MEDDOCS Open Access Publisher

Neurology and Neurological Sciences: Open Access

Open Access | Research Article

Structural and functional brain differences in key opinion journal leaders

Roger Smith[1,2,3]; Marvin Monroe[1]; Alfred Bellows[1]; Frasier Crane[1,2]; Joe Hung[4]; Jose Williams[4]*; Katrina Cornwell[1,2]

[1]*Department of Psychiatry, University of Los Angeles, California,USA*

[2]*Department of Neuropsychiatry, Faber University, Colorado, USA*

[3]*Department of Advanced Neuroimaging, Adams College, Los Angeles, California, USA*

[4]*Department of Veteran and Diagnostic Assessment (DVDA), Orbison University, Los Angeles, California, USA*

***Corresponding Author(s): Jose Williams**

Department of Veteran and Diagnostic Assessment (DVDA), Orbison University, Los Angeles, California, USA

Email:

Received: Aug 22, 2018

Accepted: Nov 09, 2018

Published Online: Nov 13, 2018

Journal: Neurology and Neurological Sciences: Open Access

Publisher: MedDocs Publishers LLC

Online edition: http://meddocsonline.org/

Keywords: Neuroimaging; Psychiatry; Morphometry

Abstract

Objectives: With the emergence of an exponential growth in the number of scientific journals, it becomes difficult to ascertain those which are reputable from those which are of the so-called 'predatory' type. The current study aimed to investigate whether the brain morphology and neuropsychological profiles differ between the editors of these two types of journals.

Methods: Magnetic Resonance Imaging (MRI) brain scans were obtained from 11 editors of Established Reputable (ER) journals and 11 editors of journals of Questionable Reputation (QR). We also assessed each subject on a set of neuropsychological and psychiatric battery of tests.

Results: The MR results revealed significant reduction in the editors of QR journals in brain regions related to emotion and psychiatric profile, particularly aspects related to reward.

Conclusions: Our unique findings validate the concern amongst the scientific community as to the values held by editors QR journals, highlighting the importance of carefully selecting journals when considering the submission of manuscripts.

Introduction

Publishing scientific findings in reputable journals is an important aspect of clinical research. Each study is the result of considerable resources, including hundreds (and sometimes thousands) of hours of effort among multiple authors, and supported by large amounts of funding often in the order of hundreds of thousands of dollars [1]. Sometimes this extends into millions of dollars in the case of multi-site longitudinal studies. With this in mind, it is important that the findings are disseminated among peers to inform the community as to the value of these results and how they may advance our understanding of the human experience, whether in normal functioning or a disease state [2].

Cite this article: Williams J, Smith R, Monroe M, Bellows A, Crane F, et al. Structural and functional brain differences in key opinion journal leaders. Neurol Neurol Sci Open Access. 2018; 1: 1005.

In recent years, a plethora of journals have emerged which are of Questionable Reputation (QR) and value [3,4]. They also commonly charge authors large publication fees, although some do not [5]. They are purportedly lacking in quality of peer-review and are not listed in major search engines. Hence, their value is limited (or non-existent) and their findings do not reach the scientific community. As an unfortunate occurrence, the findings sometimes reach the general public and are promoted by media outlets. This creates a misunderstanding among the general community as the studies published in these QR journals are often of poor quality with misinterpreted data.

The question therefore arises as to the impetus of these journals, particularly their editors-in-chief. That is, it is unclear whether they are interested in advancing the current scientific state of knowledge, or whether their interests lie more in the financial reward from publications.

The current study aimed to investigate whether the brain morphology and neuropsychological and psychiatric profiles differ between the editors-in-chief of these two types of journals. Examining these aspects may elucidate their true motivations for encouraging and publishing scientific studies.

Materials and methods

Subjects

We approached 15 editors of Established Reputable (ER) journals and 15 editors of journals of Questionable Reputation (QR) to participate in the study. Of those, 11 editors of ER journals and 12 editors of journals of QR journals agreed to participate. Ages ranged from 28 to 67 years of age (mean=42). To avoid gender bias, we only recruited males. There was no significant age difference between the two groups. An ER journal was regarded as a journal that had been established for at least 5 years, had an ISI Impact Factor, and was indexed on both PubMed and Scopus search engines. The study received Ethics approval from the Institution Research Ethics Committee at each facility.

