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Free Will Under Siege

Neurotechnological Progress

Challenging the Core of the Human Rights Doctrine

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ABSTRACT

The rapid neurotechnological progress, including the advent of artificial intelligence through brain-computer interfaces, provide unprecedented insights into the human brain. While seemingly advantageous, these developments pose a significant risk to the realization of human rights. The profound influence of neurotechnology on our lives has the potential to undermine the validity and reliability of our subjective experiences, beliefs, and decisions. Additionally, in the hands of malicious actors, neurotechnology exposes individuals to new forms of manipulation and coercion by external agents or forces.

The primary objective of this thesis is to initiate a rigorous academic and practical examination of the philosophical and ethical dimensions inherent in the concept of free will, which serves as the cornerstone of the human rights doctrine. By examining the practical implications and academic implications, including the potential for a paradigm shift in language, pertaining to free will and consciousness, and the corresponding notion of fundamental human rights for autonomous individuals, this research aims to investigate the ramifications of neurotechnological progress on free will and human autonomy.

Key words: human rights, free will, neurotechnology, neurorights, artificial intelligence

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TABLE OF ABBREVIATIONS

ADHD	Attention-Deficit Hyperactivity Disorder
AI	Artificial Intelligence
BCI	Brain Computer Interface
BMI	Brain Machine Interface
DBS	Deep Brain Stimulation
ECHR	European Convention on Human Rights
EEG	Electroencephalography
HMI	Human-Machine Interfaces
MIT	Massachusetts Institute of Technology
ML	Machine Learning
TMS	Transcranial Magnetic Stimulation
UDHR	Universal Declaration of Human Rights
UX	User Experience

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1. INTRODUCTION

1.1. IMPORTANCE AND RELEVANCE OF THE TOPIC

Free will and personal autonomy are some of the most fundamental and controversial concepts in philosophy and ethics. The terms themselves refer to the capacity of human beings to act or choose according to their own reasons and preferences, without being determined or constrained by external factors or forces. Free will has been recognized as a necessary condition for moral responsibility, human dignity, and personal autonomy. However, the existence and nature of free will have been challenged by various philosophical arguments and scientific discoveries, especially in the field of neuroscience.

Neuroscience is an interdisciplinary field encompassing science and engineering, that focuses on understanding, monitoring, and manipulating the functions of the nervous system. Neurotechnology has made significant progress in recent years, offering new possibilities for diagnosis, treatment, and enhancement of various neurological and psychological conditions. However, neurotechnology also raises profound ethical and philosophical concerns, particularly regarding human agency and free will.

In the era of rapid technological advancements, neurotechnology has emerged as a powerful tool capable of altering our understanding of human autonomy and free will. BCI systems, for instance, allow for direct communication between the brain and external devices, potentially enabling individuals to control prosthetic limbs, restore lost sensory functions, and even enhance cognitive abilities. However, as these neurotechnological inventions continue to evolve, this progress raises *qualitatively different and unprecedented ethical issues* (Clausen 2017), and questions regarding personal autonomy, free will, and the protection of human rights have come to the forefront.

This thesis tackles a pressing and intricate issue that holds significant implications for our personal and social lives, our moral values and norms, and our legal and political systems. It aims to examine and evaluate the current threats posed by neurotechnological progress to free will and human autonomy employing an interdisciplinary approach that incorporates insights from philosophy, ethics, neuroscience,

and law. Additionally, the thesis will propose potential strategies and solutions to address these threats and uphold or enhance the human right to free will in the age of neurotechnology.

The brain forms a person's consciousness, mental processes, cognitive functions, imagination, memory, and perception of the surrounding reality (Kotchoubey 2018). Neurotechnologies involve direct interaction with the brain and impact on it, and researchers predict that further progress in the development of these methods will radically change the perception of the concept of a *human* by society.

Neurotechnologies directly interact with the brain, enabling measurement and modification of brain activity. Devices with electrodes on the head can capture brain signals and modulate them using mild electric currents; they are becoming more common not only with people who want to monitor and enhance their mental health but with businesses, governments, and militaries for many other purposes. Companies like Elon Musk's *Neuralink* are developing advanced brain implants that could do the same thing, but much better. The initial expressly mentioned goal might have been to help paralyzed people type, but the big idea is to make augmentation available to everyone.

According to Nita Farahany (2023), technologies are not yet capable of deciphering and interpreting our sophisticated mental processes, but they can decode some aspects of our neural activity. Advancements in electrode technology and algorithmic analysis, combined with large datasets and artificial intelligence, indicate that BCIs may possess more potential than commonly assumed.

These devices pose serious threats from both the commercialization of personal data and the implications of having one's neural activity observed by others, thereby infringing upon the freedom of thought which poses a serious threat to the freedom of thought. Nowadays we find ourselves at a critical point: its use is increasing rapidly but it has not yet become widespread. We have an opportunity, before others determine the conditions of use, to influence how it is applied and implemented in society.

Concerning applications include workplace brain monitoring and the exploitation of this technology by authoritarian regimes, even employing it as an interrogation tool. Alarming parallels can be drawn to involuntary neural surveillance.

The relevance of the topic lies in its examination of the implications of neuroscience in general and BCIs in particular for the right to free will, which is a fundamental human right that is acknowledged by many international declarations and conventions. Free will implies the capacity to act based on one's own

reasoning, values, and preferences, free from undue interference or coercion from others or from external factors; it entails taking responsibility for one's actions and their consequences, as well as respect for the free will of others. The notion of a right to personal autonomy or free will requires careful conceptual analysis, exploring its relationship with moral responsibility, legal implications, and philosophical underpinnings.

While free will encompasses the philosophical inquiry into the extent to which our choices are influenced, autonomy focuses on the capacity to make self-determined choices. This paper supports a plausible understanding of autonomy grounded in our ordinary experiences, recognizing that our choices are influenced by factors beyond our control. Such an understanding contrasts with absolute notions of free will, wherein choices are seen as entirely free from external influence. Analyzing the right to free will from a legal standpoint poses various challenges. One perspective suggests that the right to free will is implied by other recognized rights. For instance, if the right to life, liberty, and the pursuit of happiness is acknowledged, one could argue that the exercise of these rights presupposes some degree of free will. This implies that the right to free will is necessary to fully enjoy and exercise other fundamental rights.

However, it remains debatable whether the right to free will can be fully defined in terms of these existing rights or if there is a need for a distinct legal recognition. From a philosophical standpoint, the right to free will raises profound questions regarding moral responsibility and personal agency. Debates surrounding determinism, compatibilism, and libertarianism influence our understanding of the nature and extent of free will. Additionally, ethical considerations emerge concerning the moral responsibility and accountability associated with the exercise of free will. Recognizing a right to free will necessitates grappling with these complex philosophical and ethical dimensions. The recognition of free will as a distinct right extends beyond its implications for other rights. It serves as a foundational principle that underlies our sense of responsibility for our actions and our ability to engage in meaningful decision-making. The philosophical analysis invites further exploration of free will as a fundamental aspect of human existence. Analysis of the right to free will requires an interdisciplinary approach, combining legal analysis and philosophical inquiry. Examining the legal implications of free will demand an understanding of its philosophical foundations, as well as its relevance to human rights discourse. Bridging the gap between these disciplines is essential to foster a comprehensive understanding of the complexities surrounding the right to free will. Lastly, this paper delves into potential strategies to protect and uphold the right to free will amidst neuroscientific progress and the advent of Neuralink's latest technology.

As noted by Umberto Eco, there is no more terrible thought, especially for a philosopher, than the thought of free will (Eco, 2016). In "The Name of the Rose" (Eco, 2004), the Antichrist appears when there is no freedom in making decisions, and there is no personal autonomy, will, and right to choose. In this interpretation, the Antichrist is Dostoevsky's *Great Inquisitor* (1879), who also believed that the free will granted to people is the source of their suffering, which he took upon himself to eliminate.

1.2. RESEARCH QUESTION

The primary research questions addressed in this thesis are: How do advanced neurotechnological devices such as BCIs threaten the concept and practice of the human right to personal autonomy and free will, also known as cognitive liberty, in contemporary society? How can we effectively protect these rights in the era of neurotechnology? Furthermore, how can we ensure that the development and application of neurotechnology align with principles of human dignity and autonomy?

The main hypothesis guiding this research is as follows: Neurotechnology poses a significant threat to the concept and practice of free will by undermining the validity and reliability of our subjective experiences, beliefs, and decisions; additionally, it exposes individuals to new forms of manipulation and coercion by external agents or forces.

Neurotechnology is a fast-expanding field that can interact with the brain and potentially affect our free will, identity, privacy, and well-being. There are many scientific, ethical, and legal implications of using neurotechnology, especially when combined with artificial intelligence. Some researchers have even suggested that we can decode the neural code for intentions in the human brain and use it to predict or manipulate behavior (De Vasconcelos Costa, 2021). This raises questions about the nature and limits of human agency and responsibility.

The existing Human Rights doctrine finds its foundations in the Hobbesian idea of a social contract and public consciousness, coupled with Kantian deontology that emphasizes the autonomy of the will and the subject's capacity to act independently from external influences or desires, making choices unaffected by past events. The criminal and civil legal systems operate on the premise that only actions that are freely willed are deemed valid or deserving to blame.

However, there is a counterargument rooted in a modern scientific and materialistic approach to the question of free will, contending that free will does not exist or is merely an illusion, asserting that all human actions are passive products of external influences, rendering them predetermined. Consequently, the exercise of fundamental human rights, such as the right to privacy, freedom of religion and belief,

and freedom of opinion and expression, occurs within individuals who lack genuine freedom, rationality, and autonomy.

The emergence of advanced neurotechnological progress, including the advent of artificial intelligence through initiatives like Neuralink and Metaverse, presents a threat to human autonomy. While existing fundamental rights and freedoms may initially seem capable of safeguarding many aspects of free will, critical questions arise concerning protection in cases of brain and conscience manipulation, violations of privacy based on personal consciousness, choices influenced by built-in synapses within the brain, and potential ownership of consciousness by external entities. Attention manipulation and its implications, such as attention disorders, further complicate matters.

This thesis aims to initiate a practical and academic discourse on the ethics, or potentially a new language, surrounding free will, consciousness, and the corresponding concept of fundamental human rights for the autonomous subject. The impending discussion regardless of society's preparedness and the preservation of human autonomous subjectivity hinges upon it.

Currently, scientists and corporations involved in neurotechnological progress operate without a comprehensive universal ethics code, as free will is often regarded as an abstract notion lacking a well-defined framework. In light of this, it becomes imperative to consider whether our focus on the protection of social, economic, and political rights should take precedence over safeguarding autonomy, a crucial element of our humanity. This raises the prospect of exploring a new human right to self-determination on an international level or developing a code of ethical norms, necessitating further discussion.

Given the swift pace of technological advancement and the potential exploitation of human brain vulnerabilities in the capitalist world, it is essential to raise awareness within deontological, political, and academic dimensions. How can we ensure that neuroscience in general and Neuralink in particular respect human dignity, autonomy, and diversity? How can we preemptively prevent or regulate the misuse or unethical application of neuroscience and Neuralink? Moreover, how can we formulate ethical guidelines and legal frameworks that align with principles of human rights in the realm of neurotechnology?

1.3. METHODOLOGY

The methodology employed in this thesis adopts an interdisciplinary approach that combines philosophical analysis, ethical evaluation, and legal reasoning. The primary methods used to answer the research question are normative and philosophical, employing conceptual analysis.

The main steps of the methodology of research for this paper:

• Identification of relevant empirical data: This step involves collecting and reviewing scientific and technological literature pertaining to neurotechnology and its applications, specifically exploring its impact on human agency and free will.

• Identification of relevant norms and values that are involved or affected by the phenomenon or issue under investigation: This step involves collecting and reviewing philosophical and ethical literature concerning free will and its interconnectedness with concepts such as responsibility, autonomy, dignity, and justice.

• Analysis of normative coherence and consistency of the norms or values identified in the previous step: This step utilizes logical and conceptual tools to examine the definitions, assumptions, arguments, and implications of the identified norms and values in the previous step.

• Evaluation of ethical and legal implications of the phenomenon or issue under investigation: This step applies normative criteria or standards to assess the positive and negative consequences of neurotechnology on human agency and free will. It also involves proposing potential solutions or strategies to address the challenges and opportunities arising from their interaction

The analysis will be guided by several key standards:

• Respect for human dignity: the inherent worth and value of human beings as ends in themselves, regardless of their abilities or disabilities.

• Respect for human rights: the fundamental rights and freedoms of human beings as recognized by international law and conventions, such as the right to privacy, the right to bodily integrity, the right to informed consent, and the right to non-discrimination.

• Respect for human agency: the capacity of human beings to act or choose according to their own reasons or preferences, without being determined or constrained by external factors or forces.

• Promotion of human well-being: neurotechnology should contribute to the improvement of human health and happiness by preventing or alleviating suffering, enhancing cognitive and emotional capacities, and expanding life opportunities.

