Ethical considerations of neuroscience research and the application of neuroscience research findings for the Presidential Commission for the Study of Bioethical Issues

ABOUT THE INTERNATIONAL NEUROETHICS SOCIETY
The International Neuroethics Society (INS) recently commented on the ethical considerations of neuroscience research and the application of neuroscience research findings for the Presidential Commission for the Study of Bioethical Issues, published in the Federal Register Jan. 31, 2014.

An interdisciplinary group of scholars, neuroscientists, clinicians involved in the treatment of brain disorders, ethicists, philosophers, lawyers, CEOs and other professionals formed the INS in 2006. The INS doubled its growth in a few short years and has become an international organization with over 375 members.

The INS established as its mission ‘to promote the development and responsible application of neuroscience through interdisciplinary and international research, education, outreach and public engagement for the benefit of people of all nations, ethnicities, and cultures’. For details about the INS Executive Board and Governing Board and further information about the society, see the website www.neuroethicssociety.org.

The former President, who completed his term of office in Feb. 2014, is Dr Steven E. Hyman, Director of the Stanley Center for Psychiatric Research, Broad Institute of MIT and Harvard, and President-Elect of The Society for Neuroscience (http://www.sfn.org/). The current President is Professor Barbara J. Sahakian, Professor of Clinical Neuropsychology at the Department of Psychiatry and the Medical Research Council/Wellcome Trust Behavioural and Clinical Neuroscience Institute, University of Cambridge. She has recently presented at the World Economic Forum 2014 in Davos on achieving better outcomes globally for individuals with mental health disorders and on the effects of poverty on the brain (http://youtu.be/worqvUbYMSA).
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ON THE ETHICAL CONSIDERATIONS OF NEUROSCIENCE RESEARCH AND THE APPLICATION OF NEUROSCIENCE RESEARCH FINDINGS

For the Presidential Commission for the Study of Bioethical Issues, the INS lists the top 12 areas of importance for consideration and discusses the top five in detail. These five are chosen due to their rapid advancement and the immediate need for more government and public consideration of the ethical impact on society.

There has been an explosion of important and innovative neuroscientific technologies over the recent years which have driven discoveries of greater visualization and understanding of the brain in health and disease. These techniques can be applied to understanding and promoting brain health and to novel, more effective treatments for brain disorders and brain injury. Some of these new techniques, such as induced pluripotent stem cells, new-generation antibodies, designer receptors exclusively activated by designer drugs, and optogenetics, will be game changing in terms of understanding neurotransmitters and neural circuits in healthy brains, and to producing new drug and other treatments for neuropsychiatric disorders, such as depression and dementia. There are also new advances in innovative areas, such as computing, bioinformatics, machine learning, brain–machine interface, games industry, mobile and tablet industries, nanotechnology and neuroimaging. These tools can be used to assist in understanding the neurobiological basis and to mitigate the effects of poverty on the brain, as well as other impacts on brain health. Similar to any novel advances in technology and innovation, techniques can be used to benefit society, but there are also concerns in regard to harms, which need careful consideration and evaluation in order to ensure that the benefits to society greatly outweigh the risks.

The members of the INS would welcome the opportunity to assist as required by the Presidential Commission for the Study of Bioethical Issues.

COMMENTS BY THE INTERNATIONAL NEUROETHICS SOCIETY (INS) ON THE ETHICAL CONSIDERATIONS OF NEUROSCIENCE RESEARCH AND THE APPLICATION OF NEUROSCIENCE RESEARCH FINDINGS FOR THE PRESIDENTIAL COMMISSION FOR THE STUDY OF BIOETHICAL ISSUES

The International Neuroethics Society has listed the top 12 areas of importance for consideration by the Presidential Commission for the Study of Bioethical Issues. We have picked out the top five which need to be addressed now due to the fact that these areas are rapidly advancing and require more public consideration of the ethical impact on society.

HUMAN BRAIN PROJECTS (USA AND EU)

These expensive and long-term projects have just recently got underway, and due to the use of taxpayers’ money and the intense interest by the media and general public, it is important that the main neuroethical issues for each platform are appropriately addressed. While these two Human Brain Projects have made some provision for oversight of neuroethics within the projects, it is extremely important that the key areas are
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addressed outright. These include: issues of transparency; issues of consent; safety of neuroimaging techniques; use of large databases; security of personal databases (containing e.g. disease or genetic information); obsolescence of data in a rapidly developing field where technology and methodology are updated frequently; secondary findings of potential clinical significance and return of results.

HUMAN ENHANCEMENT
There is an increasing lifestyle use of cognitive enhancing or ‘smart drugs’ by healthy people. These include amphetamine salts (Adderall), methylphenidate (Ritalin) and modafinil (Provigil). It is important to take the lead in determining the long-term safety and efficacy of these drugs in healthy people in order to avoid harms. Another concern is the purchase of these drugs via the Internet when the long-term safety is unknown, when the quality of the product is questionable, and when individuals do not take advice from a medical practitioner as to whether these drugs are counter-indicated in their particular case. The impact of the widespread use of these drugs on society, including social and distributive justice, should also be evaluated.

Other means of enhancement, such as transcranial direct current stimulation (tDCS) are currently being marketed and may be used after purchase on healthy children or adolescents whose brains are still in development.

