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A Framework to Systematize Positions in Neuroethics

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A Framework to Systematize Positions in Neuroethics

Abstract

Progress in Neuroscience advances rapidly and promises to change some of the basic concepts we have about ourselves. The field of Neuroethics is concerned with the resulting ethical implications. In this paper, we propose a framework to systematize the questions and positions in this context. We start with the discussion of three concrete cases around the topics of treatment/enhancement, personhood and privacy. For each case, we get a set of axes along which standpoints may vary. Finally, we generalize the particular axes of each case and arrive at a three-dimensional coordinate system spanned by the axes of “Liberty of Denial”, “Liberty of Use” and “Scepticism”. With this, we hope to provide a common language simplifying interdisciplinary dialogue and communication with the public.

INTRODUCTION

Motivation

During the last few decades, progress in neuroscience has advanced rapidly: Imaging techniques have been improved in terms of temporal as well as spatial resolution, providing us with ever increasing amounts of data about the brain. Sophisticated analysis tools have achieved big successes in turning these data into valuable information, and work in modelling has led to the creation of theories linking this information back to actual brain processes. Finally, we are entering an age where even manipulation of the brain on physical, chemical and physiological levels becomes possible.

This kind of progress might change the way we look at the world and ourselves like only a few developments in the history of science did before: The so called Copernican Shift more than 300 years ago led to modern science as it showed that the earth is not central to the astronomical system. Later, Darwin and even later Freud led to similar profound revolutions concerning our ideas about the nature of human kind. Today’s neuroscience promises to reveal insights that may force us to rethink fundamental concepts about what is special about us, some of which have been around for thousands of years.

How do we deal with these changes? How does our idea of the human being change? How do we want to define the borders between desirable technical progress and uncontrollable inhuman developments? How do we set criteria about what is normal and what is not in lights of new accomplishments in psychopharmacology and psychosurgery?

Shortly, how can we distinguish between good and bad when confronted with many qualitatively new options? Traditionally, this distinction is the domain of ethics, providing guidelines to derive

judgements on concrete issues based on abstract principles. In this paper, we will investigate the role of ethics in the field of neuroscience.

Definition

Progress in medicine and life sciences has already led to the formation of ethical frameworks for questions arising around human life, identity and dignity. One might think that part of these frameworks can also be applied, perhaps modified, to questions arising in neuroscience.

Medical ethics provides the foundations to define professional medical behaviour in research as well as in treatment. This involves issues like self-determination of the patient, doctor-patient confidentiality, and the huge field of death: When is it safe to be declared, when is it appropriate to be facilitated? Based on the Hippocratic Oath 2500 years ago, the principles of medical ethics have been codified in a number of declarations evolving to incorporate newest medical achievements and changes in moral standards. Central to all these declarations is the idea that the benefit of the patient should be of highest priority for physicians, ranking higher than, for example, benefits for science or society. In the late 17th century, the AMA code was the first code to be adopted by a professional organization. 1948, the declaration of Geneva re-established values violated in World War II. Recently, the latest revisions of the declaration of Helsinki include emerging issues in biomedical research.

Bioethics has become a new field on its own to deal with these issues. Triggered by latest insights and inventions, questions about organ transplants, embryonic research or genetics have arisen. This is heavily related to medical ethics as the same fundamental considerations about benefit and service to humanity are at stake. But at the same time, the scope of bioethics exceeds the scope of medical ethics. Non-human life needs to be taken into consideration as, for example, we achieve means to modify existing species. Hence, bioethics today seems to have absorbed medical ethics.

Neuroethics is a field first mentioned about a decade ago, intended to investigate topics that are created by new technological insights and which are not yet covered by existing ethical frameworks, much like bioethics earlier. The specific ethics of neuro- and brain sciences treats the implications of discovering the secrets of the organ which is responsible for intelligence, conscience and individuality.

