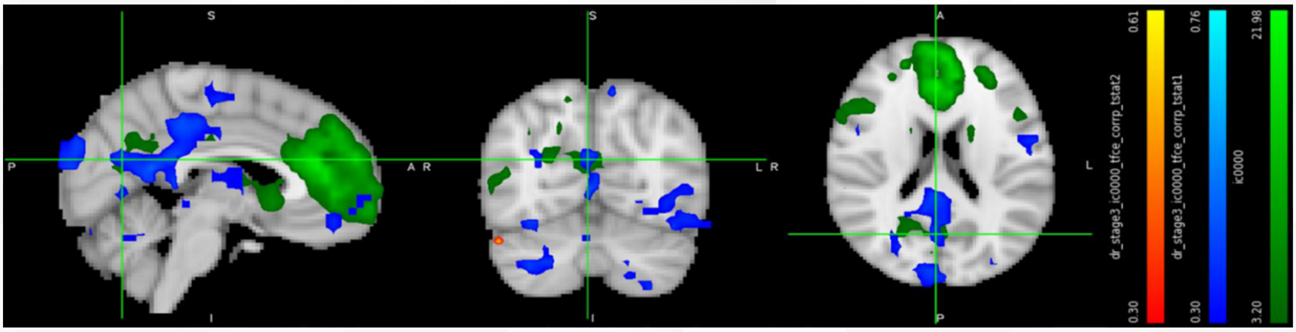
Introduction
Partial sleep deprivation (PSD) occurs when a person gets less sleep than is needed to feel awake and vigilant. This may have significant effects on brain functions. The aim of this paper is to study the effects of PSD on brain functions in resting-state.

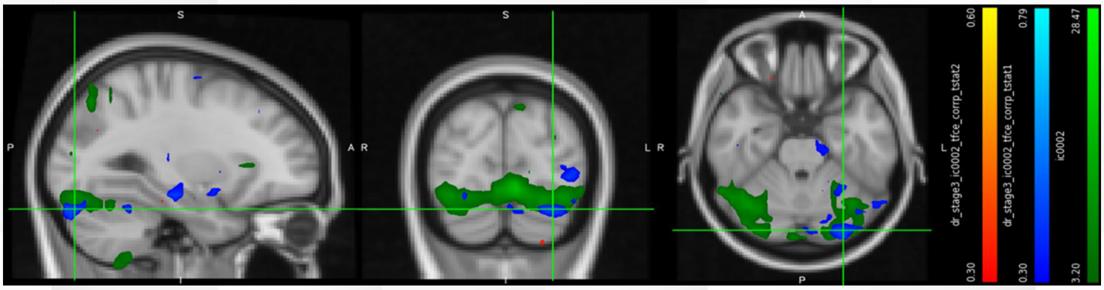
Methods
Full data is available at https://openfmri.org/dataset/ds000201/ including 6 participants experiencing full and PSD sleep. Data acquisition method and subject selection criteria are explained in the paper [1]. Brain functions had been analyzed utilizing group-ICA (constrained ICA using oxford functional template at https://www.fmrib.ox.ac.uk/datasets/brainmap+rsns/) applied to the patients' gray matters, in resting-state images. The components had been back-projected to the subject level using dual regression method and the results had been compared with permutation testing.

Results
Using ICA algorithm, get 20 components with ICA. Comparing each component in group level with related individual level with the TFCE corrected p-value, we found brain areas that showed the functional differences between two sessions. The p-value was chosen 0.1 since at first we set it 0.05 and observed no significant results.

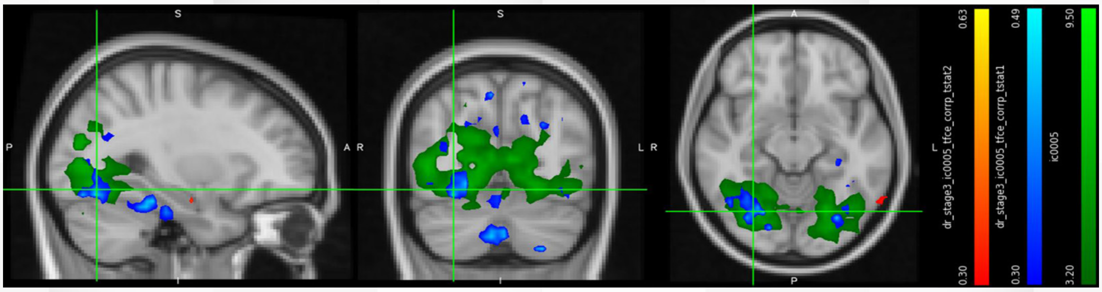
Conclusion
As observed, comparing two sessions in functional space using their independent components, had no results because we cannot find any statistically significant differences. However, reducing the minimum value to 0.1 gives us some dissimilarity between images shown below. Therefore we can conclude that our test has a null result. Perhaps this result is the consequence of the low number of subjects. Hence, with a similar test, our results are the same with the results that are obtained by two papers ([1],[2]). As this papers have concluded, one possible interpretation is that PSD and the associated moderate sleepiness may not cause changes in brain functions.



