



Reader comments to media reports on psychiatric neurosurgery: past history casts shadows on the future

Laura Y. Cabrera¹ · Merlin Bittlinger² · Hayami Lou³ · Sabine Müller² · Judy Illes⁴

Received: 6 June 2018 / Accepted: 2 October 2018
© Springer-Verlag GmbH Austria, part of Springer Nature 2018

Abstract

Background Comments made by readers in response to news articles about current events can provide profound insights into public understanding of and perspectives on those events. Here, in follow up to a paper published last year in this journal, we examined reader comments to articles in newspapers and magazines about neurosurgical interventions for treating psychiatric illness.

Method We conducted a thematic analysis of these comments ($N = 662$ coded units of data) posted in response to 115 newspaper and magazine articles from four countries (Canada, USA, Germany, and Spain) between 2006 and 2017. The comments were coded using an iteratively refined coding scheme that was structured around four a priori categories based on results from the parent study and two new categories that emerged.

Results We found many references to historical psychosurgery and mostly negative and pessimistic comments about ablative neurosurgical interventions. Comments to deep brain stimulation were more positive, and comments to optogenetics most controversial. We also found many expressions of distrust of medical professionals in the context of interventions on the brain and concerns about social and individual control.

Conclusions Overall, results suggest there is still much work to be done to raise public awareness about re-emerging and new neurosurgical interventions. Balanced discussion is needed if these approaches are to find a place in health care for psychiatric disorders.

Keywords Psychiatric neurosurgery · Neuroethics · Public perceptions

This article is part of the Topical Collection on *Functional Neurosurgery - Other*

✉ Judy Illes
jilles@mail.ubc.ca

Laura Y. Cabrera
laura.cabrera@hc.msu.edu

¹ Center for Ethics and Humanities in the Life Sciences, Department of Translational Science and Molecular Medicine, Michigan State University, East Fee Hall, 965 Wilson Road, Rm C211, East Lansing, MI 48824, USA

² Charité – Universitätsmedizin Berlin, corporate member of Freie Universität Berlin, Humboldt-Universität zu Berlin, Department of Psychiatry and Psychotherapy, CCM, Division of Mind and Brain Research, Berlin Institute of Health, Berlin, Germany

³ Neuroethics Canada, The University of British Columbia, Vancouver, Canada

⁴ Canada Research Chair in Neuroethics, Neuroethics Canada, Division of Neurology, Department of Medicine, The University of British Columbia, 2211 Wesbrook Mall, Koerner S124, Vancouver, BC V6T 2B5, Canada

Introduction

At a global cost to society of US\$1 trillion each year from depression and anxiety disorders alone [27], a clear imperative exists to find safe and effective interventions for mental health disorders. There remains much debate about best strategies, however, including those that involve psychiatric neurosurgery.

More than 15 years ago, in 2002, a collective of scholars from Belgium, Sweden, and the USA [17] reported on the increasing interest from the medical community in the use of deep brain stimulation (DBS) as a treatment for patients with psychiatric conditions refractory to conventional pharmacologic therapy. Their study built on preliminary positive results from the first DBS trial involving patients with severe obsessive-compulsive disorder (OCD) [16]. Ten years later, in 2009, the approval of DBS for OCD both in Europe and in the USA was a landmark for the use of emergent psychiatric interventions. Since these milestones, information about DBS and other forms of neurostimulation, as well as ablative techniques and, most recently optogenetics, have been captured

for the public in newspaper and magazine articles [5], health documentaries, and in social media.