NEUROTECHNOLOGY
Currently, the area of neurotechnology is advancing very rapidly. Issues of neural implants, robotics in medicine, healthcare and teaching, and nanotechnology convergence with the brain have a number of ethical concerns which need addressing immediately. The safety of these new neurotechnologies has not been fully examined, for example, in the case of nanoparticles which can pass the blood brain barrier there is the potential of neurotoxicity. It is possible, given the dearth of caregivers for the elderly infirm and especially those with dementia, that robots will become rapidly widely used. Indeed, Robots for Interactive Body Assistance (RIBA) are currently being developed by the RIKEN in Japan. Robots may be used in rehabilitation for traumatic brain injury patients. There are also robots being developed for social interaction with elderly and demented individuals, and for those with brain disorders, such as autism. New advances in this area may be beneficial to society, creating greater wellbeing and entrepreneurial opportunities. Nevertheless, we need to be cognisant of social and ethical issues raised, ranging from increasing marginalization of vulnerable populations as members of human society to the impact of increasingly ‘uncanny robots’ more broadly on human social cognition and behavior.

RESPONSIBILITY, MORAL AGENCY AND THE LAW
Increasingly, neuroimaging is being used in courts for the purposes of providing supporting evidence for the lack of intent or diminished responsibility (see e.g. http://ir.lawnet.fordham.edu/flr/vol80/iss1/9). To what extent can the person be held accountable in the case of traumatic brain injury or brain abnormalities, and brain disorders such as untreated attention deficit hyperactivity disorder (ADHD) or addiction? For example, there is evidence to indicate that among patients with ADHD, rates of criminality were lower during periods when they were receiving ADHD medication.
These findings raise the possibility that the use of medication reduces the risk of criminality among patients with ADHD. To what extent are ADHD criminals responsible for their crimes if they have not received diagnosis and treatment?

MENTAL HEALTH AND BRAIN DISORDERS

The effects of poverty on the brain are extremely important, particularly as we now know from the impressive research conducted at the National Institute of Mental Health that our brains are still in development through late adolescence into early young adulthood. Therefore, the effects of poor nutrition on the brain may be difficult to fully reverse in adulthood. (In the developing world, severe malnutrition including inadequate calories has been clearly demonstrated to stunt not only physical stature, but also intellectual ability as measured by IQ). Furthermore, the developing brain appears particularly vulnerable to environmental influences during this time, ranging from widely addictive substances such as nicotine and alcohol, and more speculatively, to highly rewarding activities such as gaming and internet use. Finally, many American states are beginning to undertake experiments (with other states as ‘controls’) on broadened marijuana use. It is of the highest importance not to accept pre-existing biases that tend to favour or disfavour recent medical marijuana or recreational marijuana laws, but for the United States Government to fund good observational experiments to determine the degree to which marijuana creates dependence in young people, whether incident cases of schizophrenia increase, whether there are significant changes in performance, and whether there are increases or decreases in incidence of anxiety disorders and depression.

Good brain health needs to be considered every bit as important as good physical health.

On behalf of the International Neuroethics Society

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THE INTERNATIONAL NEUROETHICS SOCIETY (INS) TOP 12 AREAS FOR THE PRESIDENTIAL COMMISSION FOR THE STUDY OF BIOETHICAL ISSUES

1 Human Brain Projects (USA and EU)
   - Issues of transparency
   - Safety of novel neuroscience techniques
   - Use of large databases
   - Security of personal databases (containing e.g. disease or genetic information)
   - Secondary findings of potential clinical significance and return of results
2 Human Enhancement
   o Increasing lifestyle use of ‘smart drugs’ by healthy people (e.g. modafinil, methylphenidate)
     • Implicit and explicit coercion
     • 24/7 society
   o Transcranial direct current stimulation (tDCS)
   o Cognitive training or ‘serious games’
   o Social/Distributive justice
   o Is there a human right to enhancement?
3 Neurotechnology
   o Non-invasive brain-computer interfaces (BCI)
   o Neural prosthetics
   o Robots as social companions and caregivers
   o Robots as teachers
   o Nanotechnology and the blood brain barrier
4 Responsibility, moral agency and the law
   o Addiction to substances of abuse and to gambling
   o Traumatic brain injury
   o The use of neuroscientific arguments and neuroimaging in a legal context
5 Mental health and brain disorders
   o Effects of poverty on the brain
   o Social/Distributive justice
   o Stigma
   o Issues of early detection
   o Lack of development of new treatments by the pharmaceutical industry
   o Rigour of evaluation of novel psychological treatments (e.g. mindfulness)
   o Effects of environmental toxins on brain health
6 Invasive techniques for treatment of brain disorders
   o Deep brain stimulation (DBS), especially for psychiatric disorders
   o Ablative neurosurgery
   o Cell transplantation (e.g. in Parkinson’s disease)
   o Informed consent
7 Decoding mental states and decision making
   o Brain reading
   o Issues in law and public policy
   o Lie detection
8 Special issues of children and adolescents
   o Brain development in children and adolescents
   o Issues of personhood
   o Brain development, level of understanding and intention, and the legal system
9 The Business of Neuroscience and the Neuroscience of Business
   o Neuromarketing
   o Addictive gaming, internet use etc.
10 Neuroscience, biologics and psychopharmacology in the context of the military
   ○ Issues of transparency
   ○ Issues of consent and coercion (direct or indirect)
11 Morality and Social Cognition
   ○ Neurobiology and legal issues (e.g. Autistic Spectrum Disorders, traumatic brain injury)
   ○ Effects of drugs
12 Brain injury and vegetative state, disorders of consciousness
   ○ False hopes
   ○ End of life decisions