Although neuroethics is clearly related to medical ethics and bioethics, we cannot expect those to concretely answer questions arising from neuroscience, as some of these questions exceed the scope of these disciplines. It seems that neuroethics will need to become a subdiscipline within the framework of bioethics, depending on common principles, but constructing its own particular domain.

In 2002, the first world conference on neuroethics, “Neuroethics – Mapping the Field” took place, bringing together neuroscientists, philosophers, lawyers, and public policy makers. The participants realized the challenge lying ahead of them and started laying out the scope and borders of the new-to-be-founded discipline. Beyond discussing actual scientific contents, sensitizing the scientific community and the general public turned out to be an important task for the future.

Procedure

In this paper, we want to examine a few critical cases and demonstrate the need for ethical guidelines. We will not provide definite answers, but try to show the axes along which possible positions might vary. We will see whether some of these axes will show up in several different cases and could thus be generalized to basic dimensions in the mapping process. By this, we hope to develop a framework suitable for systematic description and analysis.

First, three case studies in the central topics of treatment vs. enhancement, personality and privacy will be introduced and discussed. For each case, the particular ethical questions will be worked out. Potential solutions will be proposed, and the underlying positions will be identified, which we will then try to conceptualize as points in a space spanned by the axes we are looking for.

After discussing the individual cases, an attempt will be made to unify the positions and axes we derive. This should provide a coordinate system which makes it possible to position standpoints relative to others in a generalizable way going beyond single, concrete examples. Like this, clusters of individual opinions may be found, simplifying the identification of “camps” within the field of neuroethics. Furthermore, knowing one’s own position and the position of a set of possible choices would ideally, by finding the closest alternative, make it easier to derive decisions consistent with one’s convictions.

CASE STUDIES

Why cases?

We now present three cases, roughly in order of their expected occurrence. Concrete cases help us make intuitions explicit and better see which problems may arise – cases put some flesh to the bones of our abstract concerns. At first, we will take a closer look at the treatment/enhancement distinction which already plays a role in every-day situations today. Secondly, we go into the nearer future when investigating how topics like informed consent can be handled in psychosurgery, raising questions of personality and personhood. Finally, we will see that with the emergence of brain-imaging methods, applications in “brain reading” may not be too far away – we will investigate the privacy issues involved. For each case, we will at the end present axes which enable us to locate different positions in the space of possible opinions.

Treatment/Enhancement

The growing ability to manipulate brain function can be used to treat dysfunctions of the brain in case of (mental) illnesses as well as to enhance the brain processes of healthy individuals. As far as we can see now, there is no clear-cut boundary between treatment and enhancement, but rather we see a complex continuum with many nuances in the field of medical services (from uses which are completely detached from health-care to uses in life-threatening situations). We can achieve specific mental and behavioural changes by using neurochemicals. Drugs which are approved for and mainly used to treat neurological and psychiatric diseases lately are used more and more to enhance healthy people’s capacities.

One example becoming increasingly important, especially in US schools and colleges, is the usage of psychopharmacology against attention-deficit/hyperactivity disorder (ADHD). For children with ADHD, Ritalin improves their attention and concentration. Treatment with methylphenidate as

psychopharmacological interventions is used as a study aid as it helps focussing on topics by increasing the activity of dopamine. Stimulants are used by many more people than there are people having the disorder for which it was developed. ADHD is found only in about 4-5 percent of children, but about 16% get the prescription.

There are two different dilemmas here: First, how much do we want to allow such manipulations? Should we reserve it for extreme cases, or maybe not use it at all? Or shouldn't we rather go and enjoy the benefits of modern technology? Second, what about pressures concerning such interventions? Should they remain voluntary, is that possible at all? Or are there cases where people should be forced to use drugs?

Reality has shown that if there is a drug which makes us perform better, feel better, we will want to take it – it just looks better for us to have it than not to have it. On the other hand, extending our capabilities beyond the norm seems unnatural, and dangerous both concretely (e.g., unpredictable long term effects) and in more abstract ways (e.g. concerning our idea of humanness).