News media has historically played an important role not only as a purveyor of information about mental health and illness but as an agenda-setter that focuses public interest and shapes values and perceptions about current events [2, 12, 19]. There are challenges that arise from either overly optimistic or pessimistic media campaigns about treatments for mental health conditions [11]. Media coverage of the early years of lobotomy, for example, was generally positive [24]. This valent, sometimes misleading reporting not only stimulated interest in the procedure but contributed to its widespread adoption [8]. By contrast, news about electroconvulsive therapy, another approach used to treat psychiatric disorders, has reinforced negative attitudes over the past decades [14] despite growing scientific evidence about the safety and effectiveness of the procedure [25]. Indeed, Schläpfer and colleagues [23] have cautioned that messaging about the potential benefits of older and new interventions should err on the side of caution and mitigate hype. Similarly, Schläpfer and Fins [22] have recommended that single case studies, which tend to attract substantial international media attention, ought to be subject to distinct scrutiny and evaluation before receiving broad exposure by the press.

Both the news media and the public have also turned to the Internet and social media to push and pull information about medical therapies, including psychiatric neurosurgery, enabling active debate on the pros and cons of various issues [26]. Henrich and Holmes broke new ground in this regard by examining themes in online comments about the 2009 H1N1 Pandemic [13]. Regan et al. [20] explored perceptions of dietary health risks through a study of online comments on a popular British news media website. Cabrera and colleagues [4] similarly explored thematic changes in the understanding of transcranial direct current stimulation for the purpose of enhancing cognitive function in newspaper and magazine publications originating in the USA and UK. Unlike polls or surveys, this approach does not elicit opinions; instead, it investigates public opinion by analyzing the discussions in which they choose to take part. Overall, the study of reader comments has proven to be a rich and useful method for exploring the reactions of a subset of the public—engaged readers of online news—as well as the relative prominence of certain themes and reactions over others within that set [10, 13, 28].

In a first study published in this journal in early 2018 in which we examined trends in media coverage of all types of psychiatric neurosurgery, we found increasing numbers of generally positive articles between 1960 and 2015 and some limited discussion of ethical and regulatory issues that pertain to identity and privacy [5]. We sought to examine reader comments to these news and magazine articles here.

Methods

Sample

We generated the sample for this study from the comments to articles compiled using the Factiva database and websites of major national newspapers and magazines from Canada, USA, Germany, and Spain. For inclusion, original materials had to be published in sources with a circulation of greater than 90,000 and had to have reported on at least one psychiatric neurosurgical intervention. Although the parent dataset was benchmarked to 1960, 2006 was the first year for which we retrieved online comments for this study. We included all comments to articles updated to 2017 with content related to the use of psychiatric interventions, the use of these interventions as treatments, and general comments related to the topic such as the nature of mental health disorders. We manually curated and excluded comments deemed to be incoherent or irrelevant.

Analytic procedure

Native speakers of the research team (LC, MB, HL) conducted the analysis of comments on articles from each country. We coded interactively, applying a codebook developed for the examination of the articles themselves and adapted to the present study goals. We analyzed the content inductively and captured themes not in the initial codebook as the coding process progressed [3, 6]. We grouped comments from individual commenters into a single unit of analysis to mitigate the potential distortion effect of counting of multiple comments by a single person as independent observations.

Codes were grouped for quantitative analysis into four major, a priori categories and two emerging categories related to psychiatric neurosurgery interventions: (1) scientific and technological issues; (2) social, legal, and political issues; (3) patient/research subject issues; (4) ethical issues; (5) perceptions (optimism, pessimism, cautionary realism, controversial, or not applicable); and (6) personal experiences. We also applied a code for tone (positive, balanced, negative, neutral, or not applicable). Coders addressed questions about coding via e-mail and video conferencing. Disagreements were settled by consensus.

For the analysis, each comment was assigned a variable by type of intervention: (1) historical psychosurgery (e.g., lobotomy); (2) contemporary microsurgical ablative procedures with stereotactic frame and imaging guidance, such as capsulotomy and cingulotomy; (3) deep brain stimulation; and (4) optogenetics. A fifth category comprised a cluster of coverage of comments to articles on other procedures, such as vagal nerve stimulation, radiosurgery, focused ultrasound, stem cell therapy, and brain computer interfaces other than DBS.

