

An International Assessment on Research on Neuroethics

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ABSTRACT

Neuroethics is an essential partner to neuroscience. It is a guiding hand that indicates the moral and ethical flaws in neuroscience research. Currently, there is one outstanding problem that arises from the advancements in neuroscience research: the ethical aspect. There are flaws in the protection of individual rights to privacy during research projects and procedures. To combat these issues, it is imperative that there be an international framework that is developed to prevent the breach of privacy while still advancing our knowledge on this topic. After identifying what the overlapping goals are for countries on this topic, it is necessary to combine them and eventually create an international guideline. To achieve this goal, I will be collecting research papers that describe the work being done on neuroethics and how that has increased or decreased in the last five years. This data will be analyzed to identify the increase/decrease in knowledge and publications on this topic. There are many implications for any neurological implantation, and neuroethics is a path to help solve any issues that arise.

Introduction

Imagine being diagnosed with Parkinson's Disease and the only form of treatment that will work is Deep Brain Stimulation. In this procedure, an electrode will be implanted in your skull and try to prevent tremors. However, you will have to live with a chip inside your brain that could potentially start to deteriorate faster than actual tissue. It is important that there are answers to these conflicting situations.

"The ethics of neuroscience is an area that studies the ethical, legal, and social implications of neuroscience" (Farah, 2012). This study will indicate the flaws in neuroscience research from an ethical standpoint and try to evaluate what the research should look like. From the purpose to the work that should be done, this framework will act as a guiding hand for research on the niche that is neuroethics. This research paper will answer the following questions:

1. What have individual countries done on this topic?
2. How can these acts be intertwined and connected?
3. How should the framework be formed?
4. How has the rate of publications with "neuroethics" changed from 2002 to 2021?

There should be an international framework for neuroethics as it will help create a standard protocol for each situation that is ethically challenging in the field of neuroscience. Neuroscience ethics is an essential partner of neuroscience. It is vital to anticipate and address the questions that can arrive from neuroscience research. It can help guide neuroscience research and the use of neuroscience research results.

BRAIN Initiative

On April 2, 2013, President Obama launched The BRAIN Initiative® to “accelerate the development and application of modern technologies that will enable researchers to produce dynamic pictures of the brain that show how individual brain cells and complex neural circuits interact at the speed of thought” (Obama, 2013). In response to this grand challenge, the National Institutes of Health (NIH) convened a working group of the Advisory Committee to the Director, NIH, to develop a rigorous plan for achieving this scientific vision.

The charge from the President and from the NIH Director was bold and ambitious. The working group agreed that the best way to set this vision in motion is to accelerate technology development, as reflected in the name of The BRAIN Initiative®: “Brain Research through Advancing Innovative Neurotechnologies.” This group focuses not only on technology but also works to develop tools and acquire insight into the functions of the nervous system. This initiative will not only invest in clinical neuroscience but in other research areas that present a large-scale growth potential.

To achieve the goals presented by the government, 7 goals were identified to keep America advancing in neuroscience research. Two of the goals were specifically oriented toward ethics. The first goal was “Demonstrating causality: Link brain activity to behavior with precise interventional tools that change neural circuit dynamics.” By directly focusing on the activations and firings of neurons, the field of neuroscience started to progress from just observing to making a difference in research practice. To enable the immense potential of circuit manipulation, a new generation of tools for optogenetics, chemo genetics, and biochemical and electromagnetic modulation should be developed for use in animals and eventually in human patients.

The second goal was “Identifying fundamental principles: Produce conceptual foundations for understanding the biological basis of mental processes through the development of new theoretical and data analysis tools” (NIH, 2020). There are many tools that are helping advance our understanding of the vastly complex and nonlinear functions of the human brain. However, there are surplus amounts of data being created and evaluated that progress in happening incrementally continuously.

Another aspect of the National Institute of Health’s blueprint of neuroethics is the Neuroethics Working Group (NEWG). This is a group of experts in neuroethics and neuroscience that provides the NIH with valuable information regarding their expertise.

The group was formed in the summer of 2015 because of President Obama. The objectives of this group are to:

- Identify ethical challenges in the development or research aspects of the group
- Create pathways to navigate ethical challenges that occur
- Consult researchers on the ethics of their studies when appropriate
- Identify questions related to neuroethics research that are vital to The BRAIN Initiative that must potentially be addressed and corrected.
- Guide neuroscientists on ethical challenges for the projects they are working on through the BRAIN Initiative-funded research

Although these organizations have contributed many data sets and valuable information, there are many questions to be answered. As the NEWG seeks to find ethical answers for researchers, one overarching question remains: How can human brain data and participant privacy stay protected in case of use beyond the scope of the experiment/research procedure?

There is an opportunity for a collaborative study about the scientific capabilities of BRAIN Initiative research as well as consideration of legal definitions and historical and evolving public views about neuro-privacy. Part of the assessment of public views could involve exploring new types of informed-consent processes, for research involving neural recordings. Other projects could explore and assess best practices for community engagement and communication strategies with neuroethics issues on stigma, bias, and privacy. Cultural

views across and within cultures and geographic regions will provide greater insight into how such technologies might be received and used within a global landscape.