These standpoints above hint at the two ends of a continuum of opinions regarding this dilemma. Adopting one of them would lead to either a completely restrictive position rejecting any use of psychopharmacological means, or to an extremely liberal one, embracing all possible uses. In practice, most questions are located in the area between these two extremes. Some cases are commonly accepted to be justified occasions for psychopharmacological treatment (like Alzheimer's Disease or heavy psychoses and neuroses), just as there are other cases which a majority would judge illegitimate (doping children for better performance at school). The actual controversies emerge in border cases where clear-cut judgements are no longer possible.

A central point in this concrete case and other related discussions is the notion of "normality". Restoring or establishing normality ("treatment") would be considered legitimate by many positions; the differences between these positions then stem from their different definitions of normality. If we consider the norm to be the way we are and whatever happens to us, there is no way in which medical procedures could move us towards normality. We might say normal is how we are in the absence of dramatic external influences; then restoring a person's mental state after a traumatic experience becomes justified treatment. However, what about children born with ADHD? If we assume their untreated state to be normal, curing their disease would not be considered as treatment. There are, however, people who do agree that the norm should be the criterion, but who do not agree that ADHD should not be treated. Thus, we might further generalize our notion of normality and say that normality is defined by the species' average. This implies that all measures aiming to establish a species-typical state would be considered as treatment, while measures aiming to improve an individual's state beyond the species average would then be considered as enhancement.

As mentioned above, allowing treatment and rejecting enhancement is a common position. We have seen the range of actual positions spanned by this, depending on the definition of normality we apply. However, there are also positions that encourage enhancement. We strive to achieve above-average performance in different fields by so many means (like good education, special diets, meditation), proponents of such positions, like Arthur Caplan (2002), argue that it is not obvious why the goal of self-improvement should be illegitimate in the case of neuropharmacology.

In everyday life, actual positions are typically located somewhere between a liberal form of

“treatment only” position, as held by Francis Fukuyama (2002), and positions favouring slight enhancements. Discussions like the one about Ritalin, or the case of plastic surgery in another domain elicit this conflict. Even within “treatment only” positions and when there is agreement on the type of normality to be achieved by treatment, a “species’ average” is hard to obtain for something as complex as mental phenomena. In the case of Ritalin, for example, the boundaries between common childlike and pathological behaviour are fluid, resulting in a “grey zone” in diagnosis¹. Still, we think that the existence of a continuum has become evident on which different positions can be located relative to each other.

The second dilemma we are facing in the treatment/enhancement debate is dealing with pressures that might arise to submit to neuropharmacological treatments. Whereas the first dilemma was dealing with the freedom to take certain substances, this dilemma is concerned with the freedom not to take certain substances. One end of a potential spectrum would be the principle that no one may ever be forced to take drugs against their will. On the other end, we would locate positions that justify forced drug use under certain circumstances (hormonal preparates for sexual criminals would be a prominent example).

There are more subtle pressures than legally enforced drug use, however. This leads again to a continuum of graded positions between the two extremes. To take up again the case of ADHD, the freedom of the individual to reject Ritalin is not reduced by legal standards, but by social pressures exercised by schools, parents, or doctors. In the professional world, there might arise situations as well where the rejection of enhancing one’s performance can result in negative consequences. In such cases, one can imagine (at least) two different positions. One which will recognize the relevance of implicit pressures and therefore actively fight such pressures to keep up individual freedom, while the other position might find it sufficient to protect individuals from explicit pressure.

Let us present the axes arising from the discussion of the two dilemmas above.

Axis 1.1: Availability of Existing Means

Positions on this axis range from “no intervention for anyone” through “only treatment, but no enhancement” with increasingly liberal definitions of treatment to “enhancement for everyone”.

Axis 1.2: Liberty of Denial

Positions on this axis range from complete rejection of forced use through different positions concerning implicit pressures to the acceptance of explicit pressure.

We started out in the hope that by designing such axes, we would be able to locate certain positions in the space spanned.