We used chi-square tests to investigate the hypotheses that the perception of psychiatric neurosurgery, tone, and ethical nature of comments will differ across different interventions and countries. To place the quantitative findings into a richer narrative context, we also examined comment narratives qualitatively. Selected quotes illustrate theme content.

Results

The search yielded a total of 1974 comments to articles originating in Canada and USA, Spain, and Germany. The final sample for analysis after curation comprised 352 comments ($n = 14$ from Canada; $n = 338$ from the USA) from 6 Canadian and 31 US newspaper articles, 196 comments from 37 Spanish articles, and 114 comments from 20 German articles. We report on comments to articles from Canada and the USA as a single category for sufficient statistical power as no major differences were observed upon descriptive analysis. A sample of articles and associated comments selected for inclusion are shown in Table 1.

The frequency of reader comments was sporadic for the 11-year study period (Fig. 1), despite the steadily increasing number of media reports [5].

The two peaks for Canada/USA correspond to the 2009 *New York Times* piece on FDA approval of DBS to treat refractory obsessive-compulsive disorder and a surge in comments about VNS, lobotomy, and optogenetics in 2017.

The majority of comments were in response to articles about DBS (44% of all comments, $n = 291/662$) and historical ablative procedures (25%, $n = 163/662$). DBS was the focus of most comments to media articles across countries (Canada/USA 36% of all Canadian/USA comments, $n = 125$; Germany 46%, $n = 53$; Spain 58%, $n = 113$), consistent with the focus of the articles themselves. We found a particularly high rate of comments about historical ablative procedures to articles from Germany (48%, $n = 53$).

The tone of comments to articles on contemporary ablative procedures (59%, $n = 16/27$) and historical ablative procedures (58%, $n = 94/163$) was significantly more negative overall than comments to articles on other psychiatric neurosurgery interventions ($\chi^2(4) = 39.793$, $p < .001$; Fig. 2)

Moreover, by burning out parts of the brain, we are assuring that the person will never have normal brain function again. It is a very telling oversight that the article says nothing about adverse effects or outcomes for those for whom the procedure ‘didn’t work’. (Wired, 2015, ‘Psychosurgeons Use Lasers to Burn Away Mental Illness,’ commenter #428)

Brain and capital. The image of man was also adapted to this early zenith of "American materialism": Like an engine functional repairable. This may explain the

decades of success of Walter Freeman & the lobotomy. (Spiegel, 2015, “What have we done to you?” commenter #105, translated by MB)

However, tone also varied by country. Negative comments were significantly more frequent in response to German articles (62.3%, $n = 71/114$) compared to articles from Canada/USA (41%, $n = 144/352$) and Spain (24%, $n = 48/196$; $\chi^2(4) = 43.42$, $p < .001$). We did not find a significant correlation between tone of comments and tone of articles.

Perceptions about both contemporary microsurgical (41% of all comments on contemporary ablative procedures, $n = 11/27$) and historical ablative procedures (29%, $n = 47/163$) were also pessimistic ($\chi^2(4) = 17.029$, $p < .002$) in comparison to the other interventions (Fig. 3) and distinguished by country (Germany 40%, $n = 46/114$, Canada/USA 23%, $n = 83/352$, Spain 10%, $n = 19/196$; ($\chi^2(2) = 39.732$, $p < .001$).

So doctors are surprised that frontal lobotomy causes brain damage? It *is* brain damage. Good grief, doctors aren't tampering with neural circuits: they are destroying them. (New York Times, 2009, ‘Surgery for mental ill offers both hope and risk,’ commenter #9)

The majority of controversial comments were in response to optogenetics (28%, $n = 29/103$) and occurred most frequently in comments to articles from Spain (29%, $N = 56$) ($\chi^2(2) = 52.159$, $p < .001$).