Japan Neuroethics Society

Another leading organization in the balance of neuroethics is The Japan Neuroscience Society. The Japan Neuroscience Society is an academic organization that brings together neuroscience researchers to promote basic, clinical, and applied research on the brain and nervous system, return the results to society, and contribute to the improvement of human welfare and culture in Japan. The society holds an annual academic meeting as a place for members to announce their achievements, exchange information, and communicate with each other, and publishes the English Academic Journal Neuroscience Research to disseminate the research results to the world.

In October 1974, the Japan Neuroscience Society promoted the development of neuroscience in Japan as well as international neuroscience research as a domestic member of the International Brain Research Organization (IBRO). It was founded as a neuroscience society with about 70 members. The first academic meeting was held in 1978, and since then, the annual meeting hosted by this organization has become a principal place for presenting the results of neuroscience research in Japan and exchanging information for research promotion. The Japan Neuroscience Society has since steadily developed, and when the number of members reached about 1,500, in 1991, the Japan Neuroscience Society became an academic group that was more open to young researchers, researchers in related fields, and the public. Since then, the number of members has increased year by year, reaching about 5,200 in July 2008, making it a representative academic organization related to neuroscience that brings together most neuroscience researchers in Japan. However, through extensive research, there has been no mention of any ethical guidelines and objectives as stated in the BRAIN Initiative from the National Institute of Health.

International Brain Initiative

The Declaration of Intent to establish the International Brain Initiative was announced on December 8th, 2017 at a meeting of representatives from some of the world's major brain research projects, supported by The Kavli Foundation and hosted by the Australian Academy of Science in Canberra.

The Declaration, made by representatives from Japan, Korea, Europe, the United States of America, and Australia, is designed to speed up progress on 'cracking the brain's code.' Other member nations now include China and Canada.

The Global Neuroethics Summit (GNS) is the annual product of the Neuroethics Workgroup (WG) of the International Brain Initiative (IBI). The Summit enables members to collaborate and pursue various strategies for addressing and eliminating ethical implications of the vast neuroscience technologies. As the field of neuroscience becomes a global phenomenon, the rise in ethical questions must be equally valued and prepared. In the field of neuroscience, neuroethics has been integrated into all brain projects in formal and informal ways and continues to be a national research funding priority around the world. As individual countries expand their ventures into neuroethics, the IBI 2017 Global Neuroethics Summit was formed with the goal to integrate each singular project into a global endeavor. The GNS focused on combining the values and culture of each country and understanding where science and technology can happen and how. The group works tirelessly to fill these gaps and create a collaborative atmosphere where the option for advancement remains open and welcoming to future discoveries.

These visions are carried out through the GNS Mission Goals:

1. Facilitate a community of diverse and multidisciplinary scholars who are experienced and inclusive of various cultural perspectives when engaging in neuroethics research.
2. Create an environment where ideas are discussed, and research collaborations can have large-scale impact.
3. Generate a series of high-profile and high-impact publications that establish neuroethics priorities for research and scholarship in global neuroscience projects.
4. Neuroethics can advance and accelerate ethical neuroscience from the inception of hypotheses to research practice and dissemination of findings.

Thus, the GNS has a three-pronged approach by implementing neuroethics into all projects in their local communities, creating and modeling a culturally sound neuroethics framework for greater global impact, and creating long-lasting practices that measure accountability and have vast impacts.
(IBI, 2020)

Methods

To create an understanding of the awareness raised about neuroethics, the researcher investigated the papers published on this topic on PubMed from 2002 to 2021. It can be predicted that there is an increase in the papers published with the keyword “Neuroethics.”

Using PubMed, JSTOR, Gale Health and Medicine, and the Science Database, peer-reviewed articles in academic journals regarding perspectives from different nations and organizations on the topic of neuroethics were gathered. Additionally, using PubMed, the researcher was able to gather the number of research papers published under the keyword “Neuroethics.”