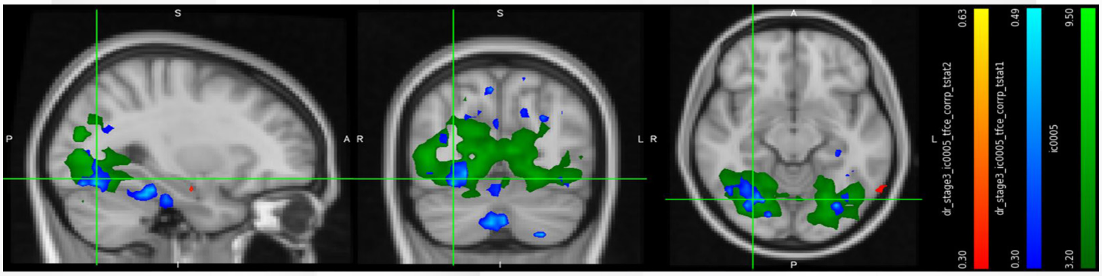
(1) Default Mode Network



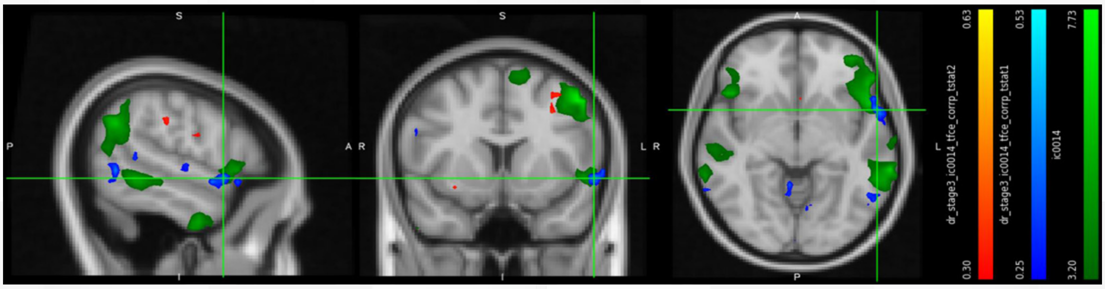
(2) Medial Temporal Network



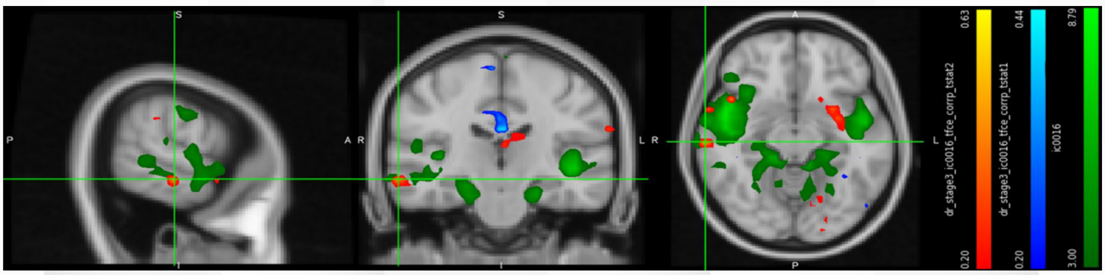
(3) Medial Temporal Network



(4) Auditory Network



(5) Ventral Stream Network



(6) Medial Temporal Network

References

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[2] A multimodal brain imaging dataset on sleep deprivation in young and old humans: The Stockholm Sleepy Brain Study

Abstract No. 125

Alteration of Functional Resting-State Networks in Partial Sleep Deprivation

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Introduction

Many people experience partial sleep deprivation (PSD) in their life. PSD has serious effects on brain functions and leads to impaired emotional and cognitive functioning. In this study, we compared intrinsic brain networks between two groups of people who had normal sleep and only three hours of sleep, in order to assess the effect of PSD on intrinsic brain networks.

Methods

We used online neuroimaging database of 75 subjects (30 female, average age= 45.5 available at https://www.openfmri.org/dataset/ds000201/), which had been acquired in two conditions. The first condition was full sleep and another was partial sleep (i.e., three hours of sleep) and during their sleep, they were awoken several times during night by an alarm, and they stayed awake for a few minutes and sleep again.

After preprocessing of neuroimaging data, group-ICA algorithm was applied using identified ten well-matched networks (i.e., constrained-ICA) in resting-state for each subject. Each ICA component has a corresponding timecourse; For the goal of examining the time domain, we then calculated a pattern matrix for each component separately for two mentioned conditions by correlating individual subjects' time-series. finally, we ran statistical testing with FDR correction at the confidence level of 95% to see whether there is any difference between patterns in two conditions.

Results

We found that the correlation matrix for individual component patterns of visual occipital network, default mode network, salience network and left executive control network, showed statistics significant difference between normal sleep and PSD.

Conclusion

Our findings demonstrated the effects of PSD on the intrinsic brain networks such as default mode network, salience network and left executive control network, which are key regions for memory functions and social behavior. These study highlight the important impact of sleep duration on normal brain functioning.