While the chosen methodology offers valuable insights, it is important to acknowledge its limitations and assumptions:

• The methodology of this research is based on a specific conceptualization of free will as a capacity for rational self-determination that is compatible with causal determinism. Alternative conceptualizations of free will that are based on indeterminism or libertarianism may require different methods or approaches.

• The method relies on a specific set of norms or values that are derived from Western philosophical and ethical traditions. Alternative sets of norms or values that are derived from other cultural or religious traditions may require different methods or approaches.

• Specific set of criteria or standards that are derived from international human rights law and conventions is used as basis for the analysis. Alternative sets of criteria or standards that are derived from other legal systems or sources may require different methods or approaches.

2. Intersection of Personal Autonomy, Free Will, and Human Rights: Philosophical Analysis

Socrates: *But if you had neither mind, nor memory, nor knowledge, nor true opinion, you would in the first place be utterly ignorant of whether you were pleased or not, because you would be entirely devoid of intelligence.*

Protarchus: *Certainly.*

<…> ***Socrates:*** *But is such a life eligible?*

(Plato, 2000, p. 10)

2.1. MAIN THEORIES BEHIND FREE WILL. COMPATIBILISM AND DETERMINISM

The concept of free will, the capacity to make independent choices unconstrained by external influences, has been a subject of philosophical debates for centuries. For a long time, it was believed that the question of free will belongs only to the domain of humanitarian knowledge, and any attempts to answer it with the means and methods used by the natural sciences are doomed to failure in advance. However, in recent decades, we have witnessed a series of interesting scientific experiments and a number of put-forward hypotheses and theories that work with this problem in the paradigm of natural science. There are three main natural science contexts in which the problem of free will is studied and discussed by modern scientists:

1) the context of physical processes associated with quantum indeterminism,

2) the context of neurophysiological processes associated with the functioning of the human brain,

3) the context of algorithmic processes related to the development and construction of strong artificial intelligence.

Scientific research has shed light on the complexity of decision-making processes, suggesting that our choices are influenced by a myriad of factors, including genetics, upbringing, environment, neural processes, and many more factors beyond individual control. Emerging neuroscientific findings challenge the traditional notion of free will as an absolute concept and propose a more nuanced understanding that acknowledges the influence of these factors. This approach to free will often attributes human actions to biological and neural processes in the brain or external circumstances that shape behavior. However, philosophical thinkers have put forth various theories to explore the nature of free will and its relation to human agency.

Due to her unique insights on the relationship between freedom, action, ethics, and politics, Hannah Arendt's thought is crucial to the main theories concerning free will. In her essay *What is Freedom?* Hannah Arendt highlights the notion of "freedom within" through a quote from Epictetus: "he is free who lives as he wants" (1961). Arendt's interpretation of this perspective is an extension of Aristotle's understanding of freedom as "the ability to do anything to anyone". She views Epictetus and Augustine's interpretations as attempts to internalize freedom, distancing it from the realm of politics. Augustine's perspective, in particular, reflects a decline in the level of freedom within the late Roman Empire. Arendt argues that individuals could not conceive of inner freedom without having previously experienced freedom as a concrete and tangible reality.

Arendt commends Kant's endeavor to characterize freedom, describing it as a criterion that allows individuals to organize the external information they receive. According to Kant, freedom acts as a prism through which individuals evaluate their experiences. The question of defining freedom "does not merely touch upon the dichotomy of science and ethics, it arises from the experience of everyday life, from which both science and ethics originate" (Kant, 1997).

Political philosophers such as Hobbes, Montesquieu, and Spinoza also played significant roles in separating freedom from politics, limiting its domain to non-political activities. In Hobbes' perspective, *the social contract* creates a sense of public consciousness or collective awareness. It involves individuals recognizing their mutual interdependence and their shared responsibility to uphold the principles of social order and stability. Through the social contract, individuals agree to abide by certain rules and laws, which are aimed at preserving peace, resolving conflicts, and protecting individual liberties. According to Hobbes, individuals voluntarily relinquish certain freedoms and rights in exchange for security and protection provided by a governing authority. This notion aligns with the idea that human rights come

with corresponding duties and responsibilities, emphasizing the importance of a reciprocal relationship between rights and obligations.

However, it is important to note that the Hobbesian social contract theory has been subject to criticism and alternative interpretations. Critics argue that Hobbes' emphasis on a strong central authority and the subjugation of individual rights may limit the full realization of human rights. Other political philosophers, such as John Locke and Jean-Jacques Rousseau, presented different conceptions of the social contract that prioritize individual liberties and democratic participation. Nonetheless, the incorporation of the social contract and public consciousness into the doctrine of human rights serves as a significant framework for understanding the collective nature of rights, the balance between individual and societal interests, and the responsibilities associated with the exercise of rights. It underscores the notion that human rights are not isolated from societal dynamics but are deeply interconnected with the social fabric and the collective aspirations of a just and harmonious society.

Both Hobbes and Spinoza equated freedom with security, perceiving it as freedom from violence (Frankel, 2011). Montesquieu recognized that philosophical and Christian definitions of freedom did not adequately apply to politics, leading him to introduce the concept of political freedom as distinct from philosophical freedom. Philosophical freedom primarily requires the exercise of the will, while political freedom entails the ability to act in accordance with what individuals must will. According to Montesquieu, a person cannot be called free if he does not have the opportunity to will, and it does not matter if external or internal circumstances are to blame (Arendt, 1961).

A philosophical shift in the approach to the concept of freedom has led to the fact that the measure of freedom has become sovereignty, and free will, taking precedence over the rest.

Jean-Jacques Rousseau derived the theory of sovereignty from the will, which allowed him to consider political power on the model of individual willpower. Power, in his opinion, should be sovereign (indivisible), since "a divided will would be inconceivable" (Arendt, 1961, p. 163). However, this line of thinking gave rise to a few logical paradoxes. Thus, for example, in his model of an ideal state, in order to avoid factions, "citizens had no communications one with another, <…> Each citizen should think only his own thoughts" (Arendt, 1961, p. 163). It is possible that Rousseau's error stemmed from an extremely individualistic perspective (Arendt, 1961).

The consequences of this philosophical shift become apparent in the writings of 18th-century thinkers like Thomas Paine, who stated that one only needs to will freedom in order to be free – "to be free it is sufficient [for man] that he wills it" (Palmer, 1942, p. 168). The problem with this shift in the definition of freedom is that, according to its logic, the freedom of one person, or group of people, can only be real at the cost of the freedom of others.

According to Arendt, the concept of freedom is best given through its connection with action: "Action insofar as it is free is neither under the guidance of the intellect nor under the dictate of the will- although it needs both for the execution of any particular goal-but springs from some- thing altogether different which (following Montesquieu's famous analysis of forms of government) I shall call a principle" (Arendt, 1961, p.152).

This approach has led Hannah Arendt to develop an understanding of freedom that is equal to action: "A person is free as long as he acts, there is no freedom before and after, because "to be free" and to act are one and the same" (Arendt, 1961, p.160). Freedom is the *raison d'être*, the reason for being.

"Freedom as inherent in action is perhaps best illustrated by Machiavelli's concept of *virtú*, the excellence with which man answers the opportunities the world opens up before him in the guise of *fortuna*" (Arendt, 1961, p.153).

The discussion surrounding free will encompasses debates on determinism, compatibilism, political freedom, and the experiential dimensions of human agency. By examining the main theories behind free will and incorporating the insights of philosophers such as Hannah Arendt, we gain a deeper understanding of the complexities involved in grappling with this fundamental concept.

Arendt's perspective brings attention to the multifaceted nature of freedom and its inseparable connection to human rights. The emphasis that her analysis puts on political action aligns with the idea that human rights are not solely about individual entitlements but also involve the capacity to participate in the political life of a community. Human rights encompass the freedom to express opinions, assemble, and engage in political processes that influence societal decisions. Arendt's perspective adds to this understanding by emphasizing the importance of political agency and the public sphere in the realization of human rights.

Furthermore, Arendt's insights have implications for contemporary debates about compatibilism, which examines the compatibility of determinism and free will. Arendt's ideas resonate with the compatibilist position that freedom can coexist with certain determinants or external influences. She recognizes that individuals are embedded in social and historical contexts that shape their choices and actions. However, the focus of her research is on the meaningful exercise of freedom within these contexts rather than on the compatibility of determinism and free will in a strict philosophical sense.

Arendt's conception of freedom, with its emphasis on both "internal freedom" and "freedom from external violations" offers a nuanced understanding of human rights. It highlights the importance of creating a conducive environment that not only enables individual agency but also protects individuals from systemic injustices and oppressive structures. By recognizing and addressing the dual aspects of freedom, human rights frameworks can strive toward a more comprehensive and inclusive approach that promotes the full realization of human dignity, autonomy, and equality.

2.2. PHILOSOPHICAL APPROACHES TO THE CONCEPT OF PERSONAL AUTONOMY FORMED IN THE XX CENTURY

Within the realm of philosophy, the concept of personal autonomy and its relationship to free will has been a subject of profound inquiry in the past century. Two prominent philosophical views, compatibilism, and determinism, have emerged as key approaches to addressing the question of human free will. Determinism posits that all events, including human actions, are predetermined by the laws of nature and the initial conditions of the universe. On the other hand, compatibilism argues that free will can coexist with determinism, allowing individuals to act freely and be morally responsible for their actions, even in a predetermined world. In this section, I will delve into these philosophical perspectives, examining their merits and drawbacks.

For contemporary analytical philosophers, free will is often understood as the necessary condition for moral responsibility. Robert Kane, one of the most prominent theorists in this field, writes: "Indeed, many modern philosophers participating in the discussion define free will as a type of freedom, whatever it may be, which for genuine moral responsibility" (Kane, 2011, p. 16). The presence of moral responsibility is the most important property of a person (Dennett, 1981, p. 267). It arises within interpersonal relationships and manifests through the ability to elicit specific responses from others, such as gratitude, appreciation, respect, resentment, and indignation. Being morally responsible entails being subject to these reactions, either praised or blamed for one's actions. E. Eshleman further defines moral responsibility as the suitability for eliciting such responses (Eshleman, 2019). However, are there rational grounds to support the possibility of moral responsibility and free will? Are these ideas compatible with other generally accepted ideas? These questions occupy a significant place in modern analytic philosophy.

At the heart of the debate lies the issue of free will. It consists in resolving the question of the compatibility of the freedom required for moral responsibility with determinism and indeterminism. "Contemporary discussions about free will ... concern not only the compatibility of free will with determinism but also compatibility with indeterminism" (Kane, 2011). Peter Strawson, another influential

theorist on free will and moral responsibility, concurs with the formulation of the problem as follows: "... moral condemnation implies moral guilt, and guilt implies moral responsibility and moral responsibility implies freedom, and freedom implies the falsity of determinism" (Strawson, 2008, p. 2). Could it be that the belief in the existence of free will and the existence of moral responsibility is under threat?

In recent years, there has been growing attention to those attempting to address the issue of free will based on scientific evidence. Notably, some argue that science has demonstrated that free will is an illusion. To designate their views, even a special term *willusionism* emerged, the name of which combines the English words *will* and *illusion* (Nahmias, 2011). The term *willusionism* is convenient in that it allows to single out a separate group of scientist-oriented skeptics about free will. It seems that the reference to science distinguishes willusionism from "abstract philosophizing" and gives willusionistic reasoning scientific respectability and persuasiveness. According to John-Dylan Haynes, people's ordinary belief in free will is very strong and can survive abstract philosophical discussions about determinism, but the idea of freedom can change when faced with scientific data that our actions are determined by our brains (Haynes, 2011). As a consequence, the willusionist thesis attracts the attention of the public and is widely discussed in the media. Some authors even suggest using the ideas of willusionists to reform the judiciary and the penitentiary system (Caruso, 2016; Vincent, 2014), which will be further discussed in Chapter IV.

Neuroscientist David Eagleman (2011) described the core ideas behind this therapeutic and reformative approach to the judiciary: *"It is time to let go of our intuitions about how people should behave and pay attention to how they do behave — to run our legal system as rigorously as a science experiment <…>. A brain-based approach can be more cost-effective, humane, and successful. If we desire our medical treatments to be biologically informed, shouldn't we demand the same from our courtrooms?".*

In recent years, discussions surrounding the role of determinism in the criminal justice system have gained significant attention. The idea that human actions and choices are determined by various factors beyond individual control has sparked debates about the implications for concepts such as criminal responsibility and the right to autonomy. One provocative notion that arises from this discourse is the concept of preemptive arrest based on determinism. This idea challenges traditional notions of criminal justice by suggesting that individuals deemed to be predetermined to commit certain offenses should be arrested before the act is even carried out. Proponents of preemptive arrest argue that if an individual's future criminal behavior can be predicted based on determinism, it is justifiable to intervene and prevent

the potential harm they may cause. This notion challenges the presumption of innocence, one of the most fundamental principles of the legal system, by assuming the existence of guilt before any criminal act is committed; it aims at blurring distinctions between evidence (focused on past crimes by law enforcement) and intelligence (usually collected by national security actors to address future threats). Critics argue that such a practice could lead to profiling, discrimination, and the curtailment of civil liberties (McCulloch & Wilson, 2016).