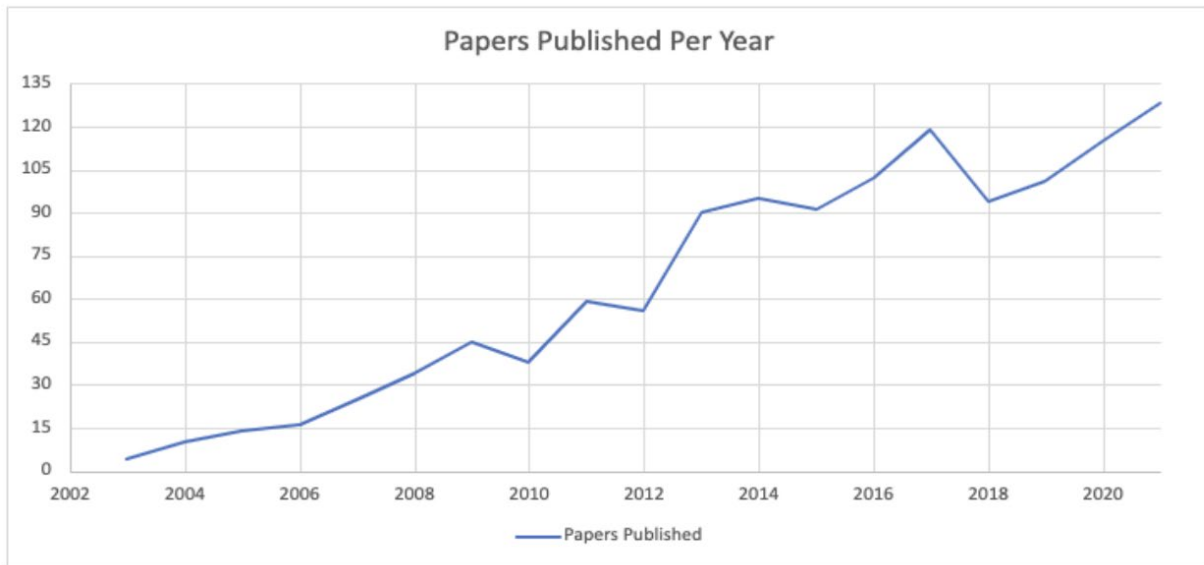
First, the researcher identified different countries that have a neuroethics system or government group to regulate research on this topic. Based on the research done, only 25 countries had such organizations, of which the US and Japan were the most prominent. Then, there was an extensive analysis of the rules and regulations for each of the committees and organizations. The research conducted compared the general rules for both countries and looked for various similarities and differences. It also evaluated the importance and significance of each rule globally. With this information, it is possible to create a standard that is applicable on an international level.

Findings

For neuroethics to be applicable worldwide, there needs to be an international standard that regulates all research done in this field. Of the various articles and research papers retrieved concerning the ethical implications of neuroscience research in various countries, many had similar underlying messages and tones. Based on the findings from prominent countries regarding neuroethics, the researcher was able to accumulate and compile a list of the most cited ethical guidelines by experts in the field for every country to follow:

1. Allow a platform of collaboration among professionals in various fields (e.g., clinician, developer, legal scholar, etc.) to reduce gaps in understanding about this topic.
2. Work with technology developers, such as engineers and software developers, to create ethical machines that can be used in the medical setting.
3. Generate regulations about data sharing and privacy in clinical studies.
4. Promote public understanding of research and allow for debate on topics to gain the perspectives of citizens.
5. Review all research projects developed in neuroscience by creating a government-based committee to manage them, similar to the UN.

These guidelines are only the beginning of what the international framework should look like.



The researcher also wanted to discover the trend of papers published on the topic of neuroethics. Although this topic was recently developed, it is growing exponentially. The author gathered data from 2002 to 2021 from PubMed.

The data showed an increase in papers published with the primary focus on neuroethics, alluding to more awareness being raised on the topic. This graph shows a spike in research papers published in 2012 and a sudden decrease in 2018. One of the reasons that could be the cause of the increased interest in this topic is that Martha J. Farah published a groundbreaking paper titled “Neuroethics: the Ethical, legal, and societal impact of Neuroscience” in 2012, creating more conversation around the topic. Since then, the number of research papers published has increased and continues to do so. Neuroethics is not a topic that can be taken lightly and the increased attention on this subject is a step in the right direction.

Discussion

There has been much work completed internationally around neuroethics. However, it is imperative that all countries be brought on the same page with an international ethics society that requires each country to agree to certain standards. The research available on this topic fails to address the future concerns of brain enhancement and the importance of creating a standard rule of ethics. Although each country is different, ethical standards are a basic need for all research in the field of neuroscience to continue successfully. Despite this, there are many different articles from lawyers, scientists, and professionals that provide valuable perspectives on this issue, painting a picture with all the details.

In particular, the Japanese and United States governments have concrete plans and aims presented in the form of a Neuroethics Working Group that are leading figures for all countries. Additionally, there is an International Neuroethics Society that bridges the gap between individuals and organizations working on this topic. It then becomes essential to evaluate the effectiveness of these organizations and draft a standard rule of ethics that will make it a practical possibility for each country to implement a plan for neuroethics.

Now, there are only 7 countries that have a committee to organize all the research. In the future, there could be a United Nations statement promoting this event broadcasting the scientific niche that is neuroethics. This will highlight the importance of this issue on a massive scale. Overall, the amount of work that has been done is immense but not the limit.

Conclusion

In order for any country to advance and reach greater heights, there needs to be an emphasis on scientific research, specifically in the field of neuroscience. However, doing the research in a moral and ethical manner is vital. For this reason, there has been government participation in the formation of Neuroethics Working Groups that strives to make all neuroscience research humane and civil. There are various circumstances that cannot be controlled and affect the creation of a standard rule of ethics on the topic of neuroethics. Although the researcher was able to gather a list of five standard rules that should be applicable to all nations, this is far from the end. In the future, there should be more emphasis on making each of the proposed guidelines a possibility. There should also be a focus on creating an environment that enables the topic of neuroethics to be more applicable to a common citizen's life and work on improving the development of the international guidelines on neuroscience research.

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