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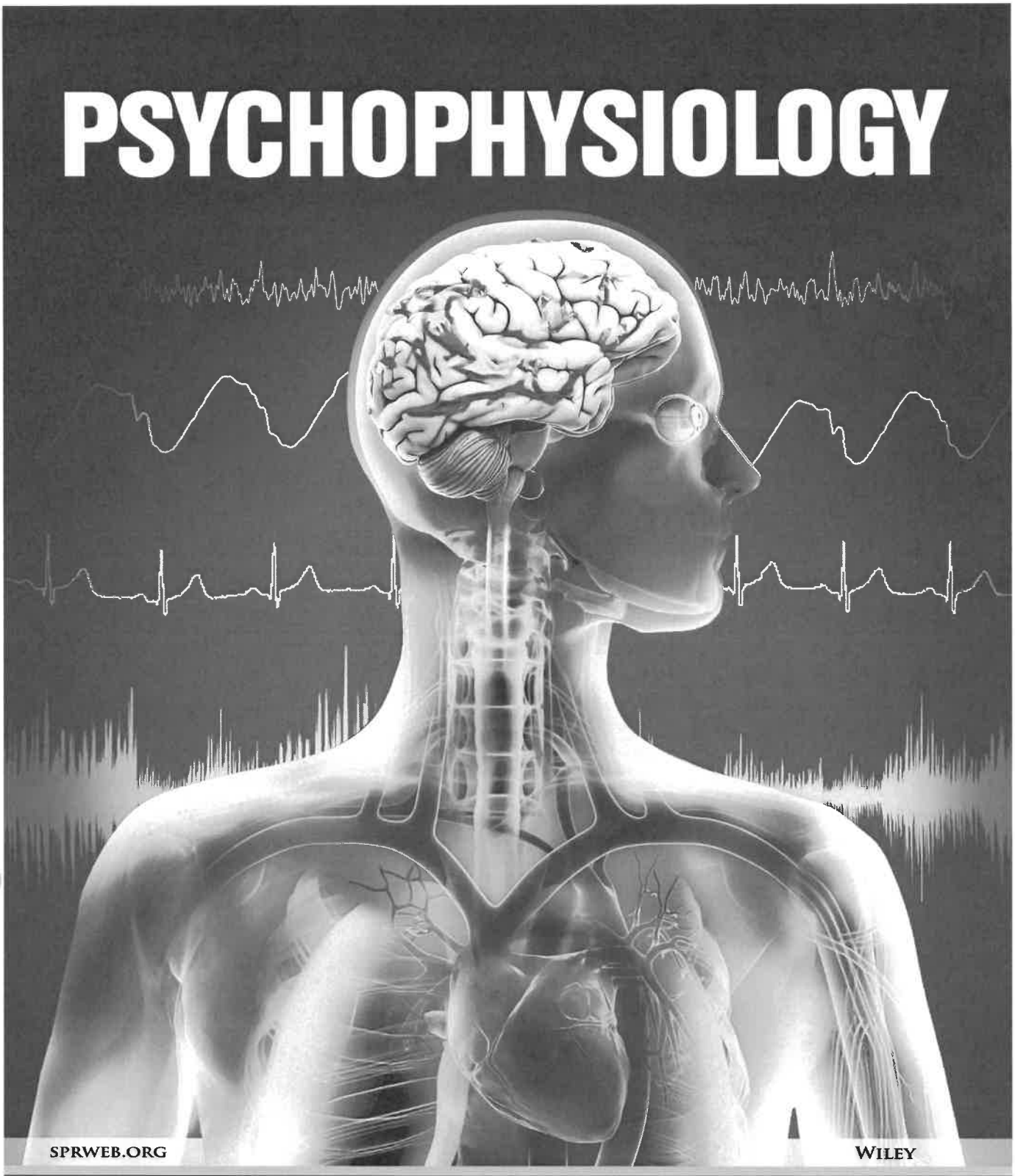

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Editorial Office: Monica Fabiani, Dept. of Psychology and Beckman Institute, University of Illinois at Urbana-Champaign, 2151 Beckman Institute, 405 N. Mathews Ave., Urbana, IL 61801, USA. e-mail: mfabiani@illinois.edu

Management Office: Society for Psychophysiological Research, 2424 American Lane, Madison, WI 53704, USA. Telephone: (608) 443-2472. Fax: (608) 443-2478. e-mail: spr@reesgroupinc.com. The Home Page of the Society for Psychophysiological Research can be found at www.sprweb.org.

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Poster 1-056

SEX DIFFERENCES IN THE RELATIONSHIP BETWEEN ERROR-RELATED ELECTROCORTICAL ACTIVITY AND ANXIETY

Natalie Strand; Ryan Watling; Jeremy Andrzejewski; Joshua Carlson
Northern Michigan University

Descriptors: Error Related Negativity, Trait Anxiety

The Error Related Negativity (ERN) is a negative ERP that occurs immediately after an error is committed. Individuals with anxiety tend to have a stronger sensitivity to errors, which is reflected in higher ERN amplitudes. Recent meta-analytic work indicates that the relationship between anxiety and ERN amplitude is moderated by participant sex such that the relationship is stronger in women compared to men. This study further investigates the effect of sex on the relationship between error-related electrocortical activity and anxiety symptoms in a sample of high trait anxious individuals. Participants completed the State-Trait Anxiety Inventory (STAI), a questionnaire that measures state and trait anxiety. This study selected for high trait-anxious individuals with a score greater than 40. While collecting EEG data, participants completed the Eriksen Flanker Task. The task included congruent trials with arrows facing the same direction (e.g., <<<<<), and incongruent trials with arrows facing different directions (e.g., <<><<). Participants were instructed to indicate the direction of the middle arrow. The ERN was measured by calculating the amplitude difference between incorrect and correct responses. The results indicate that females with higher trait anxiety scores tend to exhibit larger ERN amplitudes, whereas there is no significant relationship for males. Thus, the moderating effect of sex on the relationship between anxiety and ERN is maintained even in the higher levels of the trait anxiety continuum.

