WINNING ARTICLE
‘Redefining Justice: Updating Criminal Law to Reflect a New Understanding of the Mind’
- Cherie Fernandes

HONORABLE MENTIONS
‘Equity, Equality, and Restraint: The Ethics of Neuroenhancement in Education’
- Yashwanth Gokarakonda
‘Guilty Before Proven Innocent: The Implications of Unconscious Racial Biases in the Criminal Justice System’
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‘Common Consequences: The Case for Patient-to-Patient Education During Deep Brain Stimulation’
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Letter From the Editors

Sojas Wagle, Aayush Setty, Kareena Thakur, Ashvin Kumar, Kunal Dhirani, Anca-Mihaela Vasilica, Kyle Sugita, Shyam Soundararajan, and Annie Pan

Dear Readers,

Welcome to the special IYNA-INS (International Neuroethics Society) High School Neuroethics Essay Contest issue! We greatly appreciate your readership, continued or new. This issue serves as the eighth installment in the third season of the IYNA Journal, and we have worked hard at producing more high-quality articles for everyone to read and encouraging a growing number of high school students from around the world to submit their neuroethical analyses to the journal. All of the articles were submitted to the IYNA-INS High School Neuroethics Essay Contest, and we’ve hand-picked a special few to showcase in this month’s journal.

We have been receiving many wonderful articles from you guys. It is clear how much the journal is improving as this tumultuous year draws to a close. We would just like to thank everyone who has submitted articles to this issue and prior issues alike. Without your dedication and hardwork, we would not be able to spread the word about the amazing diversity in subject matter that neuroscience, and neuroethics specifically, has to offer. With that being said, here are some previews of the essays published this month:

Cherie Fernandes takes a closer look at redefining justice, Yashwanth Gokarakonda examines the ethics of neuroenhancement in education, Angelina Xu talks about racial biases in our criminal justice system, and Yuanmeng Zhang expands on deep brain stimulation.

We would like to recognize all of our dedicated editors for helping us make this issue the success that it is. You can see all of their names and positions on our Contributors page. If you have any questions, comments, or suggestions for us, please feel free to contact us at info@youthneuro.org. We hope you enjoy reading this issue as much as we enjoyed editing it!

Best Regards,

Sojas Wagle - IYNA Journal Editor-In-Chief
Aayush Setty - Managing Editor
Kareena Thakur - Senior Editor
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Redefining Justice: Updating Criminal Law to Reflect a New Understanding of the Mind
Cherie Fernandes

Abstract
The foremost approach to assigning punishment to crime is premised on the idea of free will; an individual lives in a society on the condition that he/she obeys a certain set of rules, and if said individual freely acts in a way that violates these rules, proportionate retribution is in order. New questions arise, however, when scientists’ growing understanding of how the physical composition of one’s brain influences behavior calls this assumed truth of total free will into question. This article highlights the neurobiological factors influencing criminal activity in a number of cases before segueing into a discussion of how advancements in our understanding of the brain may point to the necessity of re-evaluating the limits of free will. It closes having made a case for a justice system that prioritizes rehabilitation over retribution in order to pave the way for a fair, humane system of criminal law informed by neuroscience.

Legal Cases Linked to Brain Damage

In the year 2000, 40-year-old George Sheppard was arrested for possessing child pornography and molesting his 8-year-old stepdaughter. For reference, George Sheppard is a generic name used for narrative purposes; the actual subject of this case study remains anonymous. He had no previous history of pedophilia, happily married for two years before his sexual impulses abruptly changed. George was fully aware of the immorality of his actions, baffled and appalled by the sudden and sickening changes, however, he felt unable to control them. He began to visit brothels, accumulated a collection of pornographic material, and, unable to contain his urges, made sexual advancements towards his stepdaughter. When his wife discovered his predatory behavior, he was removed from his home, upon which the behavior only worsened.

While awaiting his day in court, George began to complain of terrible headaches, and a brain scan soon revealed a massive tumor in his orbitofrontal cortex, the region of the brain known to control sexual impulses. The tumor was removed, and with it, the pedophilic impulses and lack of
self-control. George completed a Sexaholics Anonymous programme and was able to return to his family. When deviant sexual impulses returned a year later, another scan revealed that the tumor had as well, and so a second surgery relieved George of the tumor and the pedophilic behavior, this time for good [1].

George’s case is not an isolated one. Similar themes emerge with Herbert Weinstein, whose abnormal cyst in his arachnoid membrane was likely directly linked to his 1992 matricide, and Charles Whitman, a widely-loved ex-marine who recognized that he wasn’t himself as he brutally murdered several people due to a nickel-sized tumor in his brain [2]. As scientists continue to improve upon technologies that probe the brain, the link between neurological aberrations and criminal behavior becomes increasingly clear. Accordingly, legal cases involving brain damage become increasingly common [3].

Neurobiology behind Criminal Activity

George’s case in particular points to what Stanford neuroscience professor David Eagleman terms “hidden drives and desires [which] lurk undetected behind the neural machinery of socialization”. “When the frontal lobes are compromised,” Eagleman explains, “startling behaviors can emerge” [3]. This disinhibition is also common in patients with frontotemporal dementia, a disease-causing the aforementioned lobes to degenerate. The lack of impulse control often causes patients to violate social norms, and commonly landing them in court for resultant crimes such as public nudity, aggression, and shoplifting [4]. The composition of their brains leaves them physically incapable of acting differently.

These, among other examples, demonstrate that behavior is inextricably linked to neurobiology. There is universal disgust for George’s behavior—and rightly so—but can he ultimately be faulted for it? After all, who’s to say what any individual might do, if their brain were to develop a growth as small as a dime, snatching their self-control? It is dubious to blame an individual whose actions are direct results of a mental affliction. At this, one might rightly point out that the vast majority of crimes are not the result of sudden onset or chronic mental afflictions such as brain tumors. However, if we accept the principle that “one should not be blamed for actions the physical composition of their brain prevents them from controlling,” then we must consider all ways in which this physical composition, or neurobiology, may impact decision making.

Consider genetic predisposition to violence, or environmental influences, from prenatal factors like stress or drug use on the mother’s part to childhood neglect or abuse impeding mental health development [5]. There is a choice in any of the above, and yet they have a tremendous impact.
on how one acts and thinks. We find it easy to look at someone who has committed a crime and assume “I wouldn’t have done that in their place,” but we likely haven’t been exposed to the same formative factors. What appears to be a voluntary action is the result of an intricate and unique set of cellular structures that make up your brain, and you’ve never had a say in them. All that is psychological is ultimately physical, and thus the line where voluntary action, or “free will,” begins and predetermined biology ends is further complicated when brought to the justice system.