Image acquisition

Data were acquired at three sites using identical model 3 Tesla MRI scanners with a 8-channel head coil. Anterior commissure-posterior commissure aligned scans were acquired with the following parameters: T1-weighted (1 mm isotropic voxels), T2-weighted (1 mm isotropic voxels), and a functional MRI (fMRI) protocol with 100 volumes (2.5 mm isotropic voxels) with an acceleration factor of 2(TR = 2400 ms, TE= 30 ms, flip angle = 90°, matrix size = 104 × 104, FOV = 240 mm × 240 mm, 2.5 mm slice thickness). All scans were inspected for quality; the dataset of one editor-in-chief of a QR journal had excessive movement artefact and was therefore removed from the analysis. Two of the study investigators (JW and MM) were scanned on all three scanners to compare data across sites. Results (not shown) demonstrated less than 1% difference in volumes and fMRI between sites.

For the fMRI study, we used event-related measurement. A task was involved whereby subjects were shown a picture every 3 seconds, randomly interleaved with a black cross on white background. The pictures were randomly presented and comprised images of money, kittens, animated genetic spirals and war. Money represented greed, kittens represented cuteness, animated genetic spirals represented scientific advancement, and war represented humanity. Subjects were presented the stimuli via a Nordic Neuro Lab 32 inch LCD monitor (Bergen, Norway) positioned at the end of the MRI bore running at 60 Hz refresh rate. The head coil was fitted with a half-mirror to enable subjects to see the screen without moving. Each stimulus type (greed, cuteness, scientific advancement and war) was randomly presented 20 times, with a mean jittered stimulus duration of 1.5 seconds (+/- 66.67 ms or +/- 4 monitor refresh cycle).

Image analysis

Structural

The T1-weighted data were processed in FreeSurfer [6] (version 6) to segment the brain into 166 cortical and subcortical regions of interest (ROIs) based on the atlas of Destrieux et al. [7]. The T2-weighted data were inspected for incidental abnormalities. Total intracranial volume (as calculated by Free Surfer) was used as a covariate, and results were corrected for multiple comparisons using the False Discovery Rate [8] (FDR) technique.

Functional

The fMRI data were processed via conventional means using established software [9] (SPM12). A z-threshold of 3.1 was set using FWHM smoothing kernel of 5 mm, and a high pass temporal filtering of 128s. The first 10 volumes were discarded to allow for T1 stabilisation and avoid the influence of anxiety of being in the scanner. All data were corrected for multiple comparisons using the FDR technique. We modelled each stimulus type as an independent parameter (e.g. Greed, Cuteness, etc) as a separate regressor, along with nuisance regressors for motion in translation x,y,z, and rotation rx,ry,rz. Significance of differences survived random field theory and cluster-based correction at $p < 0.05$.

Neuropsychological and psychiatric assessment

Each subject was assessed on a battery of neuropsychological and psychiatric tests by two psychiatrists (FK and MM) who were blinded to each subject's group membership. These included general intelligence (WAIS-III [10]), empathy (Toronto Empathy Questionnaire [11]), Mini Mental State Exam (MMSE [12]), and Global Assessment of Functioning (GAF) Scale [13] (DSM-IV, Axis V).

Results

Structural MRI

Figure 1 shows the results of the Free Surfer analysis. As can be seen, the editors-in-chief of QR journals had a number of significantly reduced regions, including frontal, temporal, and midline structures. Specifically, the dorsolateral prefrontal cortex, amygdala, and anterior cingulate gyrus. No subjects had incidental abnormalities.