The exploration of philosophical perspectives on personal autonomy and free will in the XX century has presented intriguing debates regarding the compatibility of determinism and indeterminism with moral responsibility. While proponents of compatibilism argue for the coexistence of free will and determinism, willusionists propose that scientific evidence challenges the notion of free will. These contrasting viewpoints serve as catalysts for continued discourse, prompting deeper reflections on the nature of human agency and its implications for moral responsibility. As philosophical inquiry persists, the quest for a comprehensive understanding of personal autonomy and free will remains a vital endeavor in unraveling the complexities of human existence.

2.2.1. Determinism

"All theory is against free will; all experience for it".

(Samuel Johnson, as quoted in Boswell, 2012)

Determinism is a philosophical concept that asserts that all events, including human choices and actions, are determined by preceding factors beyond an individual's control. A review of all the evidence (genetics, social psychology, sociology, etc.) is beyond the scope of this chapter which will focus on the most relevant direction for further reasoning – the neuroscientific justification of illusionism, specifically the influential experiment conducted by Benjamin Libet (Libet, 1985). Libet's famous experiment became the key to substantiating determinism through neuroscience. During the experiment, it was demonstrated that some simple actions are preceded by brain activity, which makes it possible to predict these actions retrospectively. The patients were faced with the task at any moment of time, according to their spontaneously arisen desire, decision, impulse, or will, to quickly clench the fingers or fist of their right

hand and remember in what position the point on the dial was at the moment the corresponding desire, decision, impulse or desire arose volition. During the experiment, the activity of the motor areas preceding the clenching of fingers or a fist was measured using an electroencephalogram of the brain. The EEG showed that the readiness potential is formed before a person realizes desire: brain activity begins as early as 350 ms before a person realizes that a movement needs to be made, which indicated that the reason for the action at the neuronal level has already been formed before the subject is aware of it (Libet, 1985). This reinforced the theory that all human thoughts, decisions, and actions are tied to biology and are actually beyond our control, and created a hope that studying the structure and functions of the human brain in as much detail as possible might allow to predict the behavior of people with 100% accuracy.

Initially, most of the objections were related to the technical side of the experiment, namely, to errors in the operation of devices when measuring the potential for action readiness and muscle activity, as well as to the problem of correlating the data obtained with their help with the data that were obtained thanks to the reports of the subjects about the time of their decision. Recently, more significant objections have been put forward concerning the experimental paradigm itself. For example, the discovery of the mirror neurons showed that activation of the premotor and motor areas of the cerebral cortex occurs not only when the subject performs a certain bodily movement, but also when he observes how it is carried out by another subject (Razeev, 2017). Consequently, the activation of the premotor and motor areas of the cerebral cortex does not always lead to a certain muscular movement, which means that it cannot be a sufficient basis for explaining why the subject made this or that bodily movement. In other words, although the readiness-to-action potential recorded by the devices begins 550 ms before the planned bodily movement (e.g., raising the index finger), it cannot be considered the cause of the corresponding bodily movement. This requires an additional mechanism, which some authors call a "conscious proximal decision" (Mele, 2009; 2013), which takes place (based on the data from the Libet experiment participants' reports) 200 ms before the corresponding bodily movement.

The Libet experiment, as well as the interpretation of its results, have been subjected to serious and ongoing scrutiny. Initially, most of the criticisms focused on the technical aspects of the experiment, such as the errors in the measurement of the readiness potential and the muscle activity, and the difficulty of aligning this data with the subjects' reports on their decision-making. Other substantial criticisms are aimed the experimental paradigm. For instance, the discovery of mirror neurons revealed that premotor and motor areas of the cerebral cortex activate not only when the subject executes a certain bodily

movement, but also when he observes another subject performing it (Razeev, 2017), which will not always result in a specific muscular movement, and thus – it cannot be a sufficient basis for explaining the reasoning for movement. In other words, even though the readiness potential detected by the devices starts 550 ms before the intended bodily movement (e.g., lifting the index finger), it cannot be regarded as the cause of that bodily movement. This requires an additional mechanism, e.g., a "conscious proximal decision" (Mele, 2009; 2013), which occurs 200 ms before that bodily movement (Mele, 2013).

It should be noted that Libet himself, realizing the radicalism of the consequences that followed from his experiment, decided to correct his scientific and theoretical conclusions, leaving space for free will due to more careful observation of the course of the experiment he held. In the course of multiple reproductions of the experiment, it turned out that the subjects do not always perform the action for which the readiness potential began to form in the brain and which the experimenters predicted. Some subjects made the decision not to perform the action at the very last moment. Libet called this mechanism the "principle of veto" (Libet, 1985, p. 530) and proposed to equate it with free will. In fact, Libet proposed to identify free will with negative freedom, with the right of the subject to consciously veto the decisions that are made by his brain. This conclusion of Libet can be regarded as a kind of compromise, which was proposed in the course of the naturalization of one of the basic phenomena traditionally associated with consciousness, – free will. Thus, on the one hand, all our actions are controlled by our brain and the processes objectively taking place in it. On the other hand, a number of those actions that are planned by the brain before any awareness and for which a kind of trigger mechanism for their execution has already been launched can be rejected by us at the stage of our awareness, up to the moment after which the actions become irreversible; in other words, we find ourselves to some extent free in not fulfilling them.

The interpretation of Libet's experiment, which supports a deterministic thesis, can be summarized as follows: if the readiness potential precedes conscious decision-making and subsequent actions, then the conscious decision cannot be considered the cause of the action.

Two decades after Libet's original experiment and the scientific and philosophical discussion that accompanied it, at the beginning of the 21st century, another series of curious experiments were carried out in Germany, which deduced discussion about free will to a new level. One of the 'classics' in the study of decision-making is John Dylan Haynes, a professor of neuroscience. He conducted a series of

consecutive experiments, studying the activity of the brain in the conditions of choice. One of the most cited experiments was carried out at the Max Planck Institute in Leipzig in 2007 (Soon et al., 2008).

The essence of the experiment was that the subjects had to make a choice: which of the two buttons to press. Functional magnetic resonance imaging, or fMRI, was used to measure brain activity during decision-making. It allows even local changes in blood flow in the brain to be recorded in response to neuronal activity. Scanning was performed with an interval of 2 seconds and with a spatial resolution of 3 mm. By monitoring brain activity, scientists found that decision-making preceded pressing the button by more than 1.5 seconds in only 1.4% of cases. Changes in the brain occurred 7 seconds before the person pressed the button. Adjusted for the inertia of the method, the scientists suggested that the brain starts "working" even earlier - 10 seconds before the action.

Thus, neuroscientists concluded that the result of the decision is encoded in the brain activity of the prefrontal and parietal cortex. And the delay is the outcome of a network of high-level control areas that decipher – prepare - the choice. This study is an 'update' of Benjamin Libet's experiment, as it deals with simple decisions but still fails to explain longer chains of choice.

The next study by the Haynes team (2013) was based on the latest developments in neuroscience related to polygraphs, or the so-called lie detectors. The scientists used high-resolution scanners and then interpreted the resulting radiographs. Haynes suggested that the subject's latent goals could be represented by distributed foci of activity in the prefrontal cortex, thus providing a potential neural substrate for prospective memory.

Experiments have confirmed that activity in several areas of the prefrontal cortex increases during various executive processes - for example, supporting multitasking, switching activities, keeping a goal during a delay period, or sorting tasks. His research confirmed that the prefrontal cortex encodes specific information to prepare for new tasks.

Another experiment of Haynes concerned the 'complex' chain of decision-making - the choice of a car. In the experiment, the participants were divided into two groups: one was shown pictures of cars and asked to focus on details, and the other had to find squares in pictures with a background of a car. The experimenters recorded their activity in the prefrontal cortex and insula of Reil before the experiment, and after viewing the pictures, the participants were asked which car they would like to purchase. So, it turned out that the flashing images did not affect the choice of people.

Therefore, Haynes' research showed that when making large purchases, individuals know what they need even at the stage of entering the shop. This decision has in fact already been made, encoded, and stored in the cortex, and the brain "decodes" it at the right time.

In terms of technological advancements, it is essential to consider the broader implications of these findings. As our understanding of the influence of determinism on human behavior evolves, it is important to ensure that this knowledge is used ethically and responsibly.

However, proponents of determinism argue that accepting its premises can lead to positive societal outcomes. Neuroscientist Sam Harris (2012) suggests that acknowledging the absence of free will can help improve the world by identifying and addressing factors that contribute to deviant behavior. Harris also argues that recognizing determinism can alleviate anger by eliminating the notion of blaming individuals for their actions. Nevertheless, Harris also emphasizes the importance of individuals being able to assess situations and consider various factors before making decisions. Determinism should not be confused with fatalism, which implies blind trust in fate, as determinism sees actions as a chain of cause and effect.

Such skepticism is contrary to the religious understanding of man, which implies the existence of morality. Morality is often seen as following certain commandments and standards, and deviations from these norms are considered violations of faith. Legal systems are also built on the premise of individual responsibility for actions. However, the spread of determinism in society has led to increasing skepticism about free will, with some defendants in court cases claiming that their actions were unconscious or beyond their control. The number of court cases that use evidence from neuroscience has more than doubled in the past decade (Cave, The Atlantic, 2016).

THE IMPACT OF DETERMINISM ON HUMAN BEHAVIOR

The influence of determinism on human behavior is a subject of study. Research conducted by psychologists Kathleen Vohs and Jonathan Schooler provides valuable insights into the effects of determinism on human behavior. Their experiment, which exposed individuals to the idea that free will does not exist, revealed a correlation between this exposure and an increased propensity for cheating or exceeding ethical boundaries in terms of monetary gains. This finding suggests that the belief in determinism can potentially impact ethical decision-making and behavior (Vohs & Schooler, 2008).

Additionally, Vohs' research suggests that individuals who do not believe in free will may exhibit characteristics such as reduced compassion and helpfulness, increased levels of stress and depression, lower levels of success, and a perceived lack of meaning in their lives compared to those who believe in free will (Vohs & Schooler, 2008). These findings indicate that the belief in free will plays a significant role in various aspects of human psychology and well-being.

Some scientists draw a radical conclusion about the illusory nature of free will based on the results of one of the experiments described above (Haggard, 2005). At the same time, serious progress in the techniques of measuring neural activity during voluntary movements by a person, due to which these experiments have become possible, does not remove several fundamentally important questions from the agenda: Do such experiments miss the mark at all? Can we consider that experiments related to voluntary movements of any organ of the human body deal with the problem of human free will?

These questions raise conceptual objections to the conclusion about the absence of free will and human autonomy, which is made on the basis of the above experiments.

The aforementioned experiments were dealing with freedom of action, not free will, says Daniel Razeev (2017). The difference between free will and free action was one of the first to be pointed out by the American philosopher Robert Kane, one of the authoritative experts in the study of the problem of free will (Kane, 1996). From his point of view, freedom of will and freedom of action are fundamentally different types of freedom. Freedom of action is associated with the implementation of first-order intentions, and freedom of will is associated with the implementation of second-order intentions (reflexive intentions). First-order intentions are immediate intentions (for example, "I want to go for a walk", or, using Razeev's example, even "After finishing school I am going to go to university"; they are united by the fact that the content of these intentions stands for the specific state of affairs they are aimed at). Second-order intentions are indirect intentions, the content of which is our first-order intentions (e.g., "I want to be loved", "I intend to never lie again", "I refuse to turn a blind eye to injustice") (Razeev, 2017).

American philosopher Harry Frankfurt coined a similar distinction, namely the distinction between first-order desires and second-order desires (Frankfurt, 2003). Realization of the intentions of the first and second orders requires different types of freedom. If freedom of action is sufficient for the realization of the intentions of the first order, then freedom of will is necessary for the realization of the intentions

of the second order. The fundamental difference is that the intentions of the first order are discrete, they stop at the moment when they have been fulfilled and the desired state of affairs has been achieved. In contrast to them, intentions of the second order are continuous, that is, they retain their effect in the mind of the individual. At the phenomenological level (the level of self-observation), the difference between free will and free action lends itself to fixation.

Another point introduced by Razeev is that it is necessary to distinguish between the *motivational* and *intentional* experiences of the subjects of the study. Whereas in these experiments, scientists assessed and interpreted only motivational experiences without clarifying what type of mental experiences they associate the implementation of voluntary movements with. Arguing about freedom of action, scientists put desire, intention, impulse, and decision in one row, as if these concepts meant approximately the same thing. But is it possible to consider a sudden impulse to move a finger equivalent to a decision nurtured for years? From Razeev's point of view, scientists should be aware that they are dealing with fundamentally different types of experiences: a motivational experience (an impulse to do something), and an intentional experience (an intention to do something). Motivation and intention cannot be used interchangeably when describing our free actions, because they have different conceptual content (Razeev, 2017).