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Table 1: the networks we found significant difference between PSD and normal group when we had compared their within-group correlation matrix

Networks	p_value
	PSD > Normal
visual occipital network	0.001785153
default mode network	0.008649251
salience network	0.006621839
left executive control network	0.00118565

Abstract No. 126

A Coordinate Based Meta-Analysis on the Brain Functional and Structural Changes in Late Life Depression

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Introduction
Late life depression (LLD) is turning into a health concern with the aging of the population. Its unique presentation with somatic symptoms and cognitive dysfunction highlights the need to study LLD as a distinct disease process from depression in younger adults. Numerous functional and structural neuroimaging studies have investigated the neural correlates of LLD, but have reported inconsistent results. In this study, we aimed to identify locations in the brain that were most consistently altered across the existing studies.

Methods
We searched PubMed, Embase, and Web of Knowledge for relevant studies published until July 2019 and retrieved 2657 potential studies. All whole-brain voxel-based morphometry (VBM), positron emission tomography (PET), and functional magnetic resonance imaging (fMRI) studies comparing patients with LLD and healthy controls (HC) were included. Two authors independently extracted the data and the peak coordinates of the significant foci. Coordinate-based meta-analysis was performed using the revised activation likelihood estimation (ALE) method according to the current best-practice guidelines.

Results
We identified 23 eligible studies (eight VBM, one PET, five resting-state fMRI, and ten task-based fMRI) including 516 LLD patients and 490 HCs. No significant converging structural and functional brain abnormalities between LLD and HC (27 experiments) was observed after controlling for multiple comparisons using a stringent cluster-level family-wise error correction (pcFWE = 0.680). Additionally, the meta-analysis on LLD > HC with 13 experiments (pcFWE = 0.069) and LLD < HC with 14 experiments (pcFWE = 0.357) revealed no significant convergent abnormalities.

Conclusion
The lack of convergence across individual studies might be related to the differences in experimental designs and statistical approaches, heterogeneity of clinical populations, and small sample sizes of the individual studies. Currently, there is not enough evidence available to pinpoint a specific underlying neural pathology associated with LLD.

Abstract No. 127

Therapeutic Effects of EEG-Based Infra-Low-Frequency (ILF-) Neurofeedback Training on Children and Adolescents with Attention Deficit (Hyperkinetic) Disorder

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Introduction

According to actual estimates, approximately 5% of children suffer from attention deficit (hyperactivity) disorder (AD(H)S) [1]. We addressed the question of whether EEG-based infra-low frequency (ILF) Neurofeedback is an effective therapy for such patients in this multi-center observational study.

Methods

Each AD(H)D patient received ILF neurofeedback treatment about twice a week for at least 15 weeks according to a protocol developed by Othmer [2].

To assess Neurofeedback-induced changes of clinically relevant parameters of attention, such as response time and its variability, and impulse control, such as omission and commission errors, were measured in a 21-minute GO/NOGO "continuous performance test" (CPT) that was completed by each patient before and after the Neurofeedback intervention period.

To track treatment-induced changes of AD(H)D-relevant indicators, the patients were regularly asked to assess kind and severity of their most pronounced symptoms.

Results

Data from 196 AD(H)D patients could be included in this study. After the period of about 30 sessions of ILF-Neurofeedback, the averaged response time of the patients improved significantly by 21ms (from 457ms (SD= 88ms) to 436ms (SD= 85ms)). In parallel, the variability of response time improved too by 18ms (from 122ms (SD= 30ms) to 104ms (SD= 30ms). Omission errors improved from an average of 9.6 (SD= 15.1) to 5.0 (SD= 9.3) and commission errors improved from an average of 19.1 (SD= 17.3) to 9.0 (SD= 9.0). After the NFB intervention 97% of the patients had an improvement in symptoms, like inattention, hyperactivity or impulsivity that once were perceived as stressful. Only 3% of the patients claimed no noticeable improvement of the symptoms.

Conclusion

Therapeutic outcome of the ILF-Neurofeedback therapy is excellent and this application can be seen as an effective method to treat AD(H)D. This study also demonstrates, that ILF-Neurofeedback can very well be integrated in an operating psychiatric practice.

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Regional and Whole-Brain Assessment of Fractional Anisotropy on Parkinson's Disease DTI-Datasets

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Introduction
Parkinson's disease (PD) is one of the most common neurodegenerative diseases and grows progressively worse with time. Diffusion Tensor Imaging (DTI) is a useful advanced technique employed to facilitate the differential diagnosis, which enables diffusion to be measured in multiple directions. The objective of this study is to investigate fractional anisotropy (FA) and its differences between PD patients and healthy controls (HC) for both regional and whole-brain analysis. In the regional study, three major parts of the basal ganglia loop mostly damaged in PD have been assessed.

Methods
The dataset contains diffusion MR images of 27 PD patients and 26 age-, sex-, and education-matched HC. Standard Atlases for specific regions was then transformed non-linearly into the diffusion space of 53 subjects' brains for assessing FA images. The method used a General Linear Model to summarize the global differences between Tract-Based Spatial Statistics (TBSS) FA skeleton images. Also, an independent unpaired t-test applied to check the differential diagnosis in Substantia Nigra (SN), Thalamus and Caudate of two groups' mean FA measurements.