How Research in Neuroscience Complicates “Justice”

The concept of justice is premised on the idea that every individual has the free will to obey a social contract; a transgressor has chosen not to do so of their own volition and is thus deserving of punishment [6]. Therefore, when the truth of free will comes into question, our understanding of justice must be re-evaluated accordingly. Ruling on culpability necessitates drawing a firm line between fate and free will, a task that becomes impossible as the evolving field of neuroscience continues to shift that boundary. At the end of the day, it is unproductive and immoral to adhere to the traditional notion of justice when science continues to unearth the concept; a truly fair legal system would instead look ahead and focus on effective rehabilitation as a means of keeping society safe and dispense with the notion of retribution that does not make an effective deterrent. Rehabilitation includes a focus on education and policies that foster the space for self-improvement that allows prisoners to become productive members of society. This change is ideal from a policy perspective as well, as mass incarceration continues to be a long-standing problem in the United States, China, and Russia, and a lack of legal reform is already linked to a host of other societal issues, among them racial discrimination [7]. The result should be an increase in policies that restore dignity to prisoners.

Furthermore, bringing neurotechnology to rehabilitative solutions provides a path towards re-integrating citizens into society while maintaining their integrity as humans: changing them as little as possible and on their own terms. Among them may soon be Eagleman’s “Prefrontal Workout,” biofeedback that uses real-time brain imaging to allow users to watch and learn how to control that neural activity through their thoughts, strengthening impulse-control [8]. At the risk of detouring into pure philosophy, it is worth noting that the concept is not dissimilar to Plato’s Chariot Analogy in how the user is encouraged to self-moderate their behavior and thus retains a sense of responsibility for their own identity change. While this perceived agency is ultimately illusory in that the collection of cells in one’s brain is still dictating their own transformation in a theoretically predictable way, the impression of it is, frankly, motivating and thus productive for patients. These new strategies and a scientifically informed approach to sentencing serve to maintain a fair, humane system for criminal law as neuroscience continues to unearth the mysteries of the human mind.

References


Sophie’s Choice: The Safety of Psychiatric Treatment During Pregnancy
Martyna Pałys

Abstract
Pregnancy revolutionizes life on many different levels – but not necessarily in a positive way. Waiting for an unborn child can be disrupted by a mental health problem, which can endanger both the future mother and her child. Knowledge of how to cure the mother without harming the fetus is lacking, forcing the mother and medical staff to choose a treatment with a lower risk for the patients’ health. The full range of pharmacotherapy consequences, or other kinds of medical interventions during pregnancy, remains mostly unknown. Taking into account and reducing the potentially destructive effects of treatment and the absence of such treatment is key to maintaining a balance between the patient and the child’s well-being.

The Rank of the Issue

Despite the widespread practice of calling pregnancy the ‘happiest time in life,’ several changes in a pregnant woman’s body can aggravate the symptoms of a previously diagnosed psychiatric disorder or perhaps cause a number of them due to stress. According to recent studies, about 20% of women during pregnancy suffer from mental illnesses [1]. Treatment for these illnesses requires pharmacotherapy (that is, pharmacological influence on disturbed biochemistry of the brain), which in some cases, can have teratogenic effects. Teratogens are substances responsible for abnormalities in the physiological development of the fetus, including congenital malformations and diseases that manifest themselves later in life [2].

This Moment Changes Everything

Figure 1. The “mamma’s brain” – differences in brain structures between pre-pregnancy and post-pregnancy periods. The marked areas show decreased surface area and thickness of grey matter in the brain [4].
Pregnancy leads to a significant imbalance in the human endocrine system, compared to the normal body state of a woman of reproductive age who is not expecting a child. This modified activity of hormones causes the so-called "mamma's brain." It is assumed that mainly estrogen and progesterone effects lead to a long-lasting shrinking of the grey matter in areas correlated with social cognition [3]. Even more critical is that pregnancy itself may trigger a wide range of mental health problems such as hypochondria, obsessive-compulsive disorders, eating disorders, or major depressive disorder [5][6][7]. Additionally, various symptoms of previously diagnosed diseases may be alleviated or intensified by the new situation. For a healthy pregnant woman, mood problems may be the first warning signal, but unfortunately, they are often unnoticed or even ignored by medical services.

The Chain of Consequences

The fetus, formed in the woman’s uterus, remains connected to her through the umbilical cord and the placenta. Not only nourishment and oxygen can cross the placental barrier, but also medicines with a molecular weight of <500 Dalton[8]. This property causes psychotropic drugs, which may have teratogenic effects, to transfer into the intrauterine environment. Exposure may breach the neural tube’s rapid development, which is extremely vulnerable in the first trimester.

Once a pregnancy has been confirmed, the first step that can be taken is to discontinue pharmacotherapy for the period of pregnancy and lactation. However, untreated conditions are still noticeable to the fetus. The developing fetus feels the mother’s emotional states as a result of “communication” through neurohormones. Exposure to a biochemically unbalanced environment, such as a dysregulated HPA axis, the main stress response system, due to an active mental illness, can disturb the development of the unborn child – the infant’s stress regulation system is programmed by the mother’s prenatal maternal stress [9][11]. Research shows that untreated major depressive disorder is associated with a higher incidence of miscarriages, lower IQ numbers of the infant, delayed intellectual and linguistic development, higher risk of mental illness, and poorer socio-emotional functioning [12]. It has been suggested that the mother’s mental state may be a critical predictor of a child’s future mental health history [13].
What can happen to women who have stopped taking psychiatric medication? The untreated illness may lead to postnatal depression, undesirable effects after birth (e.g., destructive or corrupting influence on sleep, physical health, emotional, behavioral, motor, or cognitive development) and obstetric consequences [14]. The risk of suicide increases, including extended suicide, which could be a consequence of a postpartum psychosis [15].

Treatment Methods

There is an urgent need for controllable treatment methods for psychiatric disorders in pregnant women for the health of the present and next generations. The risk of taking one of the most widely used psychiatric medications, selective serotonin reuptake inhibitors (SSRI), remains unclear. According to recent studies, SSRIs (except paroxetine and fluoxetine) are not associated with congenital disabilities, but evidence of cellular toxicity and DNA damage in Drosophila has been proven [16][17]. Studies on second-generation antipsychotic therapy during pregnancy provided inconsistent results on the safety or influence they could have on the fetus [18]. Mood stabilizers such as valproic acid can lead to unpredictable consequences such as the increased risk of autism [19].

However, other pharmacological treatment methods may have advantages for future mothers as the possibility of non-pharmacological therapy is seemingly underestimated. More than fifteen years ago, only about 15% of pregnant patients with MDD took part in psychotherapy [20]. Evidence suggests the effectiveness of cognitive-behavioral therapy for anxiety disorders by restoring the neuronal responsiveness within the amygdala and treating fibromyalgia symptoms, which are aggravated during pregnancy [21][22]. Recent studies on Open Dialogue therapy, a method used to cure patients with the first psychosis episode, have shown its high effectiveness. However, the treatment requires the relatives’ commitment and establishing a strong social support system [23]. There is also a proposal to use electroconvulsive therapy (ECT) as a part of the treatment of pregnant patients with MDD. Although ECT can be useful for patients with schizophrenia, there is, unfortunately, no in-depth research on the possible effects of such therapy on pregnant women [24][25].