This therapy should be applied to the politicians who win the elections to see if they remember everything they promise in the campaign. (20 min, 2008, ‘Descubren accidentalmente un método para recuperar la memoria’, commenter #149, translated by LC) [...]let them throw me those volts...and see if I get smarter. (20 min, ‘Descubren accidentalmente un método para recuperar la memoria’, 2008, commenter #139, translated by LC)

Ethical, social and political considerations

Risk was the ethical concern raised most frequently in comments to Canada/USA articles (8%, $n = 28/352$) compared to articles from Germany and Spain ($\chi^2(2) = 15.364$, $p < .001$):

It’s up to the sufferer to decide whether this treatment is worth the risk or not, and in this case, the disease itself is likely to be much worse than any potential side effect. (Wired, 2015, ‘Psychosurgeons Use Lasers to Burn Away Mental Illness,’ commenter #475)

Table 1 Selection of articles with more than 20 comments from Canada and USA, Spain, and Germany. (Note that titles do not necessarily represent the content of the articles themselves)

Title of media articles	Media	Date	No. of unique comments
Canada and USA			
Hitting the right nerve: the electronic neck implant to treat depression	The Guardian	2 Oct 17	307
Scientists use light to trigger killer instinct in mice	The Guardian	12 Jan 17	197
The Quest for a Psychiatric Cure	The New York Times	16 Apr 17	188
Surgery for mental ills offers both hope and risk	The New York Times	26 Nov 09	134
Psychosurgeons use lasers to burn away mental illness	Wired	25 June 15	99
Human behavior: is it all in the brain - or the mind?	The Guardian	30 Jun 13	96
Man develops powerful love of Johnny Cash following deep brain stimulation	The Guardian	27 May 14	74
Emma Stone to play JFK's eldest sister in tale of enforced lobotomy	The Guardian	22 Mar 16	47
FDA approves a device for weight loss	LA Times	14 Jan 15	32
MIT scientists find evidence that Alzheimer's 'lost memories' may one day be recoverable	Washington Post	17-Mar-16	30
Scientists reawaken memory in mice that had a condition resembling Alzheimer's	Washington Post	29-Jul-17	29
Brain surgery made a man obsessed with Johnny Cash	SF Gate	23-May-14	24
Spain			
Descubren accidentalmente un método para recuperar la memoria [They accidentally discover a method to recover memory]	20 min	1/30/2008	54
Consiguen acabar con la adicción a la cocaína usando luz laser [They get rid of cocaine addiction using laser light]	20 min	5/4/2013	35
¿Avanza la neurociencia hacia el control de la mente humana? [Does neuroscience advance towards the control of the human mind?]	EL Pais	9/4/2015	31
Las 'prácticas médicas' más inverosímiles de la historia [The most unlikely 'medical practices' in history]	La Vanguardia	7/31/2017	29
Operar de las 'manías' [Operate the 'manias']	El Pais	3/6/2012	24
Logran convertir en placenteros los recuerdos desagradables actuando en circuitos neuronales [They manage to make pleasant unpleasant memories by acting on neural circuits]	20 min	8/31/2014	23
Tratan con éxito la depresión estimulando el 'centro de placer' del cerebro [Successful treatment of depression by stimulating the brain's 'pleasure center']	20 min	1/31/2010	20
Germany			
Stromschläge lindern schwerste Depressionen anhaltend [Electric shocks provide sustained relieve from severest major depression]	Die Zeit	18-Apr-13	31
"Was haben wir dir angetan?" ["What have we done to you?"]	Spiegel	21-Oct-15	28
Die geheime Kennedy-Tragödie [Kennedy's secret tragedy]	BILD	9-Jul-15	20
Der Mann mit dem Eispickel [The man with the ice pick]	Spiegel	28-Feb-14	20

So going beyond the [electro-convulsive therapy], to actually invading the brain itself and destroying or removing tissue is opening up a whole new frontier of risk for patients. (The New York Times, 2009, 'Surgery for mental ills offers both hope and risk,' commenter #20)