The Center of Cognitive Liberty and Ethics (CCLE) is well suited to relate other positions to, as its policy advocates principles located towards the liberal ends of both axis (Wrye 2002):

1. As long as their behaviour doesn’t endanger others, individuals should not be

compelled against their will to use technologies that directly interact with the brain, or be forced to take certain drugs.

2. As long as they do not subsequently engage in behaviour that harms others, individuals should not be prohibited from, or criminalized for, using new mind-enhancing drugs and technologies.

The first statement positions CCLE towards the liberal end of the “Liberty of Denial” axis, the second one also places them towards the liberal end of the “Availability” axis.

Francis Fukuyama, as a representative of another position, distinguishes treatment and enhancement on the basis of the purpose of medicine, such that treatment is to heal the sick whereas enhancement creates posthumans by “turning normals into god”. This places him on a more restrictive point on the availability axis.

We have kept this section specific to psychopharmacological substances. However, the positions here can be generalized easily to other, future forms of neurological interventions like chip implants.

Personality and Personhood

Personhood is a fundamental concept in our idea of the nature of humans. It relates to the legal aspects of being human as it is closely tied to the awarding of rights^{*}. There is wide consent about the need to protect persons, which, however, results in heated debates about the exact definition. In bioethical border cases like abortion, cloning or euthanasia, the ethical discussion has evolved around the question whether the subjects in such cases could be called persons. Neuroscience not only encounters similar questions about human rights in border cases, but goes beyond these as its subject is the analysis and potential manipulation of the very foundation of personhood and personality: the brain. Changes to personhood and personality are both crucial points to investigate. But particularly interesting questions arise where both overlap, and where we have to judge whether we are facing a change of personality or whether we have to question the very possession of personhood.

In the near future, technology may enable us to perform surgeries to change certain aspects of personality. Let us construct our second case: Phineas Gage is a prominent example of personality change through physical manipulation of the brain. The manipulation, in his case, stemmed from an accident in which an iron pole destroyed parts of his prefrontal cortex. He survived this dramatic incident, but suffered from severe personality changes. In short, his ability or willingness to behave within social norms seemed distorted, particularly in contrast to his former traits of character. In a thought experiment, let us imagine Phineas Gage would live today and we were able to restore his original identity through psychosurgery. Would we want to justify such an intervention? Would he want such an intervention, and who is “he”, Phineas Gage before or after the accident? What if the new Phineas refuses the treatment although we can be sure the “old” one would have been happy to take that chance?

These questions are extreme variants of classical issues in medicine related to the notion of “Informed Consent”. Medical ethics requires health professionals to inform patients about the benefits and risks of a potential treatment, and to get their explicit, written consent before realizing

the procedure². There are exceptions to this general guideline. Patients who are in a non-conscious state obviously cannot fulfil such requirements. In these cases, the proxies of the patient take over responsibility and go through the informed consent procedure for them. A less definite case would be the treatment of patients with Alzheimer's Disease. Such patients go through different stages of this disease, with a continuous decline of mental capabilities. When the patient loses the ability to decide in his best interest, responsibility would have to be transferred to proxies as well. However, particularly in the complex context of medical treatments, this point in time is hard to assess.

The question why such a step could be justified brings us back to the question of personhood, which is particularly touchy when identity of personality over time is no longer given. The deciding criteria on which to grant or refuse personal rights are typically considered to be self-consciousness and rationality. Anyone planning to transfer responsibility from patient to proxies would have to prove that these criteria are no longer satisfied.