Results
We found that PD patients represent lower fractional anisotropy in SN ($p = 0.012902$) and Thalamus ($p = 0.016155$), and higher fractional anisotropy in Caudate ($p = 0.027077$) compared to HC. In contrast, no statistically significant results were observed from the TBSS analysis of FA skeleton images (after applying TFCE).

Conclusion
Regardless of some restrictions, DTI seems a sensitive method to study PD related changes. FA in the studied regions is an acceptable indicator not only to identify PD patients but also for PD progression. The results reveal that the reduction of anisotropy in SN and Thalamus reflects the loss of integrity of fibers of the studied regions of the brain. This suggests DTI measures might improve discrimination methods to identify PD Patients correctly in the early stages of the disease.

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Abstract No. 129

Independent Components of EEG in Moral Judgment

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Introduction
Moral judgment can be defined by the individual's performance, according to the norms and values of society. To better understand morality, researches interest in the investigation of EEG during moral judgment.
Independent Component Analysis (ICA) has significant advantages in the analysis of independent components of EEG data. Also, Group ICA analysis and clustering identifies the homogeneous components of the participants and makes it possible to compare them together or with group inference.
Methods
The EEG signal of fourteen healthy participants was registered during a moral judgment task. Four types of dilemmas were considered: impersonal, easy personal, difficult personal and control [1]. The EEG signals were recorded in 32 channels and with a sampling rate of 512 Hz. After preprocessing, each person's data was epoched into 4 categories based on types of dilemmas. ICA was performed on each of 4 categories besides the whole epochs. Then the independent components of the aggregate data were considered as the center for clustering of the independent components of the other 4 categories. The clusters with the most members (maximum 5 and minimum 3 members) were examine.
Results
Figure 1 shows the resulted brain component cluster with 5 members. The properties of components have been investigated in Figure 2. The power spectrum follows the 1/f pattern and also has little activity in the alpha band. This cluster shows activity in the frontal area and can be considered as a component of brain activity (not an artifact one).
Conclusion
There was activity in the frontal area during moral judgment, which is in line with the results of Green's study [2].
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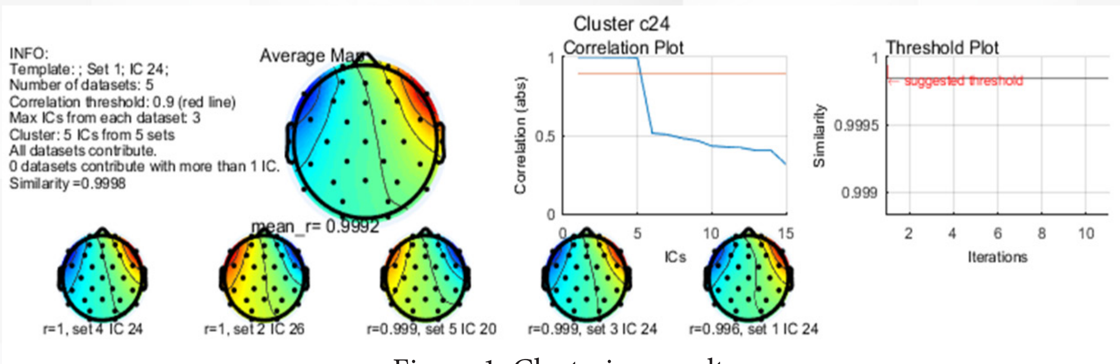

Figure 1: Clustering result.

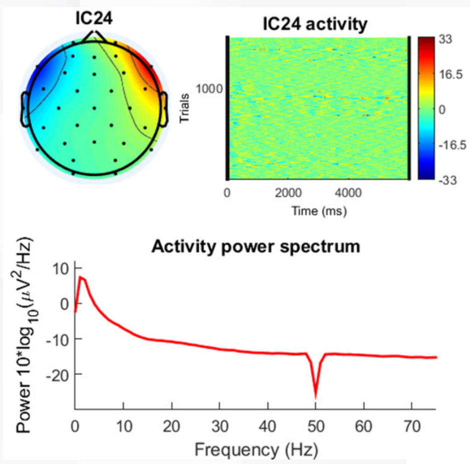

Figure 2: Properties of a component of the cluster.

What to Look at When Decoding Object Category Information from Electrical Brain Activations

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Introduction

How does the human brain recognize visual objects so rapidly and accurately? This is remarkable as the changes in the object/environment (e.g. such as when the object is rotated, is at a distance or illuminated from a different angle, etc.; Fig. 1) makes it highly unlikely that an individual object projects two identical images onto the retina [1]. Previous studies have looked for the neural mechanisms that support this 'invariant object representations' using brain imaging [2]. However, it is still unknown what dimensions of the recorded electrical brain activity (EEG) contain object category information.

Methods

In this research, we extracted and compared the efficacy of the largest set of computational features from the literature (n=32) each of which has been suggested to contain object category information in EEG. These features ranged from the simplest signal statistics such as mean, variance, evoked signal potentials (e.g. P1; Fig. 2) to the state-of-the-art features such as phase-amplitude coupling and features derived from Convolutional Neural Networks (CNNs). We also introduced two new features called signal auto-correlation and inter-channel correlation, all of which were extracted from two object EEG datasets (i.e. 31-channel amplifier, band-passed from 0.1 to 200 Hz and notch-filtered at 50 Hz with removed eye artifacts using ICA). Finally, we used a machine learning classifier (linear discriminant analysis; pairwise classification with 10- fold cross-validation) and multivariate pattern analysis to decode object categories using each of those features separately.