Distrust of medical professionals was the ethical issue raised most frequently in comments to articles originating from Canada/USA (21%, $n = 75/352$), compared to comments originating from Germany or Spain ($\chi^2(2) = 30.790, p < .001$):

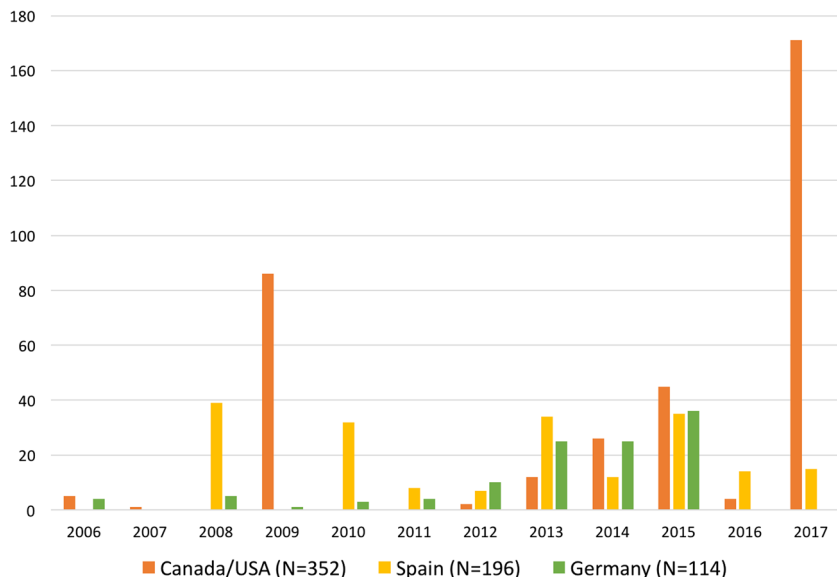
If this 'surgery' comes into vogue, get ready for the heart-breaking stories that will happen to children and people duped by the medical 'profession.' It happened

with frontal lobotomy. The doctors haven't changed, only their knives are different. (The New York Times, 2009, 'Surgery for mental ills offers both hope and risk', commenter #9)

Issues of mind and social control were raised most frequently in comments to German and Spanish articles (Germany: 9%, $n = 10$, and Spain: 5%, $n = 10$, $\chi^2(2) = 8.287, p = .016$) and particularly in response to articles about DBS:

And at some point we get such a thing implanted right after birth and all our thoughts are controlled all our lives! Great! (BILD, 2013, 'Dank eines

Fig. 1 Number of units of analysis by country (Canada/USA, Spain and Germany) across time (2006–2017)



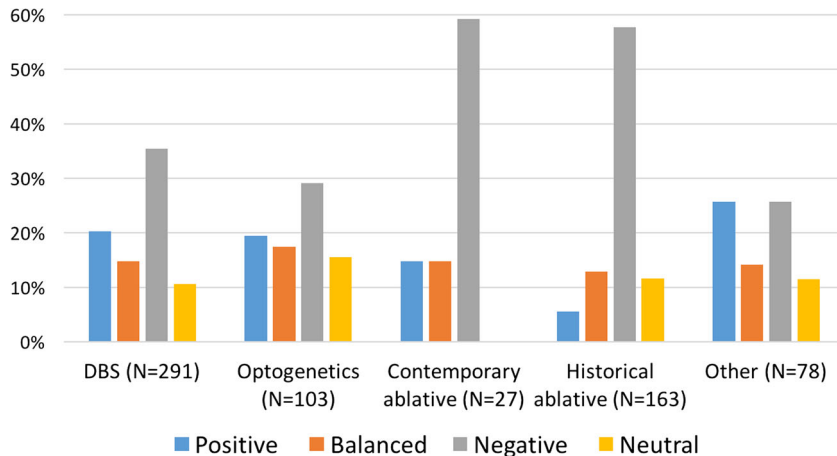
Hirnschrittmachers is(s)t Kim Rollins gesund,’ commenter #47, translated by MB)

It seems to me that behind this possible therapeutic use, it lends itself when it is perfected as the most sinister technique of manipulation of people. (El Pais, 2015, ‘¿Avanza la neurociencia hacia el control de la mente humana?’ commenter #64, translated by LC)

Only comments to articles from Germany raised issues of social pressure. Discussion of regulation was scarce in comments across all countries, representing fewer than 5% of all comments.