Our example of Phineas Gage now makes the story even more complicated. In his brain-lesioned state, he is – just like before – self-conscious and rational, so there is no reason to take away personal rights from him. Yet, intuitively, we would argue in favour of restoring his old personality anyway because this is the one that has been Gage's natural state in the absence of injury. So such an intervention would have to be considered as classical treatment and thus as justified even in more restrictive views like when normality is defined as the state in the absence of dramatic external influences (cf. the discussion on treatment and enhancement above). However, one might argue that changing Gage's personality on purpose (an intervention which is not based on concrete medical needs but on a potentially biased view on desirable and undesirable properties) is ethically questionable. Even though we said that we favoured such treatment because it restores the original, would we really consider such a restoration if we subjectively judged the new person to be nicer? Particularly when the "new" Gage rejects such a treatment, who would be in a justified position to proceed nevertheless? If we were to adopt such a position, we would either have to find arguments why the new Gage cannot be considered a "full" person, or drop our principle of the patients' self-determination and define reasons that override it. If we come to a point where it may be considered ethical to alter someone's personality against their will (for example, by reducing their personal rights by doubting their full rationality), however, it is only a short step from restoring Gage's old state to manipulating persons without brain damage, but with undesired behaviour. The legalization of court-ordered intervention on the level of the central nervous system could be a consequence.

Again, let us try to define an axis here on which to align the different views on this topic.

Axis 2.1: Persistence of Personhood

Positions range from standpoints insisting on personal rights for even severely impaired people through opinions legitimating denial of such rights in certain cases to a position that would even override persons' wills.

In Germany, it is common legal practice to incapacitate people when a lack of certain mental capacities can be proved. Forced manipulation of mental states is partially accepted, when, for example, convicted criminals have to undergo psychiatric therapy which may include psychopharmacological drugs. Psychosurgery is currently unthinkable to be enforced, although one has to consider whether enforced drug use is really qualitatively different or rather just differs in

severity and reversibility. In conclusion, the position sketched here, allowing the incapacitation of mentally impaired people, would have been located not completely at, but towards that end of our axis where the acceptance for denying personal rights is higher – the concrete position depends on how easily such incapacitations are administered.

Privacy

Within the neurosciences there is a rapid emergence of brain imaging techniques enabling us to take detailed pictures of the brain. Methods like CT (using series of X-rays), MRI (measuring changes in blood-flow) and PET (detecting emission from radioactive material) have a widespread impact on neuroscience. They help to understand relationships between different brain areas as well as to assign their function. Functional MRI even allows for the monitoring of brain activity under different conditions and with that provides an anatomical and functional view. However, there still are far more questions than answers in the field of brain-imaging: What can we really get from these pictures with red and yellow colour patches on a grey background? What exactly do the variables represent? Is it justified to map the data on actual mental states? Nevertheless, the progress enabling us to get more and more data from what happens in the brain provides a more reliable foundation for diagnosis and also promises new kinds of applications.

Currently, the evaluation of data gathered by these methods relies on the statistical comparison across different subjects: Each brain is so unique that only trends in populations can be identified, while an individual brain remains hard to analyze so far. However, there are efforts to increase the interpretability of brain scans, for example the development of the Talairach coordinate system, which helps smoothing at least the topographical differences among different brains.

Let us construct a third case and imagine a future scenario where our ability to make definitive statements about individual brain states and to map such brain states onto mental states has advanced. Once this advance has gone far enough, it will enable us to engage in brain-reading. Thinkable applications lie in investigations in criminology, identification of traumata in psychotherapy, or even every-day private use.

Recently, there has been an example of using EEG techniques to improve reliability in lie detection (“brain fingerprinting”). In the study (Farwell 2001), a certain signal indicating strong affective response was evaluated. This was combined with the presentation of seemingly irrelevant pictures. Some of these pictures, however, showed scenes or objects that were present at the scene of the crime. A suspect’s connection to a crime would then be judged by the measured responses to those pictures who are only meaningful to someone involved. Even though EEG is not a brain imaging technique, but an earlier method for monitoring brain-activity, this already points at the potential ethical implications of future techniques providing ever more detailed insights: Is it acceptable to invade a person’s (potentially even subconscious) mental states? How much should we trust such kind of findings?