Funding: A grant (R15MH110951) was awarded to Principal Investigator Joshua M. Carlson.

Poster 1-057

POSITIVE EMOTION REGULATION: THE NEURAL CORRELATES OF SAVORING

Ian Kahrilas; Fred Bryant; Kelly Polnaszek; Margaret Schroer; Adrianna Diviero; Afreen Hussaini; Rebecca Silton
Loyola University Chicago

Descriptors: Positive Emotion Regulation, Savoring, Positive Affectivity

Frequent experience and regulation of positive emotion are critical for deriving vitality from our lives. The neural correlates of savoring may provide insight into mechanisms of upregulating positive emotion. Neural response to visual affective stimuli can be measured with EEG via the late positive potential (LPP) as an index of evaluative valence and arousal. Savoring involves the use of cognitive or behavioral strategies to upregulate positive emotion. We anticipated that beliefs about savoring capability would correlate with enhanced LPP to amplifying positive affect. The present study evaluated relations between savoring, positive affectivity, and regulation of positive Open Affective Standardized Image Set (OASIS) stimuli, a new open access image set with normed valence and arousal ratings for affective science research. Hypotheses were pre-registered: https://osf.io/p5ba9/. EEG data were recorded from 48 individuals while passively watching or increasing/decreasing emotional intensity in response to OASIS images. The trait Positive and Negative Affect Schedule and Savoring Beliefs Inventory were administered. Results showed enhanced LPP in response to positive (b = 1.38, SE = 0.39, $t(244.96) = 3.52$, $p < .001$, $R^2 = .03$) and negative (b = 2.12, SE = 0.42, $t(249.05) = 5.10$, $p < .001$, $R^2 = .06$) OASIS stimuli. Positive affectivity and savoring did not moderate the relationships between watching or increasing emotional intensity to positive images and LPP. This research underscores the feasibility of the OASIS and contributes to neuroscience-informed interventions.

Poster 1-058

APPLICATION OF A BLUETOOTH HEADSET, CABLE HEADSET, AND A SMARTPHONE CHIP ON THE SMARTPHONE: DO THESE DEVICES REDUCE EFFECTS ON EEG BRAIN ACTIVITY INDUCED BY SMARTPHONE-EMITTED ELECTROMAGNETIC FIELDS?

Diana Henz
University of Mainz

Descriptors: electromagnetic fields, smartphone, EEG

Current research demonstrates adverse effects of mobile phone-emitted electromagnetic fields (EMFs) on EEG brain activity and brain health. Technical solutions are developed to reduce these effects such as bluetooth headsets, cable headsets, and smart phone chips that are applied on the surface of the smartphone. In the present study, we investigated whether these technical devices reduce effects of smartphone-emitted radiation on EEG brain activity. Subjects were exposed to smartphone (iPhone X) EMFs in three experimental conditions (bluetooth headset [AirPods], cable headset, smartphone chip [Gabriel-Tech]), and one control condition (no device) in a within-subjects design. Each experimental condition was tested for 20 minutes. High-density EEG was recorded from 128 electrodes before, during, and after each experimental condition. High-frequency EMFs were measured continuously as a control variable. Results show increases in EEG beta and gamma power when subjects are exposed to smartphone-emitted EMFs in frontal, central, temporal, and parietal areas. Further, data of source localization showed increased activity in the hippocampal area when exposed to smartphone-emitted EMFs. Application of the smartphone chip lead to a significant reduction of increases in beta and gamma power. In contrast, application of the bluetooth headset and cable headset lead to increases in overall beta and gamma power in both hemispheres. Results confirm findings from previous studies on the effects of mobile phone-emitted EMFs on brain activity, and effects of mobile phone chip application.

Poster 1-059

POST MEDITATION CHANGES IN EEG SPECTRUM OF LONG-TERM BRAHMAKUMARIS RAJAYOGA MEDITATORS

Kanishka Sharma[1]; Ronnie Daniel[2]; Sushil Chandra[2]; Ramakrishnan AG[1]
[1]Indian Institute of Science, [2]Institute of Nuclear Medicine and Allied Science, Defence R&D Organization

Descriptors: Long term meditation, EEG Spectrum, Resting state

Rajayoga meditation, taught by Brahmakumaris, is a versatile meditation tradition, performed with open eyes and practiced by more than a million people globally. It employs contemplation with an abundance of positive thoughts and directed thinking in order to reach experiential states for self-development. The present study explores the differences in the spectral properties of long-term meditators. During meditation and post meditation baseline resting, 64 channel EEG was recorded in a silent room with minimal interference. Different frequency bands were selected between 0.5-45 hertz. to determine the average power in different frequency ranges, a modified periodogram approach used after multiplying the signal with a Hamming window prior to computing the digital fourier transform. Percentage of total power was then calculated. Only lower band (0.5-3 and 3-7 hertz) were affected due to post meditation resting. An interesting finding like cross frequency coherence was observed between these bands. Overall frequency spectrum was uniformly distributed in meditation as compared to post condition. This uniform distribution in reduced activity is unique with meditation and dissolved post meditation. Findings are important to understand the sensory deprivation during meditation as well as the state of mental silence in long term practitioners. The synchronization in reduced activity between hemispheres might indicate greater balance in the activity of the two hemispheres. This may lead to more integrated and optimizable functional system to balance emotional and mental health.

Funding: SpARC wing of Brahmakumaris for EEG system.