In addition to ethical and social concerns, we also found that comments to articles from Canada/USA compared contemporary interventions to earlier forms of psychiatric neurosurgery (24%, $n = 83$) and shared personal experiences (24%, $n = 86$) more often than comments to articles from Spain or Germany ($\chi^2(2) = 32.2417, p < .001$ and $\chi^2(2) = 57.536, p < .001$, respectively).

Fig. 2 Tone of comments by type of intervention



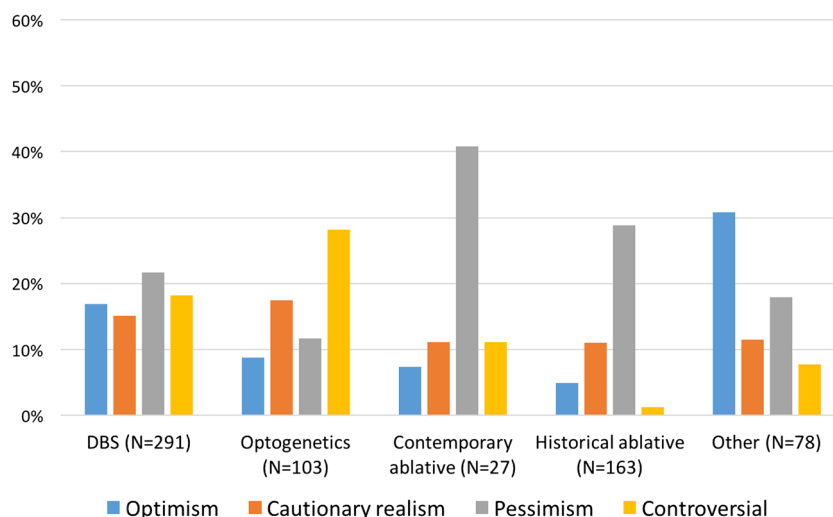
The damage done over the years with aggressive treatments such as lobotomy, insuline shock therapy treatment and electro convulsive experiments should serve as a lesson to outlaw such practices. (The New York Times, 2009, ‘Surgery for mental ills offers both hope and risk’, commenter #33)

Hey, Why don’t you people speak for yourself. I have a daughter who could benefit from such surgery. I am waiting with bated breath to see where the advances go. Medical advance is medical advance, get used to it. (The New York Times, 2009, ‘Surgery for mental ills offers both hope and risk’, commenter #116)

Discussion

This analysis of a large sample of comments to newspaper and magazine articles from Canada, USA, Germany, and Spain posted

Fig. 3 Perspectives on psychiatric neurosurgery by type of intervention



between 2006 and 2017 reveals negative attitudes and pessimism towards both historical and contemporary ablative psychiatric neurosurgery techniques. The finding is consistent with accounts of psychosurgery by medical historians [18, 24], and casts a shadow from the past on optimism for other advanced endeavors such as those involving deep brain stimulation. This difference in attitude is not justified by empirical evidence, however, as each of these types of procedures has different profiles of advantages and disadvantages, and no study to date has shown that any one intervention is superior over another [15].

Differences in the overall tone of comments between countries may be the result of distinct sociopolitical norms, cultural history, and values [1, 21, 24]. Comments with negative tone were most frequent from Germany. This is consistent with a recent European study [9] that found that only 54% of German commenters think that science and technology make the lives of people easier, more comfortable, and healthier (e.g., in contrast to 79% of commenters from Spain).