Concerning the first question, the continuum of potential positions seems to resemble the “Liberty of Denial” axis found in the first case: Again, the question is how strongly the freedom of the individual to refuse an intervention is weighted in relation to the supposed social benefits of a forced application. Concretely, it is the individual’s privacy which is at stake, compared to the interest of prosecution or other causes presumed worthy.

The second question seems to span a new dimension. It deals with the attitude towards the trustworthiness of claims produced by technological progress in the neurosciences. Critics of any kind of technology that promises a link between physiological data and mental states could argue by the complexity or the transcendental nature of the brain that any such measures are doomed to fail. Proponents of such technology would stress the reliability of scientific findings validated by numerous means. Between those two extremes, we can imagine positions that acknowledge the benefit of modern scientific methods but still are aware of their relativity.

Looking back, many methods put to use by scientists centuries ago look naïve and misleading with today's knowledge although they seemed reasonable and well-founded in their time. For example, one might argue that although statistics is a very well-developed field, it can only give an answer to the questions one asks. In our case, what the EEG tests in the ideal case is if the subject has been at the scene of the crime, not if he/she is the criminal. Such kind of subtleties may seem obvious now, but there is a risk they escape the public's notice when there is an important-looking machine promising simple answers.

More generally, whether the questions that are at the basis of neuroscientific experiments make sense is not provable in a mathematical way but depends on the prevailing valid paradigms. On the other hand, of course, this is the way of scientific progress and should not hinder us to embrace new technologies today. Still, embracing new technologies is one thing – trusting them so blindly as to rely on them in fundamental societal processes like prosecution is another. So there is plenty of space between the two extremes for a differentiated location of various positions.

This amounts to the following two axes:

Axis 3.1: Estimation of Privacy

Positions on this axis range from standpoints favouring the absolute value of mental privacy to those which rank higher the potential social benefits of invading it in certain cases.

Axis 3.2: Scepticism

Positions on this axis range from positions rejecting any validity of brain-reading techniques through different shades of sceptical positions to such which credulously embrace these techniques.

One concrete position towards the use of new neurotechnologies is the decision of the Iowa Supreme Court to admit the use of the aforementioned “brain fingerprinting” technique. This indicates a rather credulous position on the scepticism axis and little concern about issues of mental privacy.

GENERALIZATION

Until now, we discussed three cases and found several axes on which positions concerning these cases could be located. In the following, we will take a closer look at the nature of these axes and try to unify them into a single coordinate system. This idea was driven by the intuition that some

axes go hand in hand in the sense that a certain position on one axis often implies a certain position on the other one. A short recapitulation of the axes we found in the particular discussion of the cases:

- Axis 1.1: Availability of Existing Means
- Axis 1.2: Liberty of Denial
- Axis 2.1: Persistence of Personhood
- Axis 3.1: Estimation of Privacy
- Axis 3.2: Scepticism

We propose the following three general axes: “Liberty of Denial”, “Liberty of Use” and “Scepticism”. The goal in this generalization was to find a minimal set of axes which still provides enough expressive power to locate the relevant different positions in our “opinion space”. When we found correlations between two axes in the way mentioned above, we tried to collapse those onto one single axis representing the general continuum from which positions on the other axes could be derived. At the same time, we maintained different axes when we could identify positions which would be equal on one but different on the other axis. (cf. the first case in which we could imagine positions similar on the “Liberty of Denial” axis but different on the “Liberty of Use” axis).

Liberty of Denial

The most central issue in our analysis is the autonomy of the individual faced with the societal impacts of neuroscientific findings. Opinions range from absolute priority of personal rights to the relativization of these rights compared to other values. The autonomy to reject neuroscientific interventions (Axis 1.2) is a clear instance of this continuum. The privacy issue (Axis 3.1) deals with a similar question. The “Persistence of Personhood” axis (Axis 2.1) may seem a bit further away from the general axis than the two previous ones, as the discrepancy between the interests of an individual and authorities is not quite as obvious. But what is common to all of them, and why we decided to collapse all the three onto one axis, is their concern with the question of the power of society to interfere with individual decisions.