Results

Results showed that single-valued features provided little information about object categories. However, the autocorrelation and inter-channel correlation, despite containing only 30 values, were most informative of the object categories and outperformed all single-valued and 1000-valued features (Fig. 1).

Conclusion

Supporting the significance of signal temporal correlations, these results provide important insights about the neural encoding of object categories and have great implications for brain-computer interface applications.

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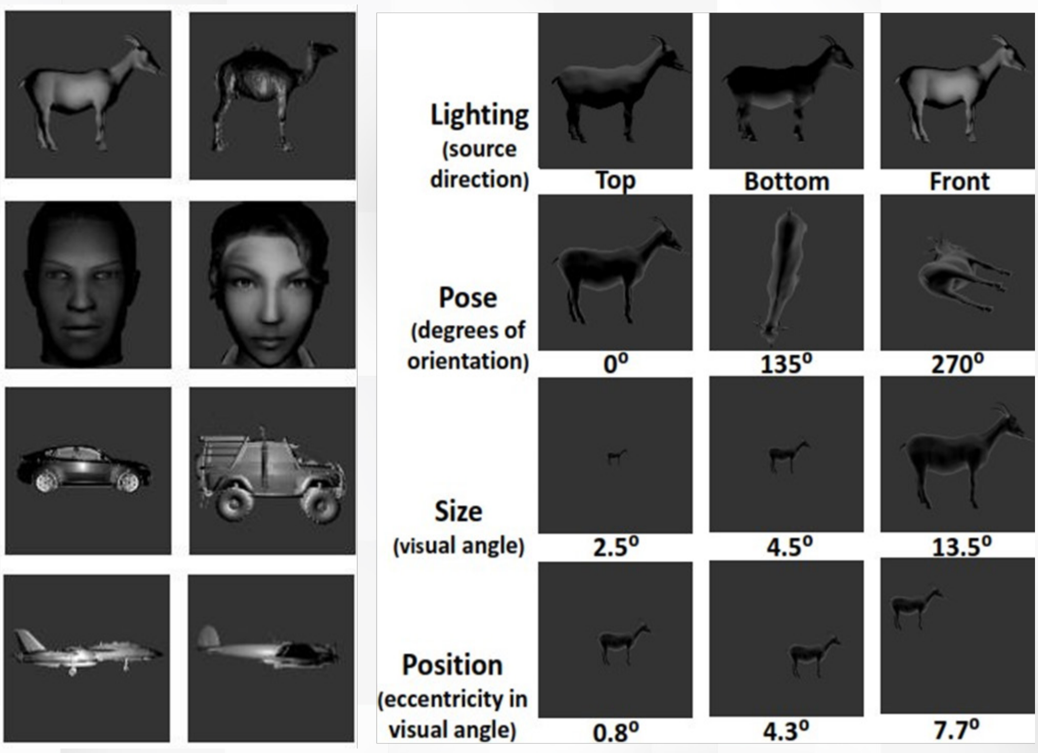

Figure 1. Images presented to the human subjects while their EEG signals were recorded. (Left) Categories of objects including animals, cars, faces and planes; (Right) Variations that each object has undergone including size, pose, position and lighting conditions.