The references to risk, control, and medical professional responsibility may be attributed to the legacy of the lobotomy era, together with public portrayals of earlier forms of psychiatric interventions. As Pressman wrote, “The spectre of politically motivated doctors hacking away at the brains of unpopular citizens branded psychosurgery as a form of bad, if not evil, medicine” [18]. Overall, however, the limited public reactions focusing on ethical concerns might be shaped by the limited discussion in the media articles themselves [7].

The few comments addressing regulation often reflected lessons from the past. These are plausibly linked to the fact that many interventions are still under investigation. Others, such as optogenetics, are still in the phase of animal experimentation.

Limitations The data contain the views of a subset of the public that reads online news and magazines, is interested in the topic of psychiatric neurosurgery, and is motivated to

comment on it. The robustness of the medical data and its presentation to the general public was not a focus of the present study but is addressed in [5]. The views of readers as reflected in their comments are nonetheless shaped by the original media reporting to the public that is itself shaped by reporting that originates with clinicians and scientists and the academic literature.

While the media platform for submission of comments belongs to each of the respective countries, commenters may not reside in that particular country: German magazines are read by people from Austria and Switzerland, Spanish magazines are read by people in South America, and English language articles are reproduced and read worldwide. The anonymity of online comments may invite more open opinions than other contexts in which anonymity of expression is not retained, but it also invites more controversial or charged views. Similarly, the anonymity of online comments makes it impossible to know sociodemographic and background information about the commenters engaged in the online debate. Overall, online comments do not necessarily reflect well-informed or well-considered positions and may be based on extraneous misinformation or misinterpretation of the target article.

Conclusions

As psychiatric neurosurgery is making a comeback, the views and values of the public and the ways in which they interact and shape public policy must be considered. Online spaces enable people to engage in extended conversations and present unsolicited reactions both to primary news articles and other commenters. This first window to public perceptions about psychiatric neurosurgery suggests that irreversible, ablative interventions are evaluated negatively, and that negative evaluations of historical psychosurgery fuels skepticism about contemporary ablative procedures. There is an ongoing

challenge for neurosurgeons, researchers, and policymakers to engage constructively with diverse societal concerns about psychiatric neurosurgery to improve public understanding of them and mitigate stigma.

Acknowledgments We would like to acknowledge the support from members of the ERA-NET NEURON psychiatric neurosurgery team, and Caitlin Courchesne (Neuroethics Canada) for the thoughtful comments on previous drafts.

Funding ERA-NET NEURON Team Grant: Ethical, Legal and Social (ELS) Issues #ERN-144241 (JI) and the Federal Ministry of Education and Research of Germany (01GP1621A) (SM). The sponsor had no role in the design or conduct of this research.

Compliance with ethical standards

Conflict of interest The authors declare that they have no conflict of interest.

Ethical approval This article does not contain any studies with human participants performed by any of the authors.