Figure 3. Brain imaging shows that glucose metabolism increases in the hippocampus and decreases in cortical regions. The usage of paroxetine may have the opposite effect [27].
As it turns out, the topic contains a lot of hard choices. The question that is commonly passed over is how burdensome the mother's decision is and what tragic consequences it can have to leave her alone with such liability, primarily when it is known that increased cortisol leads to miscarriages, pre-eclampsia, lower birth weight, complications during labor and even delayed development of the child [26].

What Has to Be Done

Despite such incredible possibilities of today's medicine - genetic changes and the cultivation of organs in a dish - we still do not know how psychiatric disorders can be safely treated during pregnancy. The most efficient approach would be to further research this topic with multidisciplinary specialists such as psychologists, psychiatrists, and gynecologists. For example, raising awareness of health professionals' problems can increase the low detection rate of psychiatric disorders [28]. Prevention of MDD through social support networks appears to be significantly beneficial as well [29]. The issue requires more in-depth research, the creation of a new generation of safe medicines, and above all, open discussion. So far, the question of how to keep both lives safe is still one of the most challenging, unsolved problems in medicine.

References


Equity, Equality, and Restraint: The Ethics of Neuroenhancement in Education
Yashwanth Gokarakonda

Abstract

Neuroenhancement is a rapidly developing area of neuroscience that focuses on the use of drugs and technologies to improve cognitive abilities. Although it has countless promising applications in all reaches of society, it has the greatest impact on the education system. Various inequalities and learning barriers plague modern education, and neuroenhancement holds the potential to decrease such cognitive disparity. As neuroenhancement technology evolves and becomes more accessible, several routes can be taken to administer it in the education system to bridge the gap between students. In this article, the morality, the advantages, and the drawbacks of multiple implementation methods are explored. The ethical and physical risks of neuroenhancement are also discussed.

What is Neuroenhancement?

As the ever-growing field of neuroscience continues to expand its reach, society is faced with the need to accept its products, results, and innovations. This could not be more true for neuroenhancement, which is defined as the “the use of neurotechnologies to improve cognitive, affective or behavioral functioning” [1]. Neuro enhancing drugs and technologies such as nootropics, tDCS (transcranial direct-current stimulation), modafinil, and other stimulants can improve concentration, memory, vigilance, decision-making, mood, and stress perception [2]. Although these methods apply to a wide population, their most direct application seems to be in the education sector. The potential benefits of neuroenhancement are limitless, but it could also lead to catastrophic consequences if it is not implemented properly into the current education system. The avenue for methods to boost mental processes is huge, especially in an era that values and rewards academic productivity, creativity, and concentration. However, the novelty of technologies such as tDCS implies exclusivity and expense, which can lead to problems such as inequality and socioeconomic division through educational disparity. Widespread implementation, on the other hand, could lead to a loss of autonomy. Even if students don’t desire to use neuroenhancers to
improve their cognitive abilities, they might be forced to in order to keep up with a “smarter” generation of peers. Conversely, if these revolutionary technologies are not explored at all, existing academic inequalities will persist and society may be held back from a wave of cognitive advancement. Thus, the decision has to be made: should society choose equity, equality, or restraint when it comes to the use of neuroenhancement in education?

The Considerations of Equity

A multitude of inequalities, barriers, and disparities already exist in the current education system. Students with conditions such as ADHD, autism, schizophrenia, dyslexia, and other learning disorders have been shown to possess lower intelligence levels, speech ability, and performance ability [4]. Other students, even though they don’t have a diagnosable condition, consistently perform worse in academic tasks. If the government chooses to only offer neuroenhancements to lower-performing students (equity), whether due to a disorder or a disadvantage, a degree of cognitive inequality would be dissolved. Ideally, if neuroenhancing technology continues to develop at the rapid pace at which it has been progressing for the past few decades, the educational gap could eventually be bridged.

However, this option has many ethical considerations that need to be accounted for before it can be widely implemented. Firstly, should the level of performance be determined by results on school assignments or by intelligence tests such as the WISC-V (Wechsler Intelligence Scale for Children, Fifth Edition)? While academic results would take into account many other factors such as test-taking strategies, anxiety, and work ethic, the WISC-V conducts assessments that only measure raw intelligence and cognitive abilities, making it a more viable evaluation for neuroenhancement [5]. One interesting perspective is that only individuals with disorders should be
supplemented with neuroenhancement. Nonetheless, this also raises many questions. Where is the line drawn between a disorder and a disadvantage? Students suffering from autism spectrum disorder (ASD) have varying degrees of symptoms and impairments [6]. Would it be justifiable to provide students who perform slightly worse than the majority with the same treatment as students who have severe autism or ADHD? Finally, should it only be supplemented to selected students? Supplying neuroenhancements only to lower-performing students could, in a way, encourage performing worse in education, contradicting many of the values such as work ethic, determination, and perseverance that education is supposed to uphold in students. Although neuroenhancements would assist students through their academic years, their lack of these values could cause them to struggle in “the real world.” Academic institutions must answer these questions to successfully implement neuroenhancements into the education system and address the cognitive inequality that plagues it.

The Considerations of Equality

Another approach to this situation is to allow neuroenhancements for all students (equality). Although true equality would drastically increase the cognitive and intellectual ability of society, many of the previous inequalities would continue to exist. Even though lower-performing students would benefit from neuroenhancements, the abilities of the already high-performing would also be increased, sustaining the cognitive disparity. On the other hand, the degree of neuroenhancements received by each student could be varied based on that student’s performance. This will ideally allow all students to possess “equal” cognitive abilities. If this method is implemented, what standard of cognitive excellence should we strive for? Either approach of equality will require an enormous amount of expenditure. Thus, until neuroenhancement becomes mainstream and more easily accessible, these options do not seem viable.

The Drawbacks of Neuroenhancement

Before considering any of these options, humans must deeply reflect on the ethical and physical drawbacks of using neuroenhancers at all. Although the side effects of neuroenhancement drugs are rarely mentioned, sustained use of such drugs poses significant neuronal risks. Illicit use of neuroenhancers impairs behavioral flexibility, causes higher levels of neuroticism, and threatens neural plasticity (the ability of the nervous system to adapt to changes in the environment or itself) in adolescents [7]. Even if students are not directly affected by neuroenhancement usage, they are more likely to abuse other illegal substances and prescription drugs for self-medication [8]. Furthermore, neuroenhancement inherently is morally wrong as it masks the natural potential and uniqueness of each student. By artificially increasing their cognitive abilities, students will never be able to comprehend what they could have achieved independently. Without gaining self-actualization, many students could be left with a sense of false identity and guilt for the rest of their lives. Is it ethical to place society’s youth at such physical and mental risk? If the government does decide that the dangers of neuroenhancement outweigh the possible benefits, can it restrict or even ban neuroenhancers? While neuroenhancement promotes welfare and has the ability to reduce
inequality, it poses several health risks and threatens the integrity of education. This question poses a complicated ethical discussion.