Liberty of Use

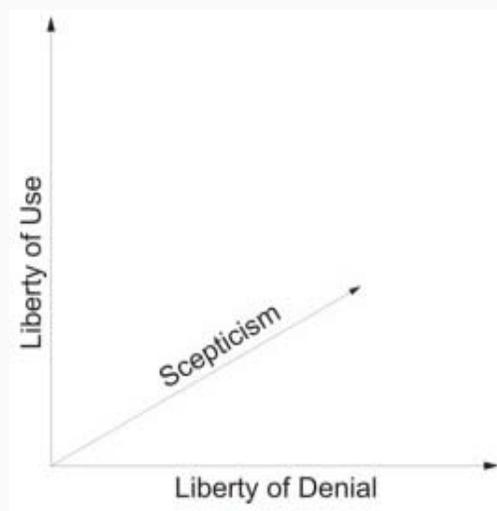
Another important axis concerns the availability of new achievements to the public. This became particularly evident in the case of treatment and enhancement (Axis 1.1) as it already is a practical concern how much liberty to grant to people concerning the use of drugs. Positions in general range from complete freedom to complete restriction. Although we didn’t discuss such an axis explicitly in the last two cases, we do recognize the relevance of this spectrum: In the case of privacy, we can imagine a point in time where mind-reading tools could practically be made available to the public. Would we then embrace a development where anyone can use tools like this in their private life?

In the case of personhood, the liberty of individuals to take the consequences of an altered personality might be rephrased as a legitimate claim. While there is no “usage” in the actual sense, the liberty to live through states of mental change might be considered a positive right as well. Opinions towards these issues seem to be located on the same axis like our initial one about the availability of neurological interventions by psychopharmacological means.

Scepticism

The final axis in our coordinate system deals with the general amount of trust towards scientific achievements. Positions on this axis range from complete rejection to credulous embracement. The axis we defined in the privacy case (Axis 3.1) within the field of brain reading can also be found in the field of treatment/enhancement: Of course, it is completely reasonable to ask in how far psychopharmacological drugs might help or maybe harm and also how secure one can be when taking the drug.³ Similarly, one may question the reliability of findings implying a reduced concept of personality. Again, one could, for example, stress the importance to scrutinize scientific results when deriving dramatic consequences for individuals.

To sum up, we were able to identify three major underlying themes which lead to a three-dimensional space enabling us to locate all positions in all cases we examined:



A central finding is the existence of two independent concepts of liberty involved. On an intuitive understanding, one might expect one axis ranging from conservatism to liberalism. Such a distinction is well-known in the political sciences. While it does not map onto the distinction between economic and personal freedom, it does map onto the axes spanned by the “Two Concepts of Liberty” made explicit by Isaiah Berlin (1969): Positive and Negative Liberty. Positive Liberty is equivalent to what we called “Liberty of Use”: It is a “liberty to” – speak freely, get health care, access existing resources at free will. Negative Liberty equals our “Liberty of Denial”: It is a “liberty not to” – follow common norms, embrace supposed advantages, have your private life influenced by authorities in general. A nice consequence of this parallel is the possibility to take advantage of findings Berlin made about the relation between these two axes and apply them to our domain. One such transfer is the conflict between the two liberties: For example, too much positive liberty, Berlin argues, may result in a restriction of negative liberty. Positive liberty easily leads to a situation where access to some resource gets such high priority that, in turn, social pressures arise that make it hard for individuals to realize their negative liberty and reject the resource. Concerning our first case study, the recent abundant prescription of Ritalin to school kids (representing a positive liberty) creates an atmosphere in which the choice of parents in border cases (the negative liberty to refuse behaviour-altering drugs) is restricted.