Overall, it might be possible that any kind of determinism – theological, genetic, logical determinism, etc. – poses a significant challenge to the concept of free will. Causal determinism, based on the idea that all events are determined by preceding causes and the laws of nature, is the most common metaphysical position.

2.2.2. OTHER APPROACHES TO FREE WILL. COMPATIBILISM AND INCOMPATIBILISM

The extensive body of contemporary research literature on the problem of free will rival that of the psychophysical problem. Nevertheless, this paper aims to shed light on key contributors to the discussion, focusing on philosophers who represent significant contemporary positions: compatibilism and incompatibilism. Compatibilism argues that free will and moral responsibility can coexist with causal determinism, while incompatibilism posits that free will and moral responsibility are incompatible with causal determinism. The two most significant incompatibilist theories of modern times have been developed by Robert Kane and Derk Pereboom. Kane defends libertarianism, the incompatibilist position that free will exists. Pereboom is advocating rigid incompatibilism. According to this theory, free

will cannot be practiced in our world. Daniel Dennett and John Martin Fisher represent compatibilism. Despite the fact that compatibilism and incompatibilism traditionally have been a part in the history of philosophy, the works of the aforementioned authors have made significant improvements in the argumentation and formulation of the respective theories.

Incompatibilism of Robert Kane

Robert Kane in *The Meaning of Free Will* tries to correlate the ideas of modern philosophers and their predecessors, as well as present a defense of one of the historically established positions - incompatibilism. Kane's historical-philosophical review seems profound, very thorough, and objective. His work is said to be, first and foremost, one of the strongest defenses of libertarianism. According to this position, free will cannot coexist with a deterministic worldview, yet it exists in our world. Consequently, an individual possesses freedom to the extent that their actions and desires are not predetermined by prior circumstances and the laws of nature. Kane contends that libertarianism has unjustly fallen into obscurity in recent times due to accusations of being regressive.

Hard incompatibilism of Derk Pereboom

An alternative to the libertarian position is the theory put forth by the philosopher Derk Pereboom. Pereboom (2014) agrees with Kane that determinism is incompatible with freedom and moral responsibility. However, unlike Kane, he argues that indeterminism is also incompatible with freedom and moral responsibility. The philosopher calls this position *hard incompatibilism*. It is somewhat similar to *hard determinism* (such a position was advocated, for example, by Spinoza) (Nadler, 2022). The difference lies in the fact that proponents of hard determinism maintain certainty in the determinism of the world around them, while hard incompatibilists remain agnostic on this matter.

Compatibilism of Daniel Dennett

Daniel Dennett defends the position that free will is not an absolute or metaphysical property, but a relative and practical one. He defines free will as "the ability to see probable futures – futures that seem like they're going to happen – in time to take steps so that something else happens instead" (Closer to Truth/Interview, 2014). At the same time, Dennett rejects the notion that free will requires indeterminism or randomness and argues that indeterminism does not enhance freedom or responsibility, but rather undermines them by introducing unpredictability and chance. Free will, according to Dennett,

is compatible with determinism, which does not imply inevitability or coercion. Therefore, individuals can still act freely as long as they are not subjected to external manipulation or interference. Dennett maintains that free will is not an illusion but a real phenomenon that has evolved through natural selection and cultural learning and that it has important functions and benefits for human survival and flourishing. Furthermore, Dennett asserts that free will is a normative concept that reflects our moral values and expectations, playing a crucial role in social practices such as praise, blame, reward, punishment, and cooperation. His theory of free will and human autonomy is grounded in a naturalistic worldview and employs a scientific approach to philosophy. Dennett aims to provide a naturalized account of free will that aligns with the findings of physics, biology, psychology, neuroscience, and other empirical disciplines.

Semicompatibilism of John Martin Fischer

John Martin Fischer's theory of free will and human autonomy contends that moral responsibility is compatible with determinism, but free will is not (Fischer 1999). He argues that moral responsibility does not require free will *per se*, but rather a weaker form of control known as guidance control. Fischer defines free will as the ability to act differently in the same circumstances or to have alternative possibilities for action. He posits that this ability is incompatible with determinism. On the other hand, moral responsibility merely necessitates guidance control, which refers to the capacity to act based on one's own reasons and values without coercion or manipulation from external factors. Fischer's theory draws on his analysis of various thought experiments and scenarios designed to test our intuitions about moral responsibility.

2.2.3. THE FRANKFURT-STYLE THOUGHT EXPERIMENT: IMPLICATIONS FOR THE FREE WILL DISCUSSION

One notable thought experiment associated with Fischer's work is the "Frankfurt-style" example (Fischer, 1999). These cases (also known as Frankfurt counterexamples or Frankfurt-style cases), introduced by Harry Frankfurt in 1969, challenge the Principle of Alternate Possibilities (PAP) that states an agent is morally responsible only if they could have done otherwise (Frankfurt, 1969). The PAP plays a significant role in the argument for the incompatibility of responsibility and causal determinism, known as the core argument for incompatibilism. This argument posits that an agent is responsible for an action only if causal determinism is false. The three key arguments are:

(1) PAP: An agent is responsible for an action only if said agent could have done otherwise.

(2) An agent could have done otherwise only if causal determinism is false.

(3) Therefore, an agent is responsible for an action only if causal determinism is false.

A popular example of a Frankfurt-style case was introduced by Derk Pereboom (McKenna, 2018). Suppose that Plum is a secret agent who has been trained to assassinate political leaders. He has been assigned to kill Peach, the prime minister of a foreign country. Plum decides to kill Peach on his own, based on his beliefs and desires. However, unbeknownst to Plum, Pear is a counterintelligence neuroscientist who has implanted a device in Plum's brain that allows him to monitor and control Plum's neural activity. Pear wants Plum to kill Peach, but he prefers that Plum does so on his own. Pear monitors Plum's brain activity and is ready to intervene and make Plum pull the trigger if Plum shows any sign of hesitation or change of mind. As it happens, Plum does not hesitate or change his mind, and he kills Peach on his own. Pear does not intervene at all.

According to Frankfurt-style examples, Plum is morally responsible for killing Peach, even though he could not have done otherwise, because he acted on his own reasons and motives, and Pear did not actually influence his decision. Therefore, PAP is false, and moral responsibility does not require the ability to do otherwise.

In response to the Frankfurt-style cases, different positions in the free will debate emerge. Daniel Dennett, a compatibilist, rejects premise No 2, and argues that the conditional analysis of free will can still hold even in deterministic scenarios. According to Dennett, an agent is free if they would have acted differently had they wanted to, irrespective of determinism.

Critics of the Frankfurt-style cases, such as Robert Kane (1996), David Widerker (1995), and Carl Ginet (1996), raise objections like the two-horned dilemma. This dilemma questions the connection between an agent's inclination and decision, whether deterministic or indeterministic and challenges the assumption that moral responsibility does not require alternate possibilities. Kane, an incompatibilist, rejects the compatibilist view and defends the existence of genuine alternative possibilities for free will. Kane argues that moral responsibility and genuine freedom require not just the ability to act based on desires and values, but also the ability to have done otherwise. Additionally, political philosopher Michael

Otsuka proposes the Principle of Avoidable Blame as an alternative incompatibilist principle, rejecting PAP (Otsuka, 1998).

The Frankfurt-style cases offer an alternative way to defend the compatibility of moral responsibility and determinism by questioning the necessity of alternative possibilities for responsibility. Fischer's notion of guidance control, rather than the ability to do otherwise, becomes the focus of moral responsibility (Fisher, 1999). The discussions and responses to the 'Frankfurt-style" experiment, including the positions of Daniel Dennett, Robert Kane and Martin Fisher, highlight the diversity of viewpoints on free will and provide insight into the ongoing debate surrounding determinism and moral responsibility.

In summary, these diverse and thought-provoking perspectives of Robert Kane, Derk Pereboom, Daniel Dennett, and John Martin Fischer reveal the complexity and richness of the free will debate, offering insights into the interplay between determinism, indeterminism, freedom, and moral responsibility. As philosophers continue to engage with the issue, further exploring its implications in light of scientific, ethical, and metaphysical considerations, the discourse on free will and its relationship with determinism remain a captivating and essential area of inquiry in modern philosophy. Recognizing and protecting free will as a vital aspect of personal identity and authenticity is crucial for promoting individual well-being and allowing individuals to live in accordance with their own values and aspirations. It emphasizes the significance of personal agency and the ability to make choices that reflect one's true self, contributing to a greater sense of fulfillment and self-realization.

2.3. THE SIGNIFICANCE OF FREE WILL AND MORAL RESPONSIBILITY IN THE CONTEXT OF HUMAN RIGHTS

The problem of free will is central to philosophy and the philosophy of law. Without addressing this fundamental issue, examination of other philosophical and legal problems becomes devoid of meaning. Denying the existence of free will leads inevitably to the conclusion that the law itself is meaningless and redundant. Law logically follows from freedom and, by its very essence, is addressed to the free will of a person, and is a product of this will. The idea of law, as Hegel (1896) noted, is, first of all, freedom. "The territory of right", writes Hegel in the *Philosophy of Law,* "is, in general, the spiritual, and its more definite place and origin is the will, which is free. Thus, freedom constitutes the substance and essential character of the will, and the system of right is the kingdom of actualized freedom...." (Hegel, 1896, para. 4).

As highlighted earlier in this chapter, the problem of free will has been discussed in philosophy since the time of Aristotle. In the latter half of the XIX century, the debate between proponents and opponents of free will appeared to be settled in favor of determinism, which became regarded as the primary principle underlying any scientific inquiry. As elucidated in the preceding section, determinism postulates that all human actions are determined by some specific reasons, which means that a person, at least from the point of view of science that studies the cause-and-effect relationships in which he is involved, cannot be considered truly free. For instance, even the materialist perspective of Thomas Hobbes reduced a person's entire life to a series of mechanically conditioned processes (Strauss, 1952). Interestingly, a peculiar form of determinism served as the basis for one of Thomas Aquinas' arguments concerning the existence of God as the first principle (Stump, 1997).

From a deterministic standpoint, a person's behavior is purportedly predetermined by their genetic makeup and the social environment in which they find themselves, thus nullifying their freedom. This viewpoint raises intriguing implications for the law, as demonstrated through the philosophical examination conducted by Stephen Law (2003). Law explores the hypothetical case of a criminal who claims exemption from punishment on the grounds that their actions are devoid of freedom. Paradoxically, the judge, adhering to the deterministic perspective, imposes punishment on the criminal,

even though the judge themselves lacks free will and is unable to alter their own actions. Strikingly, determinism can retroactively justify any action, regardless of the decisions made by the criminal or the judge. However, the deterministic argument encounters a logical contradiction: if the offender was genuinely devoid of freedom when committing criminal acts, how can they then argue for their lack of freedom by recognizing their own "unfreedom"? Consequently, by transcending the deterministic perspective and asserting control over their actions, even to a limited extent, individuals attain a degree of freedom within that particular context.

Speaking about determinism in general, it should be borne in mind that within the framework of this principle, the law of causality is understood in the way that Kant did, i.e., when a certain A is followed by "a completely different B" (Kant, 1997). In this sense, causality constitutes an infinite chain of causes and effects, with each phenomenon or event possessing its own cause, which in turn has another cause, ad infinitum.

However, Lev Petrazycki astutely critiques Kant's interpretation of the law of causality, contending that real phenomena, even from a causal perspective, are far more complex: "Real phenomena, even from the point of view of causality, are very simple, such as, for example, the fall of a stone on the ground, are the result of a causal interaction of an infinite number of factors" (Petrazycki, 1985, p. 97). Thus, the pyramid of cause-and-effect relationships extends infinitely upward. Furthermore, every event emerges from the convergence of an infinite array of infinitesimally weak causes. These two "infinities" offset one another.

Consequently, this understanding of causality does not provide grounds for asserting the absence of freedom and rigid determinism in nature. It becomes challenging to discuss determinism when dealing with intricate phenomena such as the human psyche and human society. Attempting to reduce mental phenomena to biochemical processes in the brain disregards the qualitative distinction between the psyche and biochemistry, falling into the trap of naive reductionism. As Petrazycki articulates, "When it comes to the psyche, an unheard-of multitude of factors and consequences is greatly increased. And when we have the interaction of many organisms and many psyches, as in the affairs of national, state, in general society, there again the causal complexity is even greater, since here an infinite number of factors and consequences are added" (Petrazycki, 1985, p. 101).

Moreover, it is crucial to acknowledge that modern science, particularly within the realm of quantum mechanics, has shed light on the indeterministic nature of the microcosmic realm. This perspective challenges the deterministic outlook that prevailed in the 19th century, suggesting that our universe is not as rigidly determined as previously believed. The emergence of theories such as synergetics and chaos theory in the 20th century further deepens our skepticism towards the notion of strict predetermination of events and phenomena in the universe.