Conclusion

Neuroenhancement technology will inevitably evolve and become safer, more effective, and more affordable. These technologies will hold the ability to address numerous inequalities, barriers, and disadvantages seen in the education system today. However, if all the possible drawbacks and moral viewpoints are not considered, they will also have the ability to only make current inequalities worse and cause serious ethical dilemmas. This delicate balance between cognitive prosperity and inequality is one that society must weigh carefully to ensure the well-being of its youth.

References


Common Consequences: The Case for Patient-to-Patient Education During Deep Brain Stimulation

Yuanmeng Zhang

Abstract
Deep brain stimulation (DBS) is an emerging technique for treating symptoms associated with disabling neurological conditions, including Parkinson’s disease, obsessive-compulsive disorder, and epilepsy [1]. Enabled by a small, pacemaker-like device that delivers targeted electrical stimulation directly to the brain, DBS has drastic effects on patient lives—both for the better and the worse. Current methods of patient education occasionally fail to clarify unrealistic expectations about the course of treatment and ease the burden of side effects that negatively impact patients’ daily lives. In light of the ongoing COVID-19 pandemic, online peer-to-peer platforms may be particularly appealing to correct patient expectations and speed adaptation to life after DBS.

The Relevance of Deep Brain Stimulation

Seemingly distant from public life, DBS may be closer to our own than we imagine. The United Nations has reported that nearly one in six individuals suffer from a neurological disorder in their lifetime [2]. From Parkinson’s disease to dementia, neurological disorders exert a significant impact on public lives. Different types of brain stimulation are in development to reduce this impact, making DBS more likely to enter your life or your relatives’ in the near future. However, this makes it all the more worrisome that current educational methods fail to prepare DBS patients for the full consequences of their treatment.

Figure 1. The distinct components of a DBS device [1]
The Problems: Unrealistic Expectations and Unexpected Consequences

When patients decide to undergo surgery, they may be exposed to misinformation that leads to inadequate preparation for the consequences of DBS. While over 96% of patients receive DBS education from a Parkinson’s disease specialist and 61% from a neurosurgeon, 46% continue to self-educate on DBS procedures and effects using the internet and social media platforms after being referred [3]. Unlike academic publications, online news articles overwhelmingly report “miracle stories” about the latest advancements in brain stimulation. These articles naturally avoid a nuanced consideration of individual variation, both in terms of treatment success and presented side effects. Additionally, some patients may misinterpret DBS as a single surgery when it requires extensive clinical monitoring and device programming. In a recent study, such patient expectations were only discussed with clinicians in 48.3% of cases [4]. Consequently, unrealistic positive expectations are quite common in prospective patients—and likely to remain even in consultation with their neurologist and neurosurgeon.

Implanted patients should be prepared to navigate unexpected consequences of DBS even if their treatment is a clinical success. Patients with Parkinson’s disease, for instance, have reported communication difficulties that accompany the reduction of resting tremor with DBS [5]. Unexpected side-effects such as stuttering, changes in auditory feedback, difficulties reading and writing, and mental fatigue are commonly responsible for disrupting patient social lives. On the other hand, patients without side-effects may find themselves burdened by their sudden normality—especially in cases of DBS for psychiatric disorders. Able to survey their lives from a different perspective, these patients must now confront feelings of uncertainty about the future and actively construct identities unencumbered by disability [6]. For both of these cases, then, patients must be prepared to develop coping strategies for unforeseen consequences of DBS.

Is There Anything to Be Done?

Some readers may feel that these points do not indicate that DBS education has truly failed. Correction of outlandish expectations is not a requirement of the informed consent procedure. To be adequately prepared for the consequences of their treatment, patients must be informed of the risks and benefits of DBS. The risk of unexpected complications is commonly stated. Such an
argument would be correct. On the other hand, informed consent provides no guidance on how to address risks that become actual. This is especially apparent for consequences that have not been identified yet by the clinical community at large. In such cases, patients are left on their own as they navigate life after DBS. Yet, there is a way to both correct patient expectations and help them cope with unexpected consequences: an online peer-to-peer network.

**An Online Peer-to-Peer Interaction to Improve DBS Patient Experience**

An online peer-to-peer network for DBS patients is a promising strategy to augment existing educational approaches and close the gap between treatment expectations and reality. Before deciding to undergo DBS, interaction with multiple peer mentors would allow for a more comprehensive sampling of the first-person experience and the correction of biases introduced by miracle stories. Patients also tend to be more comfortable expressing their hopes and concerns to peers, as well as heeding corrections made in clear and simple words. [7]. After implantation, a robust peer-to-peer platform should also continue to complement the expertise of healthcare professionals. Peers experiencing common consequences (e.g., speech issues) might be encouraged to share coping strategies with each other. Thus, peer-to-peer education networks can alleviate the unnecessary suffering of DBS patients caused by unforeseen side effects and other issues such as the burden of normality.

Encouragingly, the deployment of an online patient-to-patient platform has become more feasible due to the ongoing global pandemic. Telehealth, the remote diagnosis and treatment of patients by means of telecommunications technology, is used to support patient-to-clinician communication has spread along because of COVID-19 over the past several months. For instance, a recent article in the journal of the American medical informatics association indicated that many health systems are accommodating over 600 video or telephone visits a day [8]. Much current energy is directed towards online healthcare, yet efforts to include peer-to-peer Communication within existing telehealth platforms for clinical purposes may encounter significant obstacles. These
include the potential privacy issues and usability of aging patient populations. Such constraints will have to be addressed by any new peer-to-peer platforms deployed in healthcare settings.

Conclusion

Current methods of patient education fail to address unrealistic expectations before surgery and remain inadequate to ease the burden of unexpected consequences on daily life. A peer-to-peer platform for DBS patients would encourage patients to open up about their pre-surgery expectations and receive practical solutions to common and uncommon consequences of their DBS treatment. Though telehealth platforms are particularly appealing in the present, they’ll be no less important for patients moving forward. Clinical application of novel devices or target sites promise to treat a wide array of debilitating neurological conditions—but may also produce unprecedented consequences on personality, cognitive abilities, and other defining components of our identity. The creation of a patient-to-patient education platform, then, would be of immense value to many of us who will consider DBS treatment for ourselves or our loved ones in the coming future.

References


Abstract
In recent years, neuromarketing, a field of marketing using neuropsychological approaches to study consumers’ behavior, has come under increasing scrutiny. Neuromarketing, also known as consumer neuroscience, gives companies new tools to better understand consumers’ purchasing behaviors. These tools include cutting-edge neuroimaging technologies like fMRI, which measures changes in the brain’s blood flow to visualize brain activity, and MEG (magnetoencephalography), which maps brain activity by recording the brain’s magnetic fields. However, user data is arguably the most effective and potent tool in neuromarketing. According to Wired, Silicon Valley giants like Google and Facebook are rushing to monopolize this new field; thus, with the help of the latest advances in neuroscience, neuromarketing can influence and possibly manipulate consumer behavior on a massive scale.

What Makes Neuromarketing Different?