In addition, we propose a further dimension, Scepticism, which is not found in political coordinate systems: It is special to concerns in philosophy of technology. We assume this axis not to be

completely independent from the two liberty axes: Positions on the plane spanned by positive and negative liberty will be correlated to the position on the scepticism axis. It is hard to imagine a consistent position with both high positive liberty and high scepticism, e.g., providing free access to a drug without confidence in the benefit and harmlessness of it. On the other hand, the scepticism axes is not redundant either: We can imagine positions where equal positions on the liberty plane lead to different consequences depending on the position on the scepticism axis. For example, a state which would consider brain reading a legitimate legal practice in general (little negative liberty) may or may not arrive at actually using it, depending on the confidence in the new technology (high or little scepticism). Thus, we deem the postulation of this third axis justified.

CONCLUSION AND DISCUSSION

In this paper, we have proposed a general framework for ethical considerations in neuroscience. We started by motivating the particular field of neuroethics. We then presented three different cases to highlight a sample of emerging issues. For each case, we showed the variations among possible positions and proposed axes to account for them. In a final step, we found a unification of the specific axes to a generalized coordinate system. It consists of two axes representing the degree of estimation for two different kinds of liberty: The “Liberty of Denial” and the “Liberty of Use”. A third dimension is spanned by the degree of scepticism towards the new technologies.

We have shown examples in which the difference between two positions showed up on one axis only, while the difference could not be expressed by using the other axes. Although the positions on the axes are slightly correlated, in the sense that not all positions in this space correspond to sensible opinions, this demonstrates that neither of these axes can be reduced to another one. Hence, we conclude that our proposed system has the minimum required dimensionality.

We will now briefly address a few questions which exceed the scope of this paper, but might be interesting to pursue further, particularly in dialogue with researchers active in the field.

First of all, the question arises whether our axes are correct. Do we need less, other or additional axes? Are axes the right format of conceptual representation after all? It will be necessary to review other subdomains of neuroethics (concerning, e.g., “neuromarketing”, implications for education, or military usage) and test the applicability of our model.

Another task would be to fill our coordinate system with content. The location of a concrete position in the system is necessary both to test its validity and to turn it into a useful tool. Once standpoints in concrete cases are located, we can imagine that areas in the space emerge that can be assigned to general opinions regarding ethical questions. This might allow for the test of one’s current standpoints for consistency and also to decide between alternative standpoints in new cases, based on one’s general position in the space. Furthermore, one might go so far as to try to determine which choice of coordinates is best in a given situation, or even in general.

Such concrete applications, however, would have to be regarded with extreme caution. We do not want our system to be understood as an argument in favour of stereotyped thinking. Since standpoints can only be positioned relative to each other, an assignment of absolute values can only be an approximation. More generally, each case, of course, must be discussed on its own.

Neither do we want to implicitly encourage relativism: Not every position in our space can be accepted – a conclusion which might falsely arise from the neutrality of points in a space. On the contrary, we hope that the system helps to find the spectrum in which the discussion is reasonable and maybe even to define the borders to areas where it is not. If we have certain assumptions about human rights we never want to abandon, the point where we do so might actually be put on an axis as the border we do not want to surpass.

We think our coordinate system could contribute to simplify and structure issues in the formation process of neuroethics. It is a good device to locate opinions relative to the extremes and to each other. For example, it might facilitate discussion if the difference between two standpoints can be summed up as a difference on the “Liberty of Denial” axis. So it could serve as a common language necessary in an interdisciplinary dialogue involving representatives from neuroscience, medicine, philosophy, law, policy, and sociology. Further, it might help in the societal task to bring into consciousness the consequences of brain-research.

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NOTES

* We leave aside the discussion about animal rights.

1. Furthermore, one might argue whether enhancement makes me not to be myself anymore – or rather to be even more myself? For example, is the real “me” the inattentive and nervous child or the disciplined and kind pupil?

2. There are special regulations for emergencies which will not be covered here.

3. See Farah (2002) for concrete examples of potential dangers of extending mental performance. Increasing the number of items that can be kept in working memory, for example, might impair the ability to combine these items creatively. Such effects are non-obvious and might escape standard clinical testing procedures.

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