References

1. Abdullah T, Brown TL (2011) Mental illness stigma and ethnocultural beliefs, values, and norms: an integrative review. *Clin Psychol Rev* 31(6):934–948
2. Bauer MW (2005) Public perceptions and mass media in the biotechnology controversy. *Int J Public Opinion Res* 17(1):5–22
3. Braun V, Clarke V (2006) Using thematic analysis in psychology. *Qual Res Psychol* 3(2):77–10
4. Cabrera LY, Reiner PB (2015) Understanding public (mis)understanding of tDCS for enhancement. *Frontiers in Integrative Neuroscience* 9 (art 30)
5. Cabrera LY, Bittlinger M, Lou H, Müller S, Illes J (2018) The re-emergence of psychiatric neurosurgery: insights from a cross-national study of newspaper and magazine coverage. *Acta Neurochir* 17(1):1–11
6. Chi MT (1997) Quantifying qualitative analyses of verbal data: a practical guide. *J Learn Sci* 6(3):271–315
7. Craig DA (2011) Ethical language and themes in news coverage of genetic testing. *J Mass Commun Q* 77(1):160–174
8. Diefenbach GJ, Diefenbach D, Baumeister A, West M (1999) Portrayal of lobotomy in the popular press: 1935–1960. *J Hist Neurosci* 8(1):60–69
9. European Commission (2013) Eurobarometer: responsible research and innovation (RRI), Science and Technology http://ec.europa.eu/comfrontoffice/publicopinion/archives/ebs/ebs_401_en.pdf Accessed 24 January 2018
10. Faridani S, Bitton E, Ryokai K, Goldberg K (2010) Opinion space: a scalable tool for browsing online comments. In: CHI '10, ACM press, New York, New York, USA, p 1175
11. Gilbert F, Ovadia D (2011) Deep brain stimulation in the media: over-optimistic portrayals call for a new strategy involving journalists and scientists in ethical debates. *Frontiers in Integrative Neuroscience* 5 (Art 16)
12. Happer C, Philo G (2013) The role of the media in the construction of public belief and social change. *J Soc Polit Psych* 1(1):321–336
13. Henrich N, Holmes B (2011) What the public was saying about the H1N1 vaccine: perceptions and issues discussed in on-line comments during the 2009 H1N1 pandemic. *PLoS One* 6(4):e18479–e18412
14. Lauber C, Nordt C, Falcato L, Rössler W (2005) Can a seizure help? The public's attitude toward electroconvulsive therapy. *Psychiatry Res* 134(2):205–209
15. Müller S, Riedmüller R, van Oosterhout A (2015) Rivaling paradigms in psychiatric neurosurgery: adjustability versus quick fix versus minimal-invasiveness. *Front Integr Neurosci* 9(214):165
16. Nuttin BJ, Cosyns P, Demeulemeester H, Gybels J (1999) Electrical stimulation in anterior limbs of internal capsules in patients with obsessive-compulsive disorder. *Lancet* 354(9189):1526
17. Nuttin BJ, Gybels J, Cosyns P, Gabriels L, al E (2002) Deep brain stimulation for psychiatric disorders. *Neurosurgery* 5(12):519
18. Pressman JD (1998) Last resort. Cambridge University Press, Cambridge
19. Racine E, Waldman S, Palmour N, Risse D, Illes J (2007) “Currents of hope”: neurostimulation techniques in U.S. and U.K. print media. *Camb Q Healthc Ethics* 16(03):312–316
20. Regan A, Shan L, McConnon A, Marcu A, Raats M, Wall P, Barnett J (2014) Strategies for dismissing dietary risks: insights from user-generated comments online. *Health Risk Soc* 16(4):308–322
21. Rössler W, Salize HJ (1995) Factors affecting public attitudes towards mental health care. *Eur Arch Psychiatry Clin Neurosci* 245(1):20–26
22. Schläpfer TE, Fins JJ (2010) Deep brain stimulation and the neuroethics of responsible publishing. *JAMA* 303:775–776
23. Schläpfer TE, Lisanby SH, Pallanti S (2010) Separating hope from hype: some ethical implications of the development of deep brain stimulation in psychiatric research and treatment. *Brain Stimul* 15(5):285–287
24. Valenstein ES (1986) Great and desperate cures. Basic Books (AZ), Ann Arbor
25. Weiner RD, Reti IM (2017) Key updates in the clinical application of electroconvulsive therapy. *Int Rev Psychiatry* 29(2):54–62
26. Westerman D, Spence PR, Van Der Heide B (2013) Social media as information source: recency of updates and credibility of information. *J Comput-Mediat Commun* 19(2):171–183
27. World Health Organization (2016) Investing in treatment for depression and anxiety leads to fourfold return. In: World Health Organization. <http://www.who.int/mediacentre/news/releases/2016/depression-anxiety-treatment/en/>. Accessed 24 Jan 2018
28. Wright KB (2005) Researching internet-based populations: advantages and disadvantages of online survey research, online questionnaire authoring software packages, and web survey services. *J Comput-Mediat Commun* 10(3):1–19