

ISSN: 2160-5866 Volume 15, Number 7, July 2025



Journal of Behavioral and Brain Science



ISSN: 2160-5866



<https://www.scirp.org/journal/jbbs>

Journal Editorial Board

ISSN Print: 2160-5866 ISSN Online: 2160-5874

<https://www.scirp.org/journal/jbbs>

Editor-in-Chief

Prof. Sergey Konstantinovich Sudakov P.K. Anokhin Research Institute of Normal Physiology, Russia

Editorial Board

Prof. Manar AlAzzam	Al al-Bayt University, Jordan
Prof. Gjurmakch Aliev	University of Atlanta, USA
Prof. Keetam D. F. Alkahtani	King Saud University, Saudi Arabia
Dr. Khalid Wesel Al-Quliti	College of Medicine, Taibah University, Saudi Arabia
Dr. Abdoulaye BÂ	Université Félix Houphouët-Boigny, Cote d'Ivoire
Dr. Raymond Chuen-Chung Chang	University of Hong Kong, China
Dr. Alexandre Croquelois	University of Lausanne, Switzerland
Dr. Manoj P. Dandekar	The University of Texas Health Science Center at Houston, USA
Dr. Valentina Echeverria	Bay Pines Veterans Affairs Healthcare System, USA
Dr. Cheng-Xin Gong	New York State Institute for Basic Research in Developmental Disabilities, USA
Dr. Giuseppe Iurato	Linnaeus University, Sweden
Dr. Chella Kamarajan	SUNY Downstate Medical Center, USA
Dr. Anna Maria Lavezzi	"Lino Rossi" Research Center, Italy
Prof. Xu Lei	Southwest University, China
Dr. James J. Levitt	Brockton VA Medical Center, USA
Dr. Panchanan Maiti	Central Michigan University, USA
Prof. Viktor A. Minkin	Elsys Corp, Russia
Dr. Mindy J. D. Miserendino	Sacred Heart University, USA
Prof. Esther Perez-Torrero	Engineering School, Autonomous University of Querétaro, Mexico
Dr. Arcady Putilov	Research Institute for Molecular Biology and Biophysics, Russia
Prof. Djemli Samir	Badji Mokhtar University, Algeria
Prof. Pertsov Sergey Sergeevich	P.K. Anokhin Institute of Normal Physiology, Russia
Dr. Mohammad Shahnawaz	University of Texas Health Science Center at Houston, USA
Prof. Karam F. A. Soliman	Florida A&M University, USA
Prof. Makio Takeda	Kobe University, Japan
Dr. Gabriel Salazar Tortolero	International University of Catalonia, Spain
Dr. M. Afzal Upal	Defence Research & Development, Canada
Dr. Rui-Ping Xia	Department of Physical Therapy, Franklin Pierce University, USA
Prof. Gang Yang	Zhuji Affiliated Hospital of Shaoxing University, China
Prof. Xin-Fu Zhou	University of South Australia, Australia
Prof. Phillip R. Zoladz	School of Health and Behavioral Sciences, Ohio Northern University, USA

Table of Contents

Volume 15 Number 7

July 2025

Embryological and Epigenetic Foundations of Temperament: Integrating the Spemann Organizer, Notochord, and Neurodevelopment

S. R. Mundo 155

Journal of Behavioral and Brain Science (JBBS)

Journal Information

SUBSCRIPTIONS

The *Journal of Behavioral and Brain Science* (Online at Scientific Research Publishing, <https://www.scirp.org/>) is published monthly by Scientific Research Publishing, Inc., USA.

Subscription rates:

Print: \$79 per issue.

To subscribe, please contact Journals Subscriptions Department, E-mail: sub@scirp.org

SERVICES

Advertisements

Advertisement Sales Department, E-mail: service@scirp.org

Reprints (minimum quantity 100 copies)

Reprints Co-ordinator, Scientific Research Publishing, Inc., USA.

E-mail: sub@scirp.org

COPYRIGHT

Copyright and reuse rights for the front matter of the journal:

Copyright © 2025 by Scientific Research Publishing Inc.

This work is licensed under the Creative Commons Attribution International License (CC BY).