Some may argue that traditional marketing has always been and continues to be the most potent way of influencing consumers. Traditional marketing employs consumer surveys, focus groups, and external observation to gather data about what people think, feel, and believe. Companies can use that data to appeal to consumers’ decision-making processes. This is, however, a flawed view. Neuromarketing, unlike traditional marketing, tries to gain insight into the decision-making processes happening at an unconscious level. Moreover,
neuromarketing eliminates bias by not using any self-report methodologies. If only the conscious processes were looked at, as is the case in traditional marketing, a marketing campaign may fail. That was the case when the Coca-Cola Company altered their recipe for Coca-Cola in 1985. When they conducted taste tests, focus groups, and surveys, as is typical of traditional marketing, they received an overwhelmingly positive response; however, they failed to look at consumers’ automatic emotional reactions to the change, which was overwhelmingly negative. Thus, the Coca-Cola Company could not anticipate consumers’ unconscious behaviors, and their marketing campaign was an utter disaster [4].

A Threat to Society

Neuromarketing, a powerful tool, allows companies to effectively influence consumers’ unconscious behavior. However, companies could extend this influence over consumers and attempt to manipulate them.

Notably, the 2016 U.S. presidential election provided an insight into the dangers that neuromarketing can pose to society. One of the most controversial players in the election, Cambridge Analytica, a prominent data analytics firm, was found to have sold the data from 50 million Facebook profiles to the Donald Trump and Ted Cruz campaigns to convince American “political consumers” to give their votes to them; concerningly, Cambridge Analytica and Facebook didn’t bother acknowledging any privacy concerns [5].

Ultimately, services provided by companies like Cambridge Analytica that use neuromarketing for political purposes may undermine the quality of democracy. For a country firmly established on the ideals of democracy, allowing such interference in the democratic process would risk losing principles of democracy like political freedom and slipping into the grasp of tyranny.

Moreover, neuromarketing is fueling the obesity epidemic. According to a report by the World Health Organization, snack companies use neuromarketing to gather information and target children’s vulnerabilities. Now, obesity rates among U.S. teenagers have quadrupled over the past four decades, with one out of three teens being either overweight or obese [6]. Neuromarketing presents a grave threat to public health.

What’s Next?

Accordingly, neuromarketing has the potential to infringe on consumers’ freedom to withhold private thoughts; thus, it presents a unique threat to the right of freedom of thought stated in Article 18 of the Universal Declaration of Human Rights: “Everyone has the right to freedom of thought, conscience” [7]. Governments are expected to tackle the issue of neuromarketing and maintain mental sovereignty for all their people. Presumably, governments could either consider an absolute ban on any commercial uses of neuroimaging, which pertains mostly to neuromarketing, or they could regulate and impose rules about the benefits of neuromarketing.
Consider the option of an outright ban on the commercial uses of neuroimaging. France has already made the commercial use of neuroimaging illegal through its bioethics laws: “Brain-imaging methods can be used only for medical or scientific research purposes or in the context of court expertise” [8]. However, this was a controversial move and would not be supported in every country. For example, in the United States, under a landmark Supreme Court decision, “the general rule is that the speaker and the audience, not the government, assess the value of the information presented. Thus, even a communication that does no more than propose a commercial transaction is entitled to the coverage of the First Amendment” [9]. The ban on neuromarketing would also eliminate anti-smoking campaigns and charity programs, which rely on neuromarketing techniques to acquire donations. While an outright ban on neuromarketing may effectively curb its infringement on individual freedoms, it also eliminates many of its positive and ethical uses. However, if neuromarketing infringes on people’s right to private thoughts, is it ethical to use it, even if it is for a useful purpose?

In contrast, regulating neuromarketing would benefit both companies seeking to use neuromarketing and charity programs. Regulation of neuromarketing arises from the need for transparency. By adequately monitoring neuromarketing to secure consumers’ rights without enforcing excessively strict guidelines on the free market, progress and advancement of neuromarketing can be ensured. However, because of the grave ramifications of neuromarketing, it’s prudent to monitor neuromarketing not only within corporations but also through governmental means, which would allow for the creation of standardized regulations that can control the potential ethical implications of neuromarketing [10].

Conclusion

Neuromarketing will continue to grow in popularity with the ultimate goal of finding the mystical “buy” button in consumers’ brains. According to 360 Market Updates, a market intelligence and advisory firm, it is expected to grow by 15.6% by 2025 [11]. It’s clear that as the field develops, the gravity of the potential problems of neuromarketing will increase. Thus, the question of how governments will adequately deal with neuromarketing in a way that doesn’t infringe upon any rights remains.

References


An Examination of the Risks and Benefits of Moral Neuroenhancement

Kanthi Karumbunathan

Introduction

Neuroenhancement is the means of enhancing the functions and capabilities of the human brain through the use of drugs [5]. When contemplating the uses of neuroenhancement, the first idea that likely comes to mind is heightening the cognitive functions of the brain such as memory. Cognitive function, though a popular example, is not all that neuroenhancement is capable of. Another often overlooked, but just as important, side to neuroenhancement is moral neuroenhancement, or “the deliberate moral improvement of an individual’s character, motives, or behavior” [2].

What is Moral Neuroenhancement?

Throughout history, mankind has always sought to increase each other’s morality, an idea that manifests itself in the education of most children. Whether it be through bedtime stories such as “The Boy Who Cried Wolf,” or an exploration of religion and philosophy, most of us have encountered moral education in some form or another. Neurotechnologies that are currently being developed aim for the same outcome as such moral education. These technologies function by “altering certain brain states [and] neural functions” in order to imitate or enhance, the results of current moral education [2]. More simply, neurotechnology would be able to improve one’s moral compass, rendering more traditional methods of moral education more or less unnecessary.

But what constitutes moral betterment? It seems that such a statement could be easily
debateable based on one’s perspective. In this case, the “functional-augmentative approach to enhancement” could be considered. As per this approach, any enhancement can be characterized by the improvement of a particular function by “increasing the ability of the function to do what it normally does” [3]. In the case of moral enhancements, functions that could potentially be amplified include, but are not limited to, empathy, fairness, and selflessness.

**Prospective Applications**

Though the mechanisms of moral neuroenhancement are still uncertain, many potential technologies are under scrutiny. One suggestion details the use of neurohormones, such as oxytocin, to promote “pro-social” attitudes by being administered exogenously [6]. Essentially, one would become more empathetic, selfless, and trustful of others. Moreover, the manipulation of a person’s serotonin and testosterone levels could help enhance their cooperation and trust, while, at the same time, alleviating aggressive behaviors [4]. Practices such as these could be implemented in situations ranging from the attempted correction of impulsive tendencies in psychopaths to treating addiction by means of improving one’s self-control. These potential uses of neuroenhancement barely even scratch the surface of the possibilities it offers.