The concept of freedom is inextricably linked with a self-awareness of the subject of law. In this context, freedom assumes the role of consciousness, specifically the awareness of one's own limitations. Hegel's well-known aphorism that "freedom is a conscious necessity" encapsulates this idea. It can be rephrased as "freedom is a conscious recognition of one's lack of freedom". Recognizing our lack of freedom signifies a transcendence of it, a progression towards a higher level of freedom. Freedom and consciousness, in many respects, are synonymous. This paradox of freedom becomes evident when we understand that our lack of freedom becomes the impetus for us to overcome it through deliberate action. In a sense, freedom is an arduous process of contending with our constraints in order to expand the boundaries of our consciousness. Conversely, lack of freedom is inherently unconscious. If we were truly devoid of freedom, devoid of free will, we would not even be capable of posing the question of free will. The mere formulation of this question signifies the potential for freedom and the yearning for it.

Indeed, the very existence of law serves as a testament to the presence of free will. Law, as a comprehensive entity, is directed towards individuals endowed with free will and prepared to assume responsibility for their actions. The essence of law lies in fostering the development and ensuring the flourishing of freedom within individuals and society as a whole. By safeguarding the conditions necessary for the exercise of free will, the law upholds the fundamental principles of autonomy and accountability.

The UDHR, commemorating its 75th anniversary this year, was originally conceived in response to the post-World War II era, aiming to establish a lasting and universal safeguard for fundamental rights (Gumbis at al., 2023). However, the UDHR has a different perspective of the individual than the one we have in the XXI century. Many things have changed in the last decades, and this evolution results in more complicated and varied participation of people in different life processes. In the XXI century, the individual encounters new challenges and problems. These issues demand a specific definition of the context of human rights and freedoms. The UDHR is no longer appropriate and coherent with the

current sophistication and standards of life. It is time to assess contemporary values and the dimension of rights and freedoms contained in the Declaration.

At the heart of the concept of human rights lies personal freedom. Every human being is inherently free to choose how extensively he/she wants to enjoy rights. No authority or institution has the authority to interfere as a regulator of the ego is the autonomous person. Freedom derives from behaviour and consciousness of the human being. The supremacy of freedom is the ultimate regulator of our times. However, various external factors, such as reputation and public opinion, exert continuous influence on individuals.

The autonomy of an individual is a prerequisite for the effective implementation of human rights. The strength of one's autonomy determines their ability to strive for personal advancement and productivity. An autonomous person is the best self-advisor on compliance to his/her expertise and lifestyle.

Personal autonomy itself is the most basic and fundamental human right, as it recognizes and respects the dignity and agency of every human being. Individuals possess the right to make their own choices and act based on their own reasoning, free from external coercion or manipulation. They also have the right to access information and resources necessary to exercise their autonomy, and their agency should be respected, acknowledging their ability to shape their own lives.

The exercise and enjoyment of other human rights, such as the right to expression, the right to education, and the right to health, depend on the presence of free will and individual autonomy. Personal autonomy is a prerequisite for expressing opinions, accessing and benefiting from education, and making decisions regarding one's health and well-being. Without autonomy, individuals may encounter barriers or discrimination when asserting or acting upon their other human rights. Moreover, a significant danger of the current stage of neurotechnological development, is that these technologies are potentially able to destroy the natural ability of the human brain to say "no" and show discontent and dissatisfaction, which is the crucial point of personal autonomy.

Personal autonomy was intended to be both a goal and an outcome of human rights, enabling individuals to pursue their interests, well-being, and active participation in social and political life. The core principle of human rights doctrine is to promote and protect autonomy, recognizing its essential role in human flourishing and development. Additionally, personal autonomy serves as a measure of the

fulfillment of human rights, reflecting the extent to which individuals can enjoy their rights without interference or violation.

However, the mere enactment of human rights laws in international legal documents does not ensure the universality of human rights. Achieving widespread acceptance and recognition of human rights and freedoms requires a shared understanding of human nature and its inherent rights. Common recognition of these principles is vital to fostering the acceptance and realization of human rights across diverse societies. The implementation of a new vision of human rights in the UDHR should encompass the protection of the right to autonomy and take into consideration the advancements in neurotechnologies. As society progresses and faces unprecedented challenges, it is crucial to ensure that the UDHR remains relevant and responsive to the evolving needs and complexities of human existence.

2.3.1. Moral responsibility in the context of brain implants

The traditional views of moral and legal responsibility have mainly centered on the self-governing individual, i.e., someone who can act or decide based on their own wishes and plans, without being affected by external forces (Hinchman, 1996). However, advancements in technology, particularly brain implants, including artificial intelligence agents that can directly affect the brain, raise significant questions about the extent of control individuals have over their actions and behaviors. When brain implants can directly affect someone's choices and behaviors, it challenges their autonomy and raises concerns regarding the assignment of responsibility. This leads us to inquire about the attribution of responsibility to an artificial intelligence-based brain implant. A key requirement for assigning moral responsibility is the ability to act, which in moral philosophy is often discussed as a person having autonomy or free will. We hold individuals morally responsible when they can control their behavior, based on their own genuine reasons and motivations (Fischer, 1999). That is why we usually do not hold people responsible if they are coerced or manipulated to take a specific action.

The assignment of moral responsibility typically requires the ability to act autonomously or exercise free will. Individuals are held morally responsible when they have control over their behavior, guided by their genuine reasons and motivations. Coercion or manipulation diminishes this control and absolves individuals of responsibility. Brain implants, however, have the potential to influence decision-making and behavior by supporting and allowing certain human cognitive processes, actions, or attitudes while

limiting and blocking others. As Verbeek (2006) argues, *"Technological artifacts are not neutral intermediaries but actively reshape people's being in the world: their perception and actions, experience and existence*" (p. 362).

The concept of autonomy within bioethics and philosophy is not clear-cut (Gilbert, 2015), but it is generally understood as the ability of someone to act or decide based on their own wishes and plans and not as the result of coercive or distorting external forces (Buss, 2002). Research has shown how easy it is to coerce, control, or influence individuals, both by external (such as social pressure) or internal forces (such as addictions or mental problems). However, direct brain interventions seem unique in that they bypass the conscious awareness of individuals to even choose whether to follow a set of actions or not (Bublitz & Merkel, 2014). In this regard, brain implants introduce an additional layer of difficulty in deciding whether an individual has acted autonomously or freely, or if the implant had imposed enough influence to create doubt about the freedom of individual choice and behavior (Cabrera and Carter-Johnson, 2021). If the device is not controlled directly by the agent, like in the scenario of someone brain hacking the device, or *brain jacking* (Pugh et al., 2018), that seems like a typical case of manipulation, where we have abnormal and unusual causation.

The scenario of brain jacking highlights how brain implants can compromise individual autonomy and legal liability, leading to uncertainty about the causes of actions and behaviors. The question of moral responsibility becomes more complex when brain implants are involved, as they challenge conventional ethical frameworks and depend on the social norms and expectations of different contexts (Johnson, 2014). Other human agents who design, manufacture, and programme the device, are also affecting the responsibility arrangements. Therefore, a different kind of analysis is needed to determine who is responsible and what it truly means to be morally responsible when acting with brain implants.

Direct brain interventions involve manipulating neural processes or altering brain functions to influence behavior or cognition. These interventions can take various forms, such as the use of psychoactive drugs, deep brain stimulation, or neurofeedback techniques. They target specific neural circuits or regions associated with certain behaviors or mental states, aiming to modify or regulate them.

Brain chips, also known as neural implants or BCIs refer to electronic devices that are implanted directly into the brain to establish a connection between the brain and external technologies. These implants can record neural activity, stimulate neural circuits, or facilitate communication between the brain and external devices. Deep brain stimulation (DBS) is one specific application of brain chips.

However, brain chips encompass a broader range of technologies: they can include implants that record neural activity for research purposes, brain-computer interfaces that allow individuals to control external devices using their thoughts, or even futuristic concepts such as enhancing cognitive abilities or enabling direct brain-to-brain communication.

BCI technology, with its potential to directly interface with the human brain, poses both opportunities and challenges to the notion of personal autonomy. On the one hand, BCI systems can offer individuals with severe disabilities the ability to regain control over their bodies, leading to improved quality of life and increased independence. These advancements are undoubtedly a step forward in enhancing personal autonomy and should be celebrated.

On the other hand, as BCI technology progresses, the line between restoration and enhancement becomes blurred. The emergence of cognitive enhancements through neurotechnology raises concerns about potential threats to personal autonomy. If individuals can alter their cognitive abilities or manipulate their decision-making processes through external interventions, questions arise regarding the authenticity of their choices and the integrity of their personal autonomy. Therefore, it is important to consider the potential risks associated with invasive brain interventions.

Direct brain interventions have been shown to have the capacity to bypass conscious decision-making processes and directly influence individuals' thoughts, emotions, and behaviors (Gilbert, 2015). Transcranial direct current stimulation (tDCS), a form of neuromodulation that uses constant, low direct current delivered via electrodes on the head, was originally developed to help patients with brain injuries or neuropsychiatric conditions such as major depressive disorder, and related noninvasive brain stimulation techniques do not just monitor neural activity. However, they may be able to alter temporarily cognitive, affective, and social processes, including those related to self-perception (Illes et al., 2011). For instance, subjects in the study by Karim and collaborators (2009) felt less guilty about lying during brain stimulation.

The experiences of individuals undergoing brain interventions may vary, but in many cases, they may perceive a lack of control or agency over their own actions. What is even more concerning is that in many cases, they may not even notice any external control and interpret the intervention as their own voluntary action (Gilbert, 2015). This phenomenon challenges the traditional understanding of autonomy, which highlights the ability to make conscious choices based on personal values and beliefs. Additionally, there

is growing evidence suggesting that a significant number of patients undergoing deep brain stimulation experience postoperative neuropsychiatric changes, and some even report irreversible alterations following the removal of implants (Volkmann et al., 2013). These effects of deep brain stimulation can contribute to a sense of self-estrangement, further complicating the individual's relationship with their own self-perception (Gilbert, 2017).

In conclusion, the emergence of brain implants introduces profound complexities regarding moral responsibility. The extent to which individuals maintain autonomy and control over their actions when influenced by these implants poses significant ethical questions. As we navigate this new technological landscape, it is essential to develop comprehensive frameworks that address the legal and moral implications of brain implants, incorporating considerations of autonomy, influence, and responsibility. It allows to ensure that the ethical implications of brain implant technology are thoroughly examined and that individual's rights and dignity are protected in an increasingly interconnected world.

3. Human Rights Protection in the Face of Evolving Neurotechnologies: Addressing New Challenges and Opportunities

3.1. A HISTORICAL PERSPECTIVE: TRACING THE EVOLUTION OF NEUROSCIENCE

Neuroscience is the scientific study of the brain and nervous system and how they affect behavior, cognitive functions, or thinking skills. Neuroscience is a relatively young field, but it has a long history of discoveries and achievements that have advanced our understanding of the human mind and body.

The history of neuroscience can be traced back to ancient times when people tried to explain the functions and structures of the brain based on observation, dissection, and experimentation. For example, in ancient Egypt, the brain was removed during mummification, but some surgeons noticed its connection to vision and injury. In ancient Greece, Alcmaeonid was one of the first to dissect the eye and suggest that the brain, not the heart, was the organ that ruled the body and the senses. He also believed that the brain was the seat of memory and thought.

Over the centuries, neuroscience developed as an interdisciplinary field that incorporated knowledge from anatomy, physiology, psychology, philosophy, mathematics, physics, chemistry, biology, and medicine. Some of the milestones in the history of neuroscience include:

- Discovery of neurons and synapses by Ramon and Cajal and Sherrington in the late XIX and early XX centuries (Cioce & Lamond, 2005);
- Development of EEG by Berger in the 1920s, which allowed recording of brain activity (Millett, 2001);
- Identifying neurotransmitters by Loewi in the 1920s and 1930s, which revealed how neurons communicate with each other (Rubin, 2007);

- Development of the neuron doctrine by Eccles in the 1950s, which stated that neurons are the basic units of information processing in the brain (Eccles, 1994);

- Inventing computerized tomography by Hounsfield in the 1970s, which enabled imaging of brain structures (Houndsield, 1973);

- Discovery of neuroplasticity by Hubel and Wiesel in the 1970s and 1980s, which showed that the brain can change and adapt to experience (Mowery & Garraghty, 2023);

- Inventing functional magnetic resonance imaging (fMRI) by Ogawa in the 1990s, which allowed measuring brain activity in relation to tasks or stimuli (Ogawa et al., 1990);

- Mapping of the human genome by Venter and Collins in the 2000s, opened new possibilities for understanding genetic influences on brain function and disease (Collins et al., 2003).