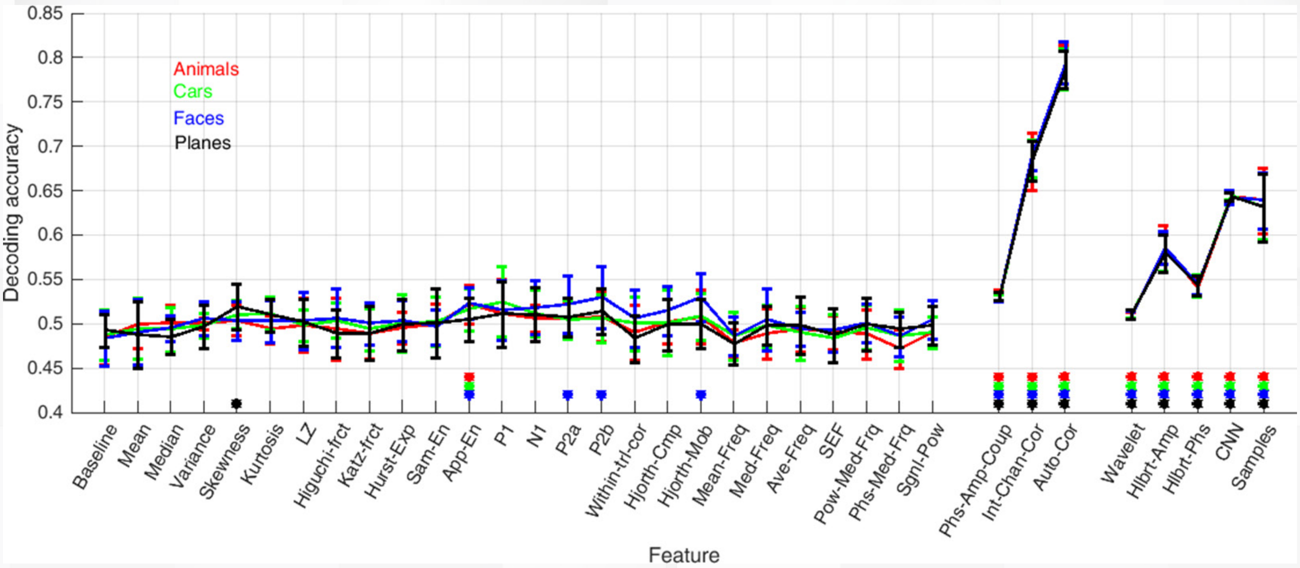

Figure 2: The performance of multivariate pattern analysis (decoding) in providing object category information using different features extracted from EEG signals. The Baseline and Samples features refer to the raw signals from the last 100 ms prior to stimulus onset and the whole processing time (1000 ms), respectively. Error bars refer to the Standard Error across subjects. The filled colored marks indicate significantly above- chance decoding as evaluated using 1000 bootstrapping iterations ($p < 0.05$).

Abstract No. 131

BCI-NNet Systems for Attention Training and Cognitive Bias Modification

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Introduction
This study will focus on Brain Computer Interface (BCI), specially its application for Cognitive Bias Modification (CBM). In regular CBMs, by presenting emotional images followed by letters, the attention is drawn toward positive faces and distracted from negative ones.
Methods
We developed a CBM intervention based on BCI (EEG headset) where neurofeedback system is added as feedback to enhance attention and decrease biases toward negative faces. An extra module has been provided for further attentional training by connecting a spinning device through Arduino microcontroller. This can provide an ecological feedback especially for those who cannot benefit from computer screen BCI feedback.
Results
The result of experiments done by the current CBM showed its efficacy in reducing anxiety, depression, and obsessive-compulsive disorder symptoms.
Conclusion
Therefore, a new CBM based on recent findings in cognitive science of attention and unconscious priming is introduced. This is a new approach to employ dynamic neural net-based neurofeedback system to enhance attention and decrease biases toward negative faces.
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Pre-Stimulus Effect on Face and Non-Face Processing: A Case Study in Individuals with Autism Using MEG

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Introduction
Pre-stimulus oscillation could affect post-stimulus activities during face processing 1. It is unclear if this interaction is intact in individuals with autism who often have difficulty in this function 2. Here we study the impact of pre-stimulus oscillations on post-stimulus evoked activities associated with face and non-face stimuli in two participants with autism.

Methods
Responses to face and non-face stimuli in two autistic participants were recorded using MEG system. In each trial, two sequentially presented stimuli from the same category (face or motorbike) were displayed and participants had to identify pairs of identical images. We calculated pre-stimulus alpha power in stimuli selective regions including occipital face area (OFA), fusiform face area (FFA), superior temporal sulcus (STS) and lateral occipital complex (LOC) per trial and made a median split of trials based on the achieved values per stimulus type. Between trial cluster-based permutation 3 were calculated to compare group of trials with low pre-stimulus alpha vs. the group of trials with high pre-stimulus alpha in each participant. This was done in the stimuli selective regions along with intra-parietal sulcus (IPS) and frontal eye field (FEF) in the post-stimulus interval.

Results
Pre-stimulus alpha power in LOC yielded a significant difference between the two groups in FFA and OFA for faces in one participant. This effect was observed from 198ms to 239ms after stimulus onset ($p=0.037$). Figure 1 shows the event-related activities of the two groups in FFA, averaged over the trials in each group. Evoked power is shown in the inset. There was no significant effect for motorbikes in this subject and no significant effect was found for the other participant.

Conclusion
Our results suggest that pre-stimulus modulation of post stimulus processing is present in autism. This is likely to be an inhibitory mechanism, in the sense that higher activation of stimulus unspecific regions during pre-stimulus intervals leads to larger post-stimulus activity in stimulus selective regions.