**Direct Versus Indirect Moral Enhancement**

As outlined by philosopher Gerald Owen Schaefer, the aforementioned possibilities of moral enhancements come in two major categories: direct and indirect. Direct moral enhancements “aim at bringing about particular ideas, motives or behaviors”, whereas indirect moral enhancements “aim at making people more reliably produce the morally correct ideas, motives or behaviors without committing to the content of those ideas, motives and/or actions” [7].
With direct moral enhancement comes the risk of eliminating a patient’s ability to change their mind following a procedure. Because everyone would follow similar moral beliefs and, thus, possess similar personalities, the ability for someone to express dissent would be diminished [2]. Such a prospect is mildly horrifying, for we would be robbing someone of their autonomy and essentially forming clones (at least in regard to morality). If such technologies were purchased illegally, it could be hugely detrimental as humans could be made into puppets, or non-consensually drugged and taken advantage of. Instead of “coming to believe or act on a given moral proposition because it is the most reasonable,” philosopher Gerald Owen Schaefer fears that “[people] would come to believe or act on it because a particular external agent (the enhancer) said it is best’ and perhaps even ‘implanted’ it in [their] brains”, further emphasizing a possible lack of autonomy [3][7]. Not only would this negatively impact patients, but it would also affect the field of neuroenhancement. If participants are unable to communicate dissent and think individually, no advancements will be made in moral neurotechnology. This concern, though valid, certainly requires more moral consideration. If direct neuroenhancement does indeed become available, it is imperative that the government make sure that all uses be consensual and done exactly as requested by the patient. Any corruption in such a field would disrupt the lives of countless people.

The alternative to direct moral enhancement is indirect moral enhancement. Rather than change the moral reasons for why one makes a certain decision, indirect moral enhancement instead empowers and supports “faculties that are part of the process of moral choice and action” [8]. No means of indirect moral enhancement would force particular beliefs or behaviors upon someone. People would still have the freedom of making independent decisions, albeit with better cognition, and the possibility of moral disagreement would still exist [1]. It is clear that indirect moral enhancement is the superior method for moral enhancement, not only because it allows for the retention of independence, but also because it leaves a slightly larger margin for error. That said, indirect moral enhancement must still observe rigid guidelines and protective measures for the parties involved.

A caveat to direct and indirect moral enhancement can even be observed when taking into account the context in which a method of direct or indirect enhancement is administered. For example, oxytocin could potentially be used to promote prosocial behaviors, and intuitively it seems as though it would be an instance of indirect moral enhancement as it only strengthens one’s capability to be more empathetic, selfless, etc. However, suppose the oxytocin were administered to a patient in the presence of, or by, a person who had previously harmed them. Would this still be an indirect form of enhancement or would it be direct? Unfortunately, the answer is not certain. Such dilemmas only emphasize the delicacy with which any form of moral enhancement should be treated in the future.

Future Directives

Perhaps we should be questioning if it is even worth it to divert from traditional means of moral enhancement and switch to using neurotechnologies. When looking at the risks of such technology, the answer at first appears to be a resounding “no.” Be that as it may, there are certainly
benefits to neuroenhancing technologies as long as the use of technologies is strictly regulated. Consider the following rules:

I. Moral neurotechnologies should be heavily researched prior to administration and all patients should properly understand the risks and benefits of the technology in question.

II. Uses must be consensual and the patient’s autonomy should never be risked.

III. The drug should merely be used as an aid to traditional forms of moral education, and usage must be strictly limited.

IV. Thorough examinations must be done on anyone trying to purchase neuroenhancing drugs.

Following a set of proposed rules, such as the ones above, when utilizing moral neuroenhancement is necessary in order to reap its benefits without causing harm. The nuances of playing with one’s moral values are numerous, and the risks of such adjustments far outweigh the benefits. For this reason, we must be increasingly sensitive and deliberate in any endeavors to alter such workings of the human psyche in the near future.

References


Neurodata Protection: Shortcomings and Considerations for Responsible Data Sharing
Rohit Paradkar

Abstract
With the increasing usage of neuroinformatics in brain research, there has been an unprecedented growth in brain data usage and sharing. These are accompanied by many ethical and societal issues that must be considered and addressed in order to expand on the effectiveness of neuroinformatics research. This article specifically discusses the problem of data-sharing frameworks and how they infringe upon the privacy of patients and test subjects. The aim of this article is to suggest future considerations and open a dialogue on measures that can be utilized to address these major privacy concerns.

Intro to Big Data and Neuroinformatics

Just as the invention of the wheel reshaped the world in 3500 BC, there is one tool that has revolutionized the 21st century: data. The use of big data has skyrocketed in recent times as its widespread use now applies to almost every discipline, including banking, healthcare, stock trading, and most importantly, research. With the rapid advancement of neuroinformatics, a discussion about the ethics of neurological data privacy and sharing has become increasingly significant. This article breaks down the inherent ethical concerns of data sharing, usage, and privacy involved in neuroinformatics as well as suggests future considerations to address these issues.
Neuroinformatics is a field of study that incorporates neuroscience and information technology by building computational models using neurological data. It is used for three primary purposes: creation of tools to manage and store neuroscience data; development of software to analyze data; and formation of elaborate models to improve our understanding of brain function [1]. The data used in neuroinformatics is called brain data and comes mainly from brain scans such as fMRI (functional magnetic resonance imaging) and EEG (electroencephalogram) [2]. Neuroinformaticians collect raw brain data, interpret it, and then employ it in computational experimentation.

Neuroinformatics research is a key factor in allowing modern-day scientists to make discoveries that further our understanding of the brain; there are approximately 100,000 research papers published every year that make discoveries through analysis of brain data [3]. Needless to say, it will continue to become a driving force in sustaining neuroscience research in the information age [1].

Current Data Sharing Practices and Frameworks

The sharing of large volumes of experimental data is essential to the efforts of neuroscientists around the globe. However, this comes with alarming ethical concerns — ones that must be addressed in order to tap into the full potential of the discipline. In order to understand the problem, it is necessary to examine current brain-data privacy measures.

In most research projects, data is first anonymized to exclude any personal and health information and then shared through interoperable databases. This strategy is employed by small and large studies including the Human Brain Project (HBP) and BRAIN Initiative — two international efforts that aim to build a collaborative neuroinformatic framework [4]. While anonymization sounds like an effective method to eliminate privacy concerns, there remain two key problems: violation of informed consent and the re-identification of subjects.

Problems with Informed Consent and Re-identification

Informed consent is the process of a research participant contractually agreeing to the usage of their data in a research study with a complete understanding of its use and possible consequences [5]. In most cases, researchers are required to obtain consent to utilize data for each individual project. However, with frameworks that allow researchers to publicly share data, the informed consent of participants can be breached. Their personal data may be unknowingly used for research projects other than those agreed upon. The ethical implications of this are drastic, especially due to the inherent sensitivity of brain data [6].

Brain patterns obtained via neuroimaging have an even higher level of uniqueness than DNA or fingerprints and are extremely personal to an individual. Brain data can not only detect diseases and mental disorders, but can even reveal an individual’s intentions, behaviors, and personal thoughts [7]. Even after anonymization, brain data is more sensitive than other health
information because it is the only data that can directly reveal a part of the forum internum—the world of mental individuality and persona—of a test subject [8]. It is therefore necessary to put forth stronger privacy laws to protect the rights of research participants and to preserve the integrity of the neuroinformatics field.