In the last 10 years, neuroscience has made remarkable progress in understanding the structure, function, and dynamics of the brain and its relation to health, disease, and society. New techniques for mapping the brain in 3D and in real-time, both at the cellular and macroscopic levels were developed. These techniques allow scientists to visualize the anatomy and activity of the brain in live animals and humans, and to study how different brain regions interact to produce behavior and cognition. For instance, MIT scientists used a combination of third-harmonic generation three-photon microscopy and retinotopic mapping to pair structural and functional mapping of the mouse visual cortex (Scientific American, 2014). Stanford University scientists used a bifocal microscopy technique called COSMOS to capture movies of neural activity across the whole cerebral cortex of a mouse brain (NeuroTracker, 2020).

The discovery of new genetic and molecular mechanisms that underlie neurological and psychiatric disorders, as well as normal brain development and function, has brought improvement to the diagnosis, treatment, and prevention of various brain diseases, such as Alzheimer's disease, Parkinson's disease, epilepsy, schizophrenia, autism, and depression. For example, scientists have identified bits of genetic material that circulate in the blood of patients with aforementioned syndromes. New ways were found to manipulate genes and molecules in the brain to modulate neural activity and behavior (Bassett et al., 2020). AI was integrated into machine learning (ML) to create new tools for analyzing large and complex datasets, modeling neural systems and dynamics, simulating brain function and behavior, and enhancing human cognition and performance. This mechanism was implemented to decode neural signals from the

brain and translate them into speech, generate realistic images from brain activity, control prosthetic limbs with brain-computer interfaces, and improve learning and memory with neurofeedback.

3.2. BRAIN-COMPUTER INTERFACES: A DEVICE FOR HUMANS OR AN INHUMANE DEVICE?

Brain-computer interfaces are devices that link the brain with a computer to enable the user to perform a task using their brain signals. Any person is not protected from cases in which he may lose a limb or the ability to move independently. After the loss of a limb, a person experiences significant psychological and physical changes. It is most difficult for him after the loss of the upper limbs. A person without a hand cannot do what previously seemed natural and did not require any effort. In such cases, prosthetics allow people to return to a full-fledged lifestyle: work, exercise, cook, and much more.

One of the problems that medicine has dealt with and continues to deal with is the problem of healing injuries and physiological deficiencies of the human body. When in the early 2000s, neuroscientists created a brain-computer interface, paralyzed people had the hope that sensitivity and mobility could return to them, even if only in the form of artificial limbs (Underwood, 2013).

In 1929, the German neurophysiologist Hans Berger for the first time succeeded in taking readings from an electroencephalograph and confirming the hypothesis that human actions are always associated with an increase in the activity of certain areas of the cerebral cortex (Kawala-Sterniuk et al., 2021). Since then, many researchers have repeatedly wanted to learn how to "read minds" in an attempt to decipher the electroencephalogram. But technical reasons interfered: insufficient spatial resolution of electroencephalographs (that is, it was not possible to obtain a picture of the potential distribution in detail), as well as the inability to store and process huge amounts of data in real-time. The development of technologies at the end of the XX and the beginning of the XXI century, such as microprocessor technology, its miniaturization, and the increase in its power made it possible to study the electrical activity of the brain in detail and opened up the possibility of controlling electrical devices with the help of thought.

BCIs have a long history, and many corporations are working on the development of this technology. In the last decade, a number of well-known companies with significant funding entered into this area of the neurotechnological development field. Kernel, an American company established in 2016, first

explored implantable devices, before changing its direction to non-invasive techniques that do not require surgery ("Brains and machines", 2018).

Facebook initiated its own BCI research, with an ambitious plan to develop a headset that would allow users to type 100 words per minute ("Imagining a new interface: Hands-free communication without saying a word", 2020).

Established in 1998 in Massachusetts, the BrainGate (https://www.braingate.com/about/) system is one of the oldest advanced BCI implant systems that have been collecting data for 17 years from 14 participants of the research. The BrainGate's BCI device is implanted in the brain using microneedles, a technology similar to what Neuralink uses, and can allow a person to type 90 characters per minute or 1.5 characters per second. It is important to mention that the Interim safety profile from the feasibility study of the BrainGate neural interface system reports 68 cases of adverse events such as infection, seizures, surgical complications, irritation around the implant, and brain damage that occurs during the trial period of BrainGate's BCI device (Rubin et al., 2023).

The first fully wireless implanted BCI technology that patients could use at home was achieved by another organization which is the University Medical Centre in Utrecht, Netherlands ("Brain-computer interfaces for paralyzed people", 2022). Its device relies on electrocorticography-based BCI (ECoG). Metal discs in the form of electrodes are placed directly on the brain surface to capture signals and connect wirelessly to a receiver, which then connects to a computer. Participants in a clinical trial (Vansteensel, 2016) that took place from 2020 to 2022 were able to use the device at home every day for about a year. It enabled them to control a computer screen and type at a speed of two characters per minute. Although this typing speed is slow, future versions with more electrodes are expected to improve.

Synchron (https://synchron.com/) was established in 2016 in Melbourne, Australia. In 2019, it became the first company to be authorized for clinical trials in Australia. Then in 2020, it became the first company to obtain FDA approval to conduct clinical trials using a permanently implanted BCI – and finally did this with a US patient this year (Brusco, 2022).

Synchron's approach is to avoid full brain surgery by using blood vessels to implant electrodes in the brain. This minimally invasive approach is similar to other stenting procedures commonly performed

in clinics. Synchron's device is implanted in the brain near the area that controls movement, and a wireless transmitter is implanted in the chest. This transmitter then sends brain signals to a computer.

Although its device efficiency could be enhanced, Synchron's approach means it leads the way in achieving a low barrier to entry. By avoiding the need for full brain surgery, it is moving towards making BCI implantation closer to becoming a plain daily procedure.

Founded by Elon Musk in 2016, Neuralink is a brain-computer interface company that has drawn extensive interest in the biotechnology field. Neuralink is the forefront of developing a fully implantable, wireless, and cosmetically invisible device – BCI, that can enhance human cognitive abilities and enable direct communication between humans and machines (Neuralink, 2023). Their vision revolves around creating a symbiotic relationship between humans and artificial intelligence, transcending the limitations imposed by human biology and culture.

Neuralink aims to use BCIs to treat conditions such as paralysis, blindness, deafness, epilepsy, depression, and dementia, as well as to enhance human cognition and performance (Fitzgerald BBC News, 2023). While BCIs hold the promise of significant advancements in health, education, entertainment, and social interaction, they also introduce risks and challenges concerning human agency, identity, privacy, and security (Gholipour, 2019).

Neuralink's BCI consists of four main components:

- The N1 implant, a small chip that distributes electrodes by threads, is hermetically sealed in a biocompatible enclosure and powered by a wireless battery;

- A surgical robot designed to insert the threads into the brain with high precision and minimal damage with the use of advanced optics and sensors to guide the needle thinner than a human hair;

- The Neuralink app, a software application for decoding the neural signals from the implant and translating them into actions and intents;

- A compact wireless inductive charger for the implant's battery (Becher, 2023).

On June 4, 2023, Neuralink received approval from the US Food and Drug Administration (FDA) to conduct its first human trials but has not announced plans to recruit participants yet (Fitzgerald, 2023).

The company has demonstrated the ability to record neural activity, stimulate brain regions, and control devices, but was widely criticized for conducting tests of BCIs in animals (Levy et al., 2022). Neuralink claims that BCI will be safe, reliable, accessible, and easy to use (Neuralink, 2023).

Neuralink is one of the most ambitious and innovative projects in the field of neuroscience and AI. It faces many technical and ethical challenges, such as ensuring the biocompatibility, durability, security, and privacy of the implant, as well as addressing the social and psychological implications of merging humans with machines. Neuralink claims to overcome these challenges and create a new paradigm for human-machine interaction that will benefit humanity (Neuralink, 2023).

The history of BCIs shows the immense challenges involved in developing this technology, increased by the fact that experts still do not fully comprehend the connections between our neural circuitry and thoughts. The crucial point that often gets underrated by developers of these technologies is that they must not hurry through trials. They have a responsibility to be transparent about the safety and efficacy of their devices, and to report on them publicly so consumers can make informed decisions.

3.3. SAFEGUARDING HUMAN RIGHTS IN THE AGE OF BRAIN-COMPUTER INTERFACES: EXAMINING THE RISKS AND IMPLICATIONS

Neuroscience has been exploring the neural correlates and mechanisms of human decision-making, volition, and sense of agency, and has challenged some common assumptions and intuitions about free will. Some studies suggest that human actions are preceded by unconscious brain activity that may determine or influence our choices, or that human actions are influenced by external stimuli or manipulations that may bypass our conscious awareness or control (Lavazza, 2016). These findings have been interpreted as evidence against the existence or significance of free will, or as threats to our moral responsibility or dignity (Heisenberg, 2009).

The potential advantages of the proposed approach by Neuralink are acknowledged, but there are also remaining challenges to be addressed (Kirsch et al., 2019). Ensuring the safety and efficacy of these technologies is crucial to avoid potential harm to consumers. The ability to access brain activity and the potential for unwanted third parties to hack or exploit this data raises concerns about privacy and the potential misuse of personal information (Kostick-Quenet et al., 2022, p.2).

The neurotechnological developments by companies like Neuralink represent an intensification of surveillance capitalism, which may cause shifting into neuro-capitalist telepathy, says Shoshana Zuboff (2019). Many critics agree that the race to develop neurotechnologies looks like a corporate dystopia that promises a future of increased surveillance and control.

Other ethical concerns include post-trial continued access and removal of devices for participants in research trials (Kostick-Quenet et al., 2022). The intentional expansion of these technologies into the commercial sphere for non-clinical and elective uses raises practical and ethical concerns related to free will (Kostick-Quenet et al., 2022).

One of the primary concerns is the potential erosion of individual autonomy and the fusion of human, machinic, and software agency (Essmann & Mueller, 2022), potential changes in agency, and implications for human autonomy and control. The direct interface between the human brain and external technologies, such as Neuralink's BCIs, raises questions about the extent to which individuals retain control over their thoughts, decisions, and personal identity (Kostick-Quenet et al., 2022). The ability of such technologies to influence or manipulate neural activity has the potential to infringe upon

the fundamental human right to self-determination and free will. Addressing these concerns requires a multifaceted approach that encompasses existing human rights frameworks, elaborating new rights (neurorights), ethics principles (AI and bioethics), and research protocols. Existing human rights instruments, such as the Universal Declaration of Human Rights and the European Convention on Human Rights, provide a foundation for safeguarding individual autonomy, privacy, and dignity.

Nevertheless, these instruments should be interpreted and applied in a manner that accounts for the unique challenges posed by neurotechnologies and their impact on human agency. Additionally, AI ethics principles, such as transparency, accountability, and fairness, can guide the development and deployment of neurotechnologies. Furthermore, research ethics protocols play a crucial role in ensuring the responsible and ethical development of neurotechnologies. By adhering to rigorous standards for informed consent, data protection, privacy, and risk assessment, researchers and developers can uphold ethical principles and prioritize the well-being and autonomy of individuals participating in neurotechnology studies or using neurotechnology devices.

In conclusion, arguments against Neuralink and similar technologies raise valid concerns regarding a range of issues, including surveillance capitalism, human agency, ethics, safety and efficacy, data security and privacy, as well as potential threats to human agency, responsibility, and liability. These concerns have significant implications for human rights and necessitate careful analysis and evaluation.

4. The right to free will, the right to personal autonomy or neurorights – a need for new approaches to the protection of human autonomy and human rights

4.1. BEYOND ETHICS: EVALUATING THE NECESSITY OF NEW RIGHTS IN THE CONTEXT OF NEUROTECHNOLOGICAL ADVANCEMENTS

According to Dr. Geoffrey Hinton, an artificial intelligence pioneer who recently left Google, *"the race between Google and Microsoft and others will escalate into a global race that will not stop without some sort of global regulation"* (The New York Times, 2023).

The importance of regulating artificial intelligence (AI) and its impact on society has become a pressing concern, especially in the context of neurotechnological advancement. Ethical guidelines have been proposed to guide the development and use of AI, but their effectiveness in influencing human decision-making is limited. Ethics, as a non-binding framework, lacks enforcement mechanisms, and violations of ethical principles often result in minimal consequences (Hagendorff, 2020). As a result, organizations and AI companies use their own ethical guidelines to avoid stricter legal regulations, creating an illusion of self-regulation. However, self-regulation may not effectively protect individual rights or address potential technological harms and misuses (Calo, 2017).

In recent years, advances in neuroscience and neurotechnology have opened new possibilities for accessing, monitoring, manipulating, or enhancing the human brain and mind (Nallur, 2020). Neurotechnologies allow us to understand and manipulate the human brain in new ways. They are advancing extremely fast, they can measure and influence how our brains work, they will become more accurate and widespread in the future, especially with the help of AI. They will also be used not only for medical purposes but also for everyday purposes as consumer devices (such as smartphones). For instance, one can already buy portable EEG systems to monitor stress and concentration levels. While these technologies offer great potential for improving human health, well-being, and performance, they

also pose significant ethical and social challenges for the protection and preservation of the human brain and mind.