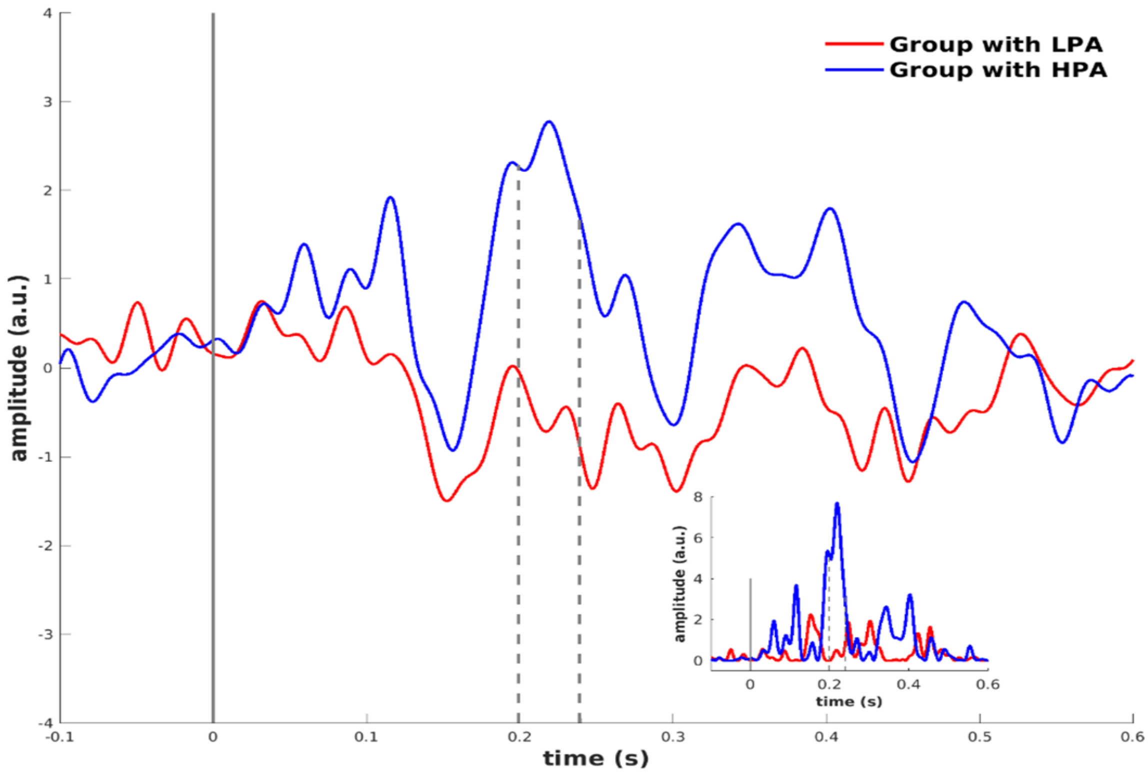

Figure 1. The group of trials with low pre-stimulus alpha (LPA) vs. high pre-stimulus alpha (HPA) in FFA. a.u: arbitrary unit.

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Abstract No. 133

Emotion Regulation Deficits Across Different Neuropsychiatric Disorders: Searching for a Regulatory Network

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Introduction

Emotion regulation (ER) impairment is a major dysfunction involved in various psychiatric disorders and is thought to play a key role in development, maintenance and treatment of psychopathology. To date, several studies have systematically and meta-analytically reviewed the neural basis of ER in healthy subjects and clinical populations. However, no study has yet integrated the common or distinct neural underpinnings of emotion dysregulation across a variety of disorders. Therefore, the aim of the present meta-analysis was to specify the brain network which is shared in disorders with ER deficits.

Methods

We performed a comprehensive neuroimaging meta-analysis of volitional ER tasks in populations of patients with various psychiatric disorders. In these studies, participants were instructed to intentionally alter their emotional responses to affective stimuli by applying specific strategies like cognitive reappraisal or response suppression.

Based on the PRISMA guideline, we screened neuroimaging papers in the PubMed database and retrieved 28 eligible studies. Then, we extracted the reported stereotactic data and used the activation likelihood analysis method to test for convergence of deviant neural activation in psychiatric patients contrasting to healthy controls.

Results

A set of meta-analyses have been performed focused on the brain activation (attending condition vs. regulating condition). Surprisingly, no significant result has been detected between the patient groups and healthy controls.

Conclusion

We conclude that the lack of ER-related regional convergence in psychiatric patients might be related to the heterogeneous clinical population. Such great heterogeneity highlights the need for further investigation on the ER difficulties in each patient group to provide enough evidence to confirm a pattern of dysfunctional brain activation during ER as a transdiagnostic feature of these disorders.

Abstract No. 134

Epileptic Seizure Prediction Using PDC and GPDC: A Comparison Study

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Introduction
Nowadays, a diverse range of methods have been developed to estimate the effective connectivity (EC) of brain activities that improve the therapeutic procedures of neurological diseases. Hence, selecting the optimal method amongst all of them derived from the coefficients and error terms of autoregressive (MVAR) models has become a popular and vital topic. In this paper, two of the most commonly used techniques for calculating EC, namely partial directed coherence (PDC) and generalized partial directed coherence (GPDC) have been compared through the prediction of epileptic seizures.

Methods
To compare GPDC and PDC measures, we estimated dynamic information derived from changing of EC patterns around seizures by GPDC and PDC measures and then considered them as a feature. The detected information of EC patterns were calculated by the EEGLAB Toolbox in 8 frequency sub-bands [1]. They were extracted from Freiburg iEEG dataset which was recorded in 6 channels for 21 epileptic patients [2]. After extracting features, thresholding step was performed on features to predict correct seizures; Thus, the epileptic seizures were predicted for all patients with GPDC and PDC measures in 8 frequency sub-bands [1] on a Receiver Operating Characteristic (ROC) curves (created by plotting sensitivity versus the false positive rate (FPR) at various threshold settings). In the end, we compared GPDC with PDC measures by using the amounts of area under the curve (AUC) in 8 frequency sub-bands.

Results
The AUC amount of GPDC measure are obtained more than AUC amount of GPDC measure in all frequency sub-bands except low and high gamma.