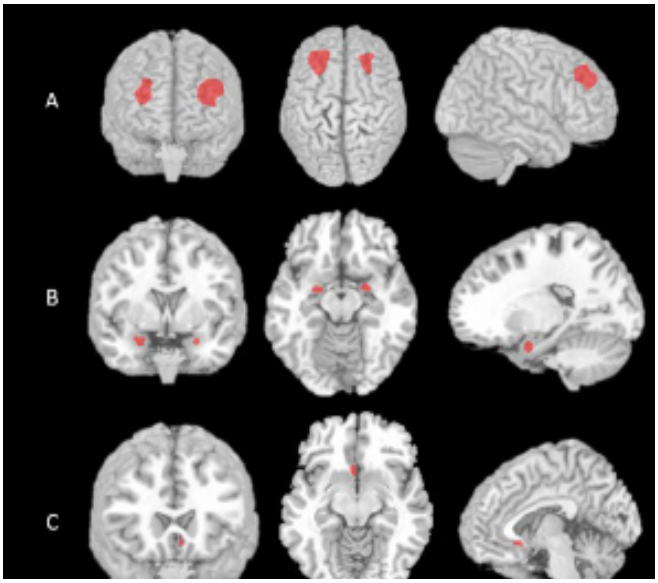

Figure 1: Regions of decreased volume in editors-in-chief of questionable reputation journals compared to those from established reputable journals. A: Dorsolateral Prefrontal Cortex; B: Amygdala; C: Anterior cingulate gyrus.

Functional MRI

The fMRI results showed that the editors-in-chief of QR journals had significantly higher Blood Oxygenated Level Dependent (BOLD) in response to images of money (nucleus accumbens), and reduced BOLD in response to images of kittens (amygdala), animated genetic spirals (dorsolateral prefrontal cortex), and war (anterior cingulate gyrus).

Neuropsychology and psychiatry

Editors-in-chief of the QR journals had significantly lower performances on assessment of general intelligence, MMSE and empathy, but significantly higher scores on tests of psychiatric disorder (Table 1). Four of the editors-in-chief of QR journals scored positively on subtests of narcissistic personality disorders, and another scored positively on subtests of non-specific personality disorder.

Table 1: Subjects scores on assessments of neuropsychology and psychiatry.

Test	ER (M/SD)	QR (M/SD)	Significance
WAIS-III	119.11/7.81	102.49/8.55	<0.001
Toronto Empathy	47.17/7.28	31.25/15.06	<0.001
MMSE	30.00/0.00	27.65/2.50	<0.01
GAF DSM-V	91.10/8.58	74.97/25.61	<0.001

Note: ER: Established reputable; M: Mean; QR: Questionable reputation; SD: Standard deviation.

Discussion

We present data comparing structural and functional brain differences between editors-in-chief of Establish Reputation (ER) and Questionable Reputation (QR) journals, as well as neuropsychological and psychiatric profiles. Our data demonstrate that there are key differences in those domains. Specifically, 1. Editors-in-chief of QR journals have reduced volume in various brain regions, 2. They have different degrees of BOLD response to images, and 3. They differ in terms of cognitive and psychiatric function.

Structural and functional MRI

Our analysis revealed structural differences between the groups in key brain regions. In particular, those in the QR group had reduced mean dorsolateral prefrontal cortex volumes (a key region associated with executive functioning such as memory, attention, impulsivity, and personality [14,15], amygdala and anterior cingulate cortex (emotional regulation and perception of fear and happiness [16]). The fMRI study demonstrated differences in blood flow response (i.e. BOLD) between the groups in these same regions in addition to the nucleus accumbens which has been identified as related to greed and gambling [17]. Specifically, those in the QR group had less response to the images related to war, empathy and scientific progress, and greater response to those associated with finance.

Neuropsychology and psychiatry

Neuropsychiatric assessment revealed significant differences among the groups such that those in the QR group had reduced general intelligence, empathy, and global functioning. Furthermore, some of the subjects in the QR group had clinical megalomania/narcissism and one had a non-specific personality disorder.

Implications

It is clear from this study that the structural, functional and neuropsychiatric characteristics of editors-in-chief differ between QR and ER journals. The results imply that those in the QR group are more driven by financial gain rather than the advancement of science [18].