To address these challenges, there have been calls for global regulations to ensure that AI is developed and used ethically, trustworthily, and for the benefit of humanity. The risks and challenges associated with AI, such as bias, discrimination, privacy violations, manipulation, surveillance, and misuse, necessitate the establishment of common values and principles to guide the design, deployment, and governance of AI systems across different countries and sectors.

Transparency, justice and fairness, non-maleficence, responsibility, privacy, beneficence, freedom and autonomy, and trust are among the ethical principles commonly proposed for AI systems. However, operationalizing these principles in practice presents challenges, such as balancing conflicting values, measuring their impact, and enforcing them effectively. While some argue for global regulations, others express concerns that they could stifle innovation and impose unnecessary burdens on AI developers and users. They emphasize the need for flexibility and adaptability to address the diverse and rapidly evolving AI landscape.

To effectively regulate AI, a stronger connection between ethics and other disciplines is crucial. Ethicists need to move beyond philosophical debates and engage with technical aspects, while technicians should be more open to ethical considerations. This interdisciplinary collaboration can foster a better understanding of ethical issues and ensure they are integrated into AI practices.

Efforts are underway to foster dialogue and cooperation among different actors and regions. The UNESCO Recommendation on the Ethics of Artificial Intelligence (2021) provides a normative framework and guidance for the healthy development of AI. The involvement of the UN Secretary-General, the UN Human Rights Council, and UNESCO, along with inclusive public discussions, can raise awareness of the benefits and risks associated with neurotechnologies.

Several countries have implemented AI regulations, but their scope, approach, and implementation levels vary. The European Union proposed a comprehensive regulatory framework for AI, classifying AI systems into risk categories and establishing corresponding requirements. In the United States, sector-specific laws and guidelines address certain aspects of AI, but there is no unified federal regulation. Canada has adopted policies and strategies to support AI development and established organizations to promote collaboration and excellence in the field.

In conclusion, the need for new approaches to protect human autonomy and human rights in the context of neurotechnological advancements extends beyond ethical guidelines. Global regulations, interdisciplinary collaborations, and dialogue among stakeholders are essential to ensure the ethical and responsible development and use of AI. Striking a balance between innovation and protection will pave the way for an AI landscape that respects individual autonomy and benefits humanity as a whole.

4.2. LEGAL FRAMEWORK FOR REGULATING NEUROTECHNOLOGICAL PROGRESS: BALANCING INNOVATION AND HUMAN RIGHTS

Neurotechnologies, along with artificial intelligence, can become the most advanced technologies of the fourth industrial revolution. Their value lies in the fact that in the era of the development of artificial intelligence, they make it possible to strengthen natural intelligence and combine it with artificial intelligence into one system.

AI and neurotechnologies have many intersecting applications in various domains, such as:

- Enhancement of learning and cognition among students by providing personalized feedback, adaptive curricula, or brain stimulation;

- Improvement of efficiency, productivity, and creativity in the workplace by facilitating communication, collaboration, or problem-solving;

- Augmentation of physical or mental abilities in military and intelligence services, such as coordination, motor skills, situational awareness, or resilience;

- Diagnosis, treatment, or prevention of neurological disorders, such as Parkinson's disease, epilepsy, depression, or chronic pain; restoration of motor function, sensory perception, or communication for people with disabilities.

While AI and neurotechnology may intersect in certain areas, they represent distinct approaches and have different implications. AI deals with computational intelligence and the processing of information, whereas neurotechnology directly interacts with the human brain and neural activity and focuses specifically on the interface between the human brain and technology.

Given the potential impact of neurotechnologies on personal autonomy, there is an urgent need to develop new approaches to protect and promote neurorights — rights specifically designed to safeguard

human autonomy in the context of neurotechnology. Neurorights should be rooted in the principles of respect for individual autonomy, informed consent, privacy, and non-discrimination.

Potential misuse of neurotechnologies can lead to violations of human rights by powerful subjects of public law and private law relations, such as for example, government bodies or corporations. In the absence of international public law and civil law regulation of the use of neurotechnologies, there are many risks and gaps in the system of human rights protection. To mitigate those risks, tackle the cases of abuse, and fill regulatory gaps, the United Nations has started developing approaches to the legal regulation of neurotechnologies, perhaps via "soft law" instruments, developing a code of conduct for states and corporations, as well as interpreting the norms of existing international human rights treaties in neurotechnological realities. At the same time, a wide layer of civil and criminal law relations remains untouched (Ienca & Andorno 2017), arising from the use of neurotechnologies for commercial purposes to meet the demand of private customers, as well as from the use of neurotechnologies by the state authorities and law enforcement bodies. Involvement of commercial lawyers is crucial in addressing contractual, intellectual property, regulatory, privacy, liability, risk management, and other legal aspects associated with the commercialization of neurotechnology products and services.

Application of neurotechnologies opens the prospect of impacting personal integrity that is comparable to biomedical practices. Neurotechnological products and services should respect the right to physical and mental integrity which is protected in the EU by the EU Charter of Fundamental Rights (article 3). The normative framework for commercial use should also provide free and informed consent. Non-commercialization of private neurodata and prohibition of any in regard to BCIs should prohibit any malicious interventions at the level of measurement, decoding, and feedback.

Speaking about neurotechnologies, experts from different countries note the lack of clear standards and regulations and point out that ethical and legal issues related to the interference in the human brain, in the cognitive sphere, especially with the help of artificial intelligence systems, are still waiting to be resolved (Smalley, 2019). The topic of creating legal regulation in the field of neurotechnologies is being actively developed by lawyers all around the globe.

Since the late 1990s, some advances in neuroscience have been used in court proceedings in the United States (Petoft, 2015), which marked the beginning of the formation of case law in this area. The concept of neurolaw was introduced in 1991 by American lawyers Taylor and Elliott, who substantiated

the need to involve neurobiologists and neuropsychologists in forensic medical examinations (Taylor et al., 1991).

France was the first country to introduce a special section of legislation dedicated to the regulation of neurotechnologies, in particular, the commercial use of neuroimaging technologies was limited (Schwab 2018). In 2011, the book I "On Individuals" of the Civil Code of France was included in Ch. IV, containing only one article - art. 16-14 "Use of brain imaging techniques", which states that "brain imaging techniques may only be used for medical or scientific purposes or as part of a forensic examination" (Code Civil).

In 2012, the Center for Strategic Analysis of the French Government published the report "Brain and Legislation: An Analysis of the Emergence of Neurolaw" (2012), which provides a detailed analysis of ethical and legal issues prepared by specialists in the field of law, philosophy, cognitive neuroscience and psychology. One of the authors of the report notes: when collecting and analyzing personal data, it turns out that people differ greatly in the level of empathy, intelligence, impulsiveness, and aggression. Differences contribute to the development of society, but it presents confusion for the justice system, since the French justice system, just as in most parts of our planet, is built on the premise that all people are equal before the law. "The myth of human equality suggests that all people have the ability to control their impulses, to accept decisions and understand the consequences", but the statement about equality in relation to the nervous systems is false (Eagleman, 2012, p. 49). Advances in neuroscience will make it possible to understand human behavior along a long continuum, rather than through the simplistic categories that are currently used. As we delve deeper into the complexities of neuroscience and its implications for human behavior and individual differences, it is crucial to approach these discussions with an awareness of the historical context and the potential dangers associated with misconstrued interpretations, to avoid the perpetuation of harmful stereotypes, discrimination, or the erosion of human rights. The responsible exploration of this subject necessitates a commitment to promoting equality, inclusivity, and the preservation of human dignity, while actively challenging and dismantling any racist or eugenicist overtones that may arise in these conversations.

According to neuroscientist Katherine Vidal, who is a member of the ethics committee of *Inserm* research group in France, there is an urgent need to "increase ethical vigilance in the face of the impressive development of brain manipulation technologies, which are now moving beyond medicine with commercial applications aimed at healthy populations" (Vidal, 2020). Vidal gives examples of brain

monitoring that is already spreading in China: pupils of elementary schools wear headphones, determining the degree of concentration of attention while studying; in factories, workers wear helmets equipped with sensors to detect brain waves associated with their emotional state. Vidal's position is consistent with the opinion of Herve Chneiweiss, Chairman of the UNESCO International Bioethics Committee in 2020, who points out that neurotechnologies have the potential for explicit interaction and implicit manipulation, and therefore require legal regulation (Chneiweiss 2020).

To effectively regulate neurotechnologies, policymakers must strike a balance between promoting innovation and ensuring the protection of neurorights. A comprehensive regulatory framework should be established, considering the following key aspects:

Informed Consent: Clear guidelines must be established to ensure individuals fully understand the potential risks and benefits of neurotechnological interventions. Informed consent should be obtained, encompassing comprehensive information about the technology, its limitations, and the potential impact on personal autonomy. It is necessary to ensure that the information provided to the users of neurotechnology is clear, accurate, comprehensive, and understandable, especially when the intervention involves complex or novel technologies or uncertain outcomes. Another important aspect is an assessment of the competence and voluntariness of the users of neurotechnology, especially when the intervention may affect their cognitive or emotional capacities. Moreover, the already installed BCIs can influence consent or question this mechanism's credibility in general.

Privacy and Data Protection: Robust privacy measures should be in place to protect the sensitive neural data obtained through neurotechnological interventions. Strict protocols for data storage, access, and anonymization must be enforced to prevent misuse and unauthorized access.

Ethical Research and Development: Neuroscientific research should adhere to rigorous ethical standards, emphasizing transparency, integrity, and accountability. Regulatory bodies should oversee the research and development of neurotechnologies to ensure responsible practices and prevent unethical applications.

Non-Discrimination: Policies must safeguard against discrimination based on neural characteristics or enhancements. Equal access to neurotechnologies and their benefits should be guaranteed, regardless of socioeconomic status, gender, ethnicity, or disability.

Public Dialogue and Education: Public engagement and education programs are essential for fostering awareness and understanding of neurotechnologies. Dialogue between policymakers, scientists, ethicists, and the general public can help shape regulatory frameworks that align with societal values and address concerns effectively. Engaging the public and stakeholders in citizen forums, stakeholder consultations, or participatory design can promote a more participatory, democratic, and ethical way of shaping policies on neurotechnology and free will. These participatory processes improve policy discussions, increase the quality of decision-making, and help to create policies that align with the values and goals of society as a whole.

The main implication of the existing legal framework for human rights protection brought by the neuroscientific progress is defining and protecting the emerging *neurorights*, which will be further discussed in the next subchapter. Another challenge is harmonizing the rights and interests of neurotechnology users, providers, and third parties, such as employers, insurers, or law enforcement agencies. This is crucial, in civil law – for disputes involving neurotechnologies, in criminal law – for the use of neurotechnologies in forensics and justice (Ligthart, 2021).

A clear and consistent legal framework that can balance the interests and rights of neurotechnology users, providers, and regulators can be built with the following steps:

- Developing standards and guidelines for the quality, safety, and efficacy of neurotechnological products and services, based on scientific evidence and best practices (OECD, 2019);

- Implementing measures for the privacy, security, and ownership of brain data and other information, such as data protection laws, encryption methods, or data trusts (Hertz, 2023);

- Empowering neurotechnology users with informed consent, transparency, and accountability mechanisms, such as user agreements, disclosure policies, or complaint procedures (Goering, 2021);

- Promoting fairness, diversity, and inclusivity in the development and application of neurotechnological products and services, such as anti-discrimination laws, diversity audits, or inclusive design principles (Goering, 2021).

According to many researchers, neuroscientists and lawyers, it is important to take preventive measures to tackle the ethical and legal consequences of the emerging revolution in the field of

neurotechnologies. Back in 2011, speaking at the Brookings Institution, Columbia University law professor Timothy Wu (2013) pointed out that humanity still loses sight of the issues that need to be considered when developing legislation governing the interaction of man and machines, increasingly included in our lives.

4.2.1. PERSONAL AUTONOMY IN CIVIL LAW

Free will and human autonomy are the basis of moral and legal responsibility and are crucial for the concept of valid consent. They imply that agents can act freely and rationally, without being coerced or determined by external or internal factors, and that they can be held accountable for their actions and their consequences (Zürcher, 2019).

Neuroscientific research on free will and personal autonomy goes in contradiction with the theory of free will specific to legal science. Civil law does not allow division into stages of a reasonable decision and unconscious intention. On the other hand, an approach that equates the concepts of "man" and "individual", "individual" and "brain", "brain" and "body" is not typical for psychology, biology, cognitive sciences.

In the theory of law, the inadmissibility of a simplified understanding of the free will of a person as a subject of legal relations has been repeatedly noted. Thus, J. Dworkin, basing his analysis on Kant's concept, proposed the allocation of several levels of will autonomy (Dworkin, 1988). To describe several levels of will, Dworkin cites an example from ancient Greek mythology, when Odysseus orders sailors to tie him to the mast of a ship in order to hear the sirens, but not to succumb to the primary will and not stay on their island. According to Dworkin (1988), the will implies a secondary ability to realize and is critical of one's primary desires and emotions. In such a hierarchical system, an individual choice is subject to legal protection only if it reflects the real will, that is, corresponds to the true (rationally conscious) goals and values of the subject.