Conclusion
Our findings demonstrate that GPDC measure due to be the scale invariance version of the classical PDC and immune to static gain can have a better epileptic seizure prediction compared with PDC measure in all frequency sub-bands except gamma [3].

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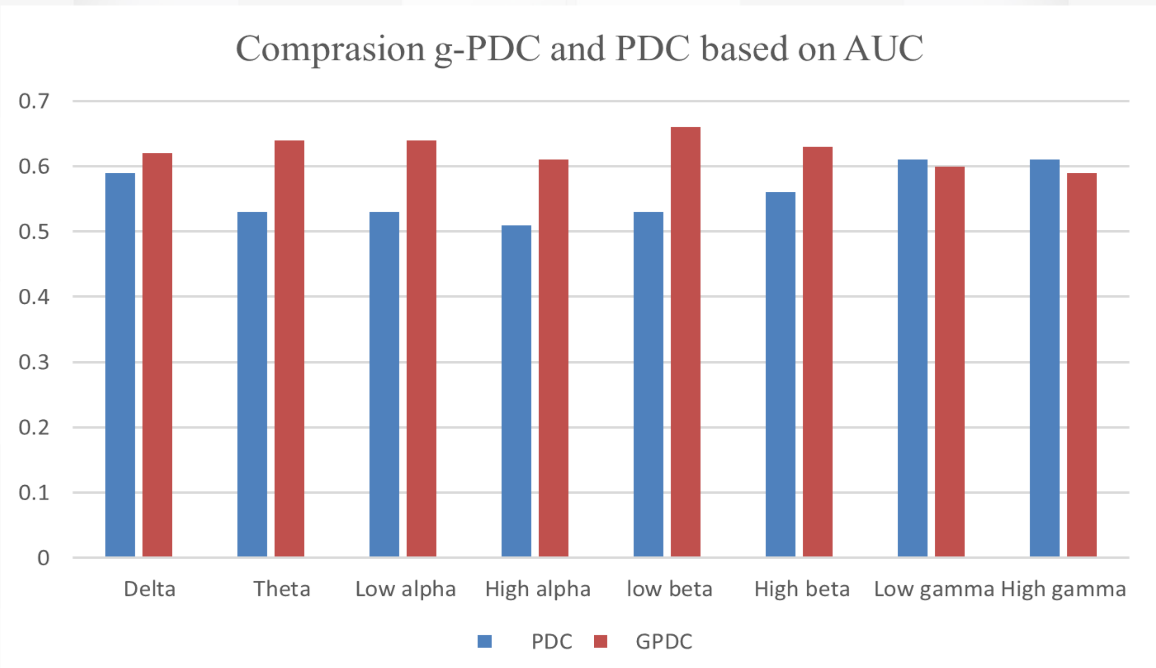

Abstract No. 135

Neural Correlates of Implicit and Explicit Learning of Foreign Language Syntax: An fMRI Study

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Introduction

One of the fundamental questions in second language acquisition is whether language can be learned explicitly through conscious learning of language rules or whether it can be acquired implicitly in the context of meaningful language use. Although a large body of behavioral research has addressed the issue, how implicit and explicit contexts mediate the neural representation of language has not been well characterized [1][2].

Methods

32 Persian speakers were randomly assigned to the implicit or explicit conditions to learn French in three sessions. The explicit condition provided formal instruction on the underlying grammatical rules as well as 40 meaningful examples, whereas the implicit condition presented 140 meaningful examples and no explicit grammar rules were provided. Following the training sessions, fMRI data were acquired using a rapid-presentation event-related design while participants completed a timed grammaticality judgment task.

Results

The whole-brain analysis revealed that both groups activated a rather large network of language-relevant regions in the frontal, temporal and parietal lobes when processing L2 syntax. However, learners in the explicit group showed a more left-lateralized response pattern to processing of both syntactic and violation sentences (as evidenced by the activation of the left BA6). In addition, region of interest (ROI) analysis revealed the involvement of both declarative memory structures, i.e. the hippocampus, the parahippocampal gyrus and the left BA47 as well as procedural memory structures, i.e. the putamen and the precentral gyrus (BA6) (Table 1).

Conclusion

Both groups appeared to rely on areas related to L1 grammar (BA6) but also activated areas of attention and control for the syntactic task (as evidenced by the activation of the posterior cingulate gyrus and insula). Moreover, the pattern of activity revealed by ROI analysis was consistent with the Declarative/Procedural model which predicts that grammar relies on both declarative and procedural memory systems [3].

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Table 1: ROI Analyses for the GJT

Anatomical Location	Value (Wilks' Lambda)	F	Sig
L caudate	.986	.330	.571
R caudate	.956	1.096	.305
L putamen	.698	10.380	.004
R putamen	.905	2.526	.125
L Hippocampus	.556	19.132	.000
R Hippocampus	.628	14.211	.001
anterior parahippocampal gyrus	.830	4.928	.036
posterior parahippocampal gyrus	.575	17.712	.000
L BA6	.776	6.924	.015
R BA6	.982	.438	.515
L BA44	.999	.021	.885
R BA44	.953	1.185	.287
L BA45	.970	.736	.399
R BA45	.748	8.086	.009
L BA47	.705	10.035	.004

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