Another issue that occurs within data sharing is the ease of reidentifying brain data. Currently, US researchers are required to follow the Health Insurance Portability and Accountability Act (HIPAA) guidelines to protect “individually identifiable health information” [9]. Data anonymization is compliant with these guidelines [10]; however, with the increasingly human-like capabilities of artificial intelligence and machine learning, data anonymization is not enough to effectively protect the privacy of test participants. A study conducted by researchers from the Imperial College of London and Université Catholique de Louvain found that by using just 15 demographic attributes, the anonymized data of 99.98% of Americans could be correctly reidentified. Furthermore, even incomplete and heavily anonymized datasets were found to be easily identifiable [11]. The case of Cambridge Analytica’s political weaponization of Facebook data exposed the ramifications of inadequate data privacy laws [12]. It is imperative that robust alternatives to data anonymization are developed.

**Conclusion and Future Suggestions**

As brain data becomes more abundant, we must engage in an open dialogue about this critical issue before it’s too late and find solutions to safeguard the rights of research participants. Presently, big data governance is primarily geared towards business endeavors and does not fully consider scientific research applications. Chile is the only country taking initial steps towards legislation that specifically regulates brain data privacy [13]. In order to ensure that informed consent standards are not violated and anonymized data remains truly anonymous, governments should follow Chile’s lead and apply more provisions for brain data privacy. Stricter regulations and policies need to be put in place so that research participants are aware of the possibility that their data may be shared. Greater strides need to be taken to ensure that data can be made permanently unidentifiable.

As we strengthen our “21st century wheel”, it is vital that new regulations maintain subject privacy without impeding the scientific progress made possible by collaboration. As revolutionary as the wheel was, its partnership with the invention of wings allowed us to transcend to an entirely new frontier. Like the wheel, the field of neuroinformatics has the potential to widen the boundaries of neurological research, but it is crucial that we pair it with the wings of ethical practice so that it can truly soar.

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**References**


A Happy Pill: A Scientific and Neuroethical Analysis of Antidepressant Use in Non-Depressed Individuals

Sasha Tunsiricharoengul

Introduction

Antidepressants have been widely prescribed for clinical depression, a common mental disorder, for years. The biological and chemical functionality of antidepressant medication, specifically SSRIs (Selective Serotonin Reuptake Inhibitors), motivates the question of whether or not antidepressants can serve as “happy pills” for non-depressed individuals. This paper will analyze this question from both a scientific and neuroethical lens, considering both the health implications of administration and philosophical arguments on the definition of true happiness.

The Context of Depression in the United States

From 1996 to 2005, there was a massive increase in antidepressant use in the United States, doubling from thirteen million Americans in 1996 to twenty-seven million Americans in 2005 [1]. The recent pandemic has only exacerbated this statistic with clinical depression diagnoses being positively correlated with COVID-19 cases. Dr. Fava Maurizio, Psychiatrist-In-Chief at Massachusetts General Hospital, notes that significant stress and psychological distress will steadily increase as the pandemic progresses [2].

What is arguably more concerning, however, is the historically staggering overdiagnosis and overtreatment of depression. A study at the Johns Hopkins Bloomberg School of Public Health found that only 38.4 percent of adults that had been prescribed with psychiatric medication could actually be clinically identified as having depression [3]. This high false-positive rate results in a significant number of individuals who have to combat the neurological effects of antidepressant drugs without actually having clinical depression. This essay will examine if, scientifically and ethically, antidepressants (specifically SSRIs) should be administered to individuals who have not been clinically diagnosed with depression in order to increase emotional well-being.

The Implications of a ‘Happy Pill’ Amidst a Global Pandemic
Through a scientific lens, it is possible to better understand the effects antidepressants have on non-depressed individuals, assess the gravity of the overdiagnosis of depression, and further the knowledge on factors that affect happiness. However, through a neuroethical lens, we can attempt to understand if a “happy pill” exists as well as open up the debate over what can be considered “true happiness”. The applications of such a conclusion would especially be revolutionary amidst this global pandemic through which clinical depression has risen due to financial stress, the loss of loved ones, and social isolation.

What are SSRIs?

Selective Serotonin Reuptake Inhibitors are one of the main classes of antidepressants that work on balancing the serotonin levels in the brain by blocking neuron channels from reabsorbing serotonin. Serotonin is known as a “happy chemical” since its levels in the brain have been correlated with an individual’s happiness. Therefore, depleted serotonin levels may lead to clinical depression [4]. SSRIs’ common negative side effects include feelings of agitation and anxiety as well as indigestion, stomach aches, diarrhea, and dizziness among others [5].

A Scientific Analysis of Both Sides

There has been some evidence that supports the claim that “antidepressant use is favorable even in non-depressed individuals”; they have been cited as having modest positive effects, resulting in emotional boosts in certain case studies. A meta-analysis study published in the Neuropsychology Review found that cognitive function was not significantly affected in non-depressed participants [7]. Furthermore, the case study of Troy Dayton, a 29-year-old who regularly takes antidepressants despite never being diagnosed with depression, provides evidence that non-depressed individuals can actually benefit from modified doses of antidepressant medication. Dayton told CNN that Wellbutrin, an antidepressant that affects neurotransmitters in a similar manner to SSRIs, allows him “to experience sadness in a very healthy way.” As a result, his overall mood has improved.

Though Dayton did receive positive benefits from the intake of the antidepressant, he might just be an exception. In reality, exceeding evidence suggests that administering antidepressants to non-depressed individuals permanently alters brain architecture and does not serve as the “happy pills” that many people expect. As stated by SANE Australia, a mental health charity, antidepressants do not induce euphoria, “but simply help you react more realistically in your
emotional responses” [8]. In other words, by correcting imbalances of certain brain chemicals such as serotonin, antidepressants help depressed individuals get back to normal, not to a happier self. As a result of this intended function, antidepressant medication cannot be labeled as the “happy pill” that Troy Dayton claims it to be [9]. In addition, a study conducted at the University of New South Wales in Australia found that sertraline (an SSRI) reduced the volume of the anterior cingulate cortex. This cortex controls the hippocampus, a brain structure that regulates emotions, memory, motivation, learning, and mood [10].

A Neuroethical Approach

There can also be an ethical debate over whether antidepressants facilitate “true” happiness. Within The Book of Joy: Lasting Happiness in a Changing World, the Dalai Lama and Archbishop Desmond Tutu argue that, philosophically, there are two separate kinds of happinesses. The first type of happiness is described as “enjoyment of pleasure through our senses,” whereas the second type of happiness is described as “experiencing happiness at the deeper level through our mind.” The use of antidepressants by non-depressed individuals for the intent of feeling emotional highs, can be argued as falling more within the jurisdiction of the former type of happiness. Although the limited scientific evidence soundly proves the popular belief that antidepressants result in emotional highs in non-depressed individuals, these emotional highs are instead considered “artificial”, since they were not induced by emotions linked with the deeper level of happiness, such as “love, compassion, or generosity”. From a philosophical standpoint, The Dalai Lama states that the second type of happiness is what characterizes true joy [11]. According to this argument, since antidepressants can be argued to not lead to this deeper, true happiness, the “happiness goals” of non-depressed individuals who take antidepressants seem to be misguided.