<http://creativecommons.org/licenses/by/4.0/>

Copyright for individual papers of the journal:

Copyright © 2025 by author(s) and Scientific Research Publishing Inc.

Reuse rights for individual papers:

Note: At SCIRP authors can choose between CC BY and CC BY-NC. Please consult each paper for its reuse rights.

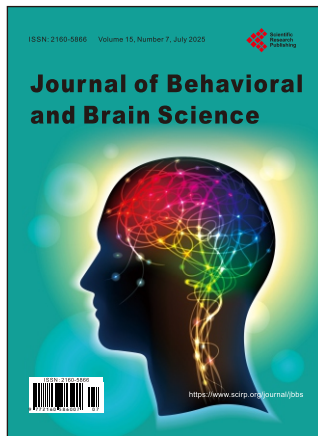
Disclaimer of liability

Statements and opinions expressed in the articles and communications are those of the individual contributors and not the statements and opinion of Scientific Research Publishing, Inc. We assume no responsibility or liability for any damage or injury to persons or property arising out of the use of any materials, instructions, methods or ideas contained herein. We expressly disclaim any implied warranties of merchantability or fitness for a particular purpose. If expert assistance is required, the services of a competent professional person should be sought.

PRODUCTION INFORMATION

For manuscripts that have been accepted for publication, please contact:

E-mail: jbbs@scirp.org



Journal of Behavioral and Brain Science

ISSN: 2160-5866 (Print) ISSN: 2160-5874 (Online)

<https://www.scirp.org/journal/jbbs>

Journal of Behavioral and Brain Science (JBBS) is an international journal dedicated to the latest advancement of behavioural and brain function. Articles dealing with the neuroanatomical and neurochemical basis of behavior are especially welcomed. Multidisciplinary contributions from all fields of the neurosciences are encouraged so long as emphasis is placed in investigating the biological substrates of behavior and of mental processes underlying behavior.

Editor-in-Chief

Prof. Sergey Konstantinovich Sudakov

P.K. Anokhin Research Institute of Normal Physiology, Russia

Editorial Board

Prof. Manar AlAzzam
Prof. Gjurmakch Aliev
Prof. Keetam D. F. Alkahtani
Dr. Khalid Wesel Al-Quliti
Dr. Abdoulaye BÂ
Dr. Raymond Chuen-Chung Chang
Dr. Alexandre Croquelois
Dr. Manoj P. Dandekar
Dr. Valentina Echeverria
Dr. Cheng-Xin Gong
Dr. Giuseppe Iurato

Dr. Chella Kamarajan
Dr. Anna Maria Lavezzi
Prof. Xu Lei
Dr. James J. Levitt
Dr. Panchanan Maiti
Prof. Viktor A. Minkin
Dr. Mindy J. D. Miserendino
Prof. Esther Perez-Torrero
Dr. Arcady Putilov
Prof. Djemli Samir
Prof. Pertsov Sergey Sergeevich

Dr. Mohammad Shahnawaz
Prof. Karam F. A. Soliman
Prof. Makio Takeda
Dr. Gabriel Salazar Tortolero
Dr. M. Afzal Upal
Dr. Rui-Ping Xia
Prof. Gang Yang
Prof. Xin-Fu Zhou
Prof. Phillip R. Zoladz

Subject Coverage

This journal invites original research and review papers that address the following issues in Behavioral and Brain Science. Topics of interest include, but are not limited to:

- Behavioural Science
- Cognitive Neuroscience
- Neurobiology
- Neuroimaging
- Neurology
- Neuropharmacology and Psychopharmacology
- Neurosurgery
- Neurotoxicology
- Psychiatry

We are also interested in short papers (letters) that clearly address a specific problem, and short survey or position papers that sketch the results or problems on a specific topic. Authors of selected short papers would be invited to write a regular paper on the same topic for future issues of the *JBBS*.

Notes for Intending Authors

Submitted papers should not have been previously published nor be currently under consideration for publication elsewhere. Paper submission will be handled electronically through the website. All papers are refereed through a peer review process. Authors are responsible for having their papers checked for style and grammar prior to submission to JBBS. For more details about the submissions, please access the website.

Website and E-Mail

<https://www.scirp.org/journal/jbbs>

E-mail: jbbs@scirp.org