Limitations

The current study has several limitations. Firstly, the group sizes were small and therefore generalisability is limited. Secondly, the subjects were only from one part of the world and hence may not represent editors-in-chief of all QR and ER journals. Our future efforts will be directed towards recruiting and assessing a larger and more representative cohort. There is the potential for bias due to major difference in educational level, professional hierarchy and scientific achievement in terms of publications and awarded grants between the two groups. This could bring structural difference in some of the brain development and function.

Conclusion

This study found that the brains of editors-in-chief of QR and ER journals differ on several levels, and that they have different priorities and personalities. Scientists may take this into account when selecting journals to submit their work to.

Acknowledgments

We thank the staff of the MRI facility at various institutions, and Prof Joseph Davola for his advice and assistance regarding psychiatric assessments.

Funding

This work was funded by a grant from the University of Los Angeles (ULA-20170998326A).

References

1. Van Noorden R. Open access: The true cost of science publishing. Nature 2013; 495: 426-9.
2. Ferris LE, Winker MA. Ethical issues in publishing in predatory journals. Biochemia Medica (Zagreb). 2017; 27: 279-284.
3. Beall J. Predatory publishers are corrupting open access. Nature. 2012; 489: 179.
4. Gasparyan AY, Yessirkepov M, Voronov AA, Gerasimov AN, Kostyukova EI, et al. Preserving the Integrity of Citations and References by All Stakeholders of Science Communication. Journal of Korean Medical Science. 2015; 30: 1545-1552.
5. Stojanovski J1, Marušić A. Does small equal predatory? Analysis of publication charges and transparency of editorial policies in Croatian open access journals. Biochemica Medica (Zagreb). 2017; 27: 292-299.
6. Fischl B, van der Kouwe A, Destrieux C, Halgren E, Ségonne F, et al. Automatically parcellating the human cerebral cortex. Cerebral Cortex. 2004; 14: 11-22.
7. Destrieux C, Fischl B, Dale A, Halgren E. Automatic parcellation of human cortical gyri and sulci using standard anatomical nomenclature. Neuroimage. 2010; 53: 1-15.
8. Benjamini Y, Hochberg Y. Controlling the false discovery rate: A practical and powerful approach to multiple testing. J R Stat Soc Ser B. 57: 289–300.
9. Friston KJ, Ashburner JT, Kiebel SJ, Nichols TE, Penny WD. Statistical Parametric Mapping: The Analysis of Functional Brain Images. Elsevier, London. 2006.
10. Wechsler D. WAIS-III administration and scoring manual. San Antonio, TX: The Psychological Corporation; 1997.
11. Spreng RN, McKinnon MC, Mar RA, Levine B. The Toronto Empathy Questionnaire: scale development and initial validation of a factor-analytic solution to multiple empathy measures. Journal of Personality Assessment. 2009; 91: 62-71.
12. Folstein MF, Folstein SE, McHugh PR. Mini-mental state. A practical method for grading the cognitive state of patients for the clinician. Journal of Psychiatry Research 1975; 12: 189-98.
13. American Psychiatric Association. Diagnostic and statistical manual of mental disorders (5th ed.). Arlington, VA: American Psychiatric Publishing. 2013.
14. Bari A, Robbins TW. Inhibition and impulsivity: behavioral and neural basis of response control. Progress in Neurobiology 2013; 108: 44-79.
15. Lipton ML, Gulko E, Zimmerman ME, Friedman BW, Kim M, et al. Diffusion-tensor imaging implicates prefrontal axonal injury in executive function impairment following very mild traumatic brain injury. Radiology. 2009; 252: 816-824.
16. Verdejo-Román J, Bueso-Izquierdo N, Daugherty JC, Pérez-García M, Hidalgo-Ruzzante N. Structural brain differences in emotional processing and regulation areas between male batterers and other criminals: A preliminary study. Social Neuroscience. 2018; 31:1-8.
17. Martucci KT, Borg N, MacNiven KH, Knutson B, Mackey SC. Altered prefrontal correlates of monetary anticipation and outcome in chronic pain. Pain. 2018; 159: 1494-1507.
18. Shamseer L, Moher D, Maduekwe O, Turner L, Barbour V, et al. Potential predatory and legitimate biomedical journals: can you tell the difference? A cross-sectional comparison. BMC Medicine. 2017; 15: 28.