To further complicate this debate, the use of antidepressants for emotional highs can also be seen as inducing genuine happiness, since chemically and neurologically, “there’s little difference between good feelings induced by medication and those occurring naturally”[12]. Within neuroethics, the line blurs between whether or not induced “happiness” from antidepressants can be considered genuine, and if the designation as either genuine or ingenuine happiness affects conclusions on whether or not antidepressants should be administered to non-depressed individuals.

Conclusion

Since the ethics of non-depressed individuals taking antidepressants include somewhat subjective definitions of true joy or happiness, the objectivity of scientific evidence should be relied on to address whether or not a “happy pill” does exist. Scientifically, it is unlikely that non-depressed individuals’ emotional well-being will improve, and ethically as well as logically, the risks of permanent structural brain damage outweigh slight chances of elevated emotional well-being. Dr. Julie Holland, a psychiatrist at New York University, explains that “where antidepressants are concerned (...) you don’t need crutches unless your leg is broken” [12].
References


Guilty Before Proven Innocent: The Implications of Unconscious Racial Biases in the Criminal Justice System

Angelina Xu

Abstract

Although a bedrock principle of the American criminal justice system is the presumption of innocence, research shows it might not always be upheld. This paper addresses various factors that can result in unjust rulings, including the cross-race effect, fallibility in memory, and the skin tone bias. These phenomena can unintentionally incriminate innocents, especially African Americans at disproportionate rates. Given the science, how will the government and society address these issues?

Cross-Race Effect

In 2011, Otis Boone was convicted of two armed robberies and sentenced to 25 years in prison—based on identification by the victims and no physical evidence [1]. Seven years later, New York’s Court of Appeals cleared Boone of the charges. Two transaction records showed that Boone was one mile away during the time of the robberies. The judges also ruled that the jury should have been informed of the difficulty in identifying strangers of a different race: specifically, Boone was black; the victims were white.

Known as the cross-race effect, this phenomenon has been repeatedly demonstrated by studies that people are better at recognizing same-race faces, relative to other-race faces. This raises a major concern over eyewitness identification. In Boone’s case, the white victims wrongly accused a black man. As a result, Boone served seven years of someone else’s time. However, this is not an isolated case. According to the Innocence Project, of the 364 falsely convicted individuals who were later exonerated with DNA evidence, over 70% involved witnesses who identified the wrong assailant; almost half of those mistaken identifications involved a witness and suspect of different races [1]. Evidently, when cases involve parties of different races, society must reevaluate the role of witness identification in verdict decisions.

However, jurors and prosecutors consider the eyewitness’s confidence an important factor when assessing a testimony, even though the level of confidence has proven to be an unreliable
indicator of accuracy, especially in cross-race identification. In one experiment, Caucasian and Asian subjects predicted their confidence (or lack of confidence) in remembering the same- or other-race face in a recognition test [2]. Caucasian subjects reported more confidence in future recognition of Caucasian faces while reporting less confidence in future recognition of Asian faces. Analogous results were seen in Asian subjects, who reported more confidence in the future recognition of Asian faces than in Caucasian faces. Yet, the subjects’ self-reported confidence inconsistently predicted the accuracy of other-race face recognition. For example, while Caucasian subjects may report confidence in remembering an Asian face in the later test, many fail to do so.

These mistaken cross-race witness accounts have grave legal implications: coupled with already faulty recognition (ie. the cross-race effect), faulty confidence could incriminate innocents. The devastating consequences materialized in the 1985 case of Ronald Cotton (a black man) after Jennifer Thompson (a white victim) falsely identified him as the assault perpetrator [3]. During the attack, Thompson vowed to remember the perpetrator’s face. Based on Thompson’s high self-reported confidence, the police believed that she would reliably recognize the face of the assailant in the line-up. Despite a second victim’s failure to select Cotton from the same line-up, Cotton was sentenced for life. Eleven years later, Thompson’s erroneous identification was overturned with concrete DNA evidence; Cotton was proven innocent.

**Memory Fallibility**

Considered compelling evidence by prosecutors and jurors, witness accounts and identifications have been warned by neuroscientists as susceptible to mistakes due to various other factors too. Besides the cross-race effect, stress, fear, and the crime incident’s short duration may prevent the viewer from perceiving the event accurately. The science of memory has shown that recollective experiences are often fragmentary and out of order [3]. The witness’s brain unconsciously rearranges the events and fills in the gaps to create a coherent narrative of the incident. However, this coherence comes at the expense of accuracy. Thus, when eyewitness memory is provided to the law, the evidence can be fallible at best and unreliable at worst.

**Skin Tone Bias**

Furthermore, researchers have used functional magnetic resonance imaging (fMRI) to explore the correlation between skin tone bias and amygdala activity [6]. The amygdala region of the brain is stimulated by fast, unconscious assessments of potential threats. When subjects were presented photographs of darker-skinned individuals, higher levels of amygdala activation were
observed, signifying the association of darker skin with danger. Combined with the aforementioned unreliable memory, the preconceptions of dangerousness may alter the witness’ perceptions. They may falsely remember a black defendant’s actions as threatening or mistakenly imagine he was carrying a weapon. Ultimately, this subconscious stereotyping disproportionately incriminates African Americans on false premises.

Ramications of this unintentional stereotyping are evidenced in another empirical study. Mock jurors who saw a photo of an armed robber with dark skin judged subsequent ambiguous evidence as notably more probative of guilt than did mock jurors who saw the identical photo with the armed robber being light-skinned [8]. Although the mock jurors’ racial-based judgments were unintentional, they undermine a core principle of US criminal law: the presumption of innocence. Instead, black defendants—especially those with darker skin tones and greater Afrocentric features—are subject to the presumption of guiltiness [9]. The evaluation of successive trial evidence is injected with racial bias, resulting in more frequent guilty verdicts and harsher sentences. These unconscious racial perceptions based on physical features raise concerns on the integrity and legitimacy of the criminal justice system.

Conclusion
With the recent cries of “I can’t breathe” and “Say her name” for racial equality, society must also consider the steps that must be taken to ensure fairness for African Americans in criminal law. After Boone’s ruling, New York has required the jury to understand the cross-race effect before making informed decisions. But New York is only one of the few states to address this issue. Even so, when people unintentionally associate Afrocentric features with danger, how fair are the verdicts? What can be done to diminish the effects of this phenomenon when people are seemingly unaware of its influence? With science questioning the legitimacy of witness identifications and memory, how will law enforcement view these long-held, reliable types of evidence? Should all testimonies and identifications be viewed with skepticism? In the event that there is no concrete evidence like video footage or DNA tests, can verdicts then—and only then—be made solely based on memory? If wrong convictions are later overturned, who should be responsible for the psychological damage and lost opportunities caused by imprisonment? More importantly, how may this contribute to the ever-perpetuating cycle of black mass incarceration? With racial inequity and public safety at play, these ambiguities beg the question: Should we imprison innocents or allow criminals to roam free?

References


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