In the context of BCIs, it is important to recognize that decision-making and the expression of will may be influenced by a combination of conscious and subconscious neural processes. BCIs have the potential to decode neural signals and facilitate communication or actions based on those signals, bypassing traditional physical means of expression. This raises questions about how to interpret and

protect the "real will" when it may involve subconscious neural processes that are not consciously accessible or rationally driven.

The cornerstone principle of conflict regulation of foreign economic contracts is the right of the parties to subordinate the contract to the legal order of any country. In the doctrine of private international law, this institution is called "the autonomy of the will of the parties" - *lex voluntatis*.

It should be emphasized that in theory and practice, the autonomy of the will of the parties as an institution of conflict of law should be distinguished from the right of the parties to the contract to independently establish substantive legal conditions within the limits allowed by dispositive and relatively dispositive civil law norms, that is, from the phenomenon of "freedom of contract".

Freedom of contract is enshrined in the UNIDROIT Principles of International Commercial Contracts of 1994, developed by the International Institute for the Unification of Private Law (UNIDROIT)1. This document is the result of many years of research and discussion, in which lawyers from all five continents, representing various legal systems of the world, took part. It establishes general rules for international commercial contracts and is applicable if the parties have agreed that their contract will be governed by the UNIDROIT Principles.

4.2.2. NEUROTECHNOLOGIES AND CRIMINAL LAW

Formulating new or expanding the scope of existing norms of criminal law appears to be needed urgently. The spread of neurotechnologies in practice gives rise to the problem of ensuring the safety of citizens using neurotechnologies, especially brain implants. A threat to their security will potentially be cyberattacks, from which the state will be obliged to protect its citizens through the appropriate reform of the criminal law. Cyberattacks aimed at persons with neuroimplants can be carried out for various purposes: obtaining information about their bank accounts, manipulating a neuroprosthesis in order to harm a third party, etc.

Neuroimaging of the brain may help to make more informed decisions in the field of criminal justice, and recidivism risk assessment, say Goodenough and Tucker (2010); the wearing of a neural interface is likely to become mandatory for perpetrators of crimes, as a sanction that provides control over their behavior.

The current European human rights framework, although legally allowing some types of use of neurotechnologies such as non-consensual forensic brain-reading, excludes the clearly unacceptable methods, based on Articles 6 (the right not to incriminate oneself), 8 (the right to privacy) and 9 (the right to freedom of thought) ECHR. Moreover, the use of forensic brain-reading is also limited by the prohibition on ill-treatment under Article 3 ECHR. Therefore, there might be no need for a new fundamental right to protect free will and personal autonomy; instead, a legal approach that adapts the existing doctrine of fundamental (privacy) rights to the case of non-consensual brain-reading might be preferable (Ligthart, 2021).

The emergence of neurotechnologies raises critical concerns regarding established legal principles and instruments, particularly those related to informed consent and the genuine expression of an individual's will. These technologies, such as brain implants, pose the risk of intruding into various levels of brain function, thereby threatening the fundamental human right to physical and mental integrity. It is imperative for new legal regulations to address these challenges and provide adequate protection.

One key aspect to consider is the need for a mechanism that safeguards personal consent in the context of neurotechnologies. This mechanism should ensure that individuals have full control over the use and application of these technologies, protecting their autonomy and privacy, including and especially while giving their consent. Additionally, the protection of personal neural data becomes paramount, necessitating robust measures to prevent unauthorized access or misuse.

In light of these concerns, there may be a need to consider introducing partial or complete bans on the commercialization of personal neurodata. This prohibition would serve to protect individuals from the exploitation of their neural information for commercial gain. Furthermore, discrimination based on individual neurodata should be explicitly prohibited, ensuring that individuals are not unfairly treated based on their neurotechnological profiles.

When drafting contracts for the use of neurotechnological products and services, it is essential to guarantee the right to mental integrity. These contracts should include provisions that prioritize the well-being and agency of the individual, establishing clear boundaries and ensuring that the technology is utilized in a manner that respects their physical and mental integrity.

4.3. NEURORIGHTS AND THE NEED FOR NEW HUMAN RIGHTS TO PROTECT THE BRAIN AND MIND

The human brain and mind are the most essential and distinctive features of our existence. They enable us to perceive, think, feel, communicate, create, and act in the world. They also shape our identity, personality, values, and beliefs. However, the human brain and mind are also vulnerable and malleable and can be affected by various internal and external factors, such as disease, injury, aging, environment, culture, and technology (Ienca & Andorno, 2017).

This leads to the question of whether current legal human rights are really adequate and what problems or drawbacks may arise from creating new human rights. New human rights are defined here as "rights that, when first conceived, are not expressly recognized in any human rights treaty and are not in any other way recognized as rights in a legal sense" (Von der Decken & Koch 2020).

Some scholars argue that current human rights do not protect us enough from these issues and that we need new human rights, called neurorights, to safeguard our brain activity, that rights embedded in a legal document are not sufficient to guarantee and protect a modern individual. The international community and domestic institutions may need to create a mechanism that would provide the individual with the proper legal conditions to exercise his own rights in accordance with existing social values.

A comprehensive framework is required to deal with the variety and difficulty of both neurotechnology and the ethical, legal, and social issues they create. Neuroscientist Rafael Yuste, along with other scholars claims that ethics is essential but the basis of this governance framework for neurotechnologies should be at the level of fundamental human rights (Yuste, 2017). After all, mental processes are the core of what makes us human.

Existing human rights may need to be expanded in scope and definition to adequately protect the human brain and mind. To address these challenges, legal scholars Roberto Adorno and Marcello Ienca have proposed the idea of neurorights, which are the ethical, legal, social, or natural principles of freedom

or entitlement related to a person's cerebral and mental domain (Ienca, 2021). At the constitutional and international legal level, guarantees of privacy should be provided, including the right not to be subjected to illegal surveillance by public authorities or private corporations. Such guarantees, according to researchers will be new rights and freedoms designed to protect "mental integrity and freedom of mind" (Ienca & Andorno, 2017), including the right to cognitive liberty (or the right to free will); the right to mental privacy; the right to mental integrity; the right to psychological continuity (Hertz, 2023).

The right to *cognitive liberty* (or *the right to free will*) is the right to control one's own mental processes, to decide whether or not to use neurotechnology and to choose the kind and extent of neurotechnological intervention (Ienca, 2021). This right protects the individual's freedom of thought, conscience, and expression from external interference or manipulation. The right to *mental privacy* is aimed at keeping one's own mental information, such as neural activity, thoughts, emotions, or preferences, private and confidential from unauthorized access or disclosure (Ienca, 2021). This right protects the individual's personal identity, intimacy, and dignity from intrusion or exploitation. The right to *mental integrity* is the right to preserve one's own mental health, well-being, and continuity from harm or damage caused by neurotechnology (Ligthart et al., 2022). The right to *psychological continuity* is aimed at maintaining one's own sense of personality and agency over time and across different situations. This right protects the individual's personal identity, authenticity, and consistency from fragmentation or transformation (Ligthart et al., 2022).

These rights and freedoms are not yet explicitly recognized in international human rights law, but they are derived from existing human rights principles and norms, such as the right to privacy, the right to health, the right to dignity, and the right to freedom of thought. They aim to address the specific challenges and risks posed by neurotechnology to the human brain and mind, which are not adequately covered by the current legal framework, and to promote responsible development and application of neurotechnology.

These rights can be enforced in practice by developing and implementing ethical guidelines and standards for neurotechnology design and use, such as codes of conduct, best practices, or certification schemes (Ienca, 2017). Incorporating these rights into international human rights instruments, be it through adopting new treaties or resolutions that explicitly recognize and protect these rights. This can help to establish a universal normative framework for neurotechnology governance and provide legal mechanisms for redress and accountability.

• Promoting public engagement and participation in deliberative processes on neurotechnologies and neurorights, such as citizen forums, stakeholder consultations, or participatory design. These can help to foster a more inclusive, democratic, and socially responsible approach to shaping policies on neurotechnology and neurorights. By involving the public and stakeholders, these participatory processes can enrich policy discussions, enhance the quality of decision-making, and contribute to the development of policies that reflect the values and aspirations of society as a whole.

• Encouraging international cooperation and coordination in developing and applying neurotechnology and neurorights, such as by creating networks, platforms, or alliances that facilitate information sharing, dialogue, collaboration, and mutual learning among different actors and regions. This can help to address the global challenges and opportunities posed by neurotechnology and neurorights, as well as to promote the harmonization of ethical standards and legal frameworks across different jurisdictions

Neurorights aim to safeguard the human dignity, autonomy, privacy, identity, agency, and well-being of individuals and groups in the face of neurotechnological innovation and intervention. Neurorights also aspire to promote the responsible and beneficial development and use of neurotechnologies for the common good of humanity.

However, neurorights are not a settled or uncontroversial concept. There are different conceptualizations and formulations of neurorights, as well as different approaches and perspectives on their need and justification. Moreover, there are various challenges and controversies that neurorights encounter in terms of their definition, scope, content, implementation, and enforcement. Therefore, there is a need for new approaches to the protection of personal autonomy and human rights in the context of neuroscience and neurotechnology.

It is practically impossible to predict all developments in the field of neurotechnologies, since new technologies are developing at such a rapid pace, and the awareness of ethical issues that stimulate the formulation of legal questions often lags far behind technology. This means that the formulation of legal norms in this area will be a continuous process with constant adjustments (MacKellar, 2019). Nevertheless, a number of fundamental issues are in desperate need to be settled by law.

The most sophisticated ideas of neurorights by legal experts have been proposed by Jan Christoph Bublitz and Nita A. Farahany (Hertz, 2023). They both advocate for adding only one new human right, *the right to cognitive liberty* (Farahany, 2023) or *the right to mental self-determination* (Bublitz, 2013), which are not seen as absolute rights, implying that some interventions can be legitimate.

Cognitive freedom, i.e., freedom of knowledge and intellectual self-determination, is "the right to alter one's mental states with the help of neurotools as well as to refuse to do so" (Bublitz, 2013, p. 234). Such freedom should include 1) the right of individuals to use emerging neurotechnologies; 2) protecting people from the forced and unconditional use of neurotechnologies.

Cognitive freedom is a concept that relates to the ethical and legal aspects of neurotechnologies as they can potentially enhance or alter cognitive abilities, mental states, or personality traits of individuals, as well as access or manipulate their neural data or information. Such freedom implies that individuals have the right to use or refuse these technologies according to their own preferences, values, or interests and that they are protected from any coercion, manipulation, or violation of their privacy or autonomy by others.

Some of the implications of this concept are:

• Individuals may have various reasons or motivations to use neurotechnologies, such as improving their health, well-being, learning, creativity, etc. They may also have different views or beliefs about the benefits or risks of these technologies, or the ethical or moral implications of using them. Therefore, they should have the freedom to choose whether and how to use these technologies, and to access them without undue barriers or restrictions.

• Individuals may face pressure or coercion from others to use neurotechnologies, such as employers, insurers, governments, courts, etc. They may also be subject to unconsented or unauthorized use of these technologies by others, such as hackers, criminals, researchers, etc. Therefore, they should have the right to refuse or withdraw from using these technologies, and to consent and control how their neural data or information is collected, stored, processed, or shared.

There may be cases where the use or refusal of neurotechnologies by individuals may conflict with the social norms or expectations of family members, communities, cultures, and religions; or where the use or refusal of neurotechnologies by individuals may affect public safety, security, and justice. These

implications raise ethical challenges, such as balancing the individual's cognitive freedom and intellectual self-determination with the collective interests or values of society and ensuring the quality, reliability and safety of neurotechnologies and their use. There may be risks or uncertainties such as technical failures, adverse effects, unintended consequences, misuse, abuse, or gaps or inconsistencies in the regulation and governance of these technologies across different countries or regions.

The right to mental integrity should be seen as the right to privacy of data contained in the human mind or generated by the mind. The right to mental integrity — protection from brainhacking, or brainjacking[1], from unauthorized (without the informed consent of the person himself) physical or mental invasion of the brain — becomes relevant due to the development of memory engineering methods associated with changing or selectively erasing a person's memories (Nabavi et al., 2014). These rights should be supplemented by the right to psychological continuity, since brain stimulation can lead to a change in the individual's behavior.

Enshrining at the constitutional level the rights to mental integrity and cognitive liberty should become a guarantee of the reliability of information entering the brain. After all, if third parties (a medical organization, a service center, a government agency, etc.) gain access to neuroimplants connected to a person's brain, the result may be, for example, the placement of pop-up advertising or other information in the person's mind for the purpose of incentives for any action, and the person will perceive this information as his thoughts. In such a scenario, the third party violates the person's privacy by accessing their BCI without their consent or knowledge. The personal brain data and information may be exposed or exploited by the third party for their own interests or purposes, and the person may lose control over their own thoughts, feelings, or behavior, or may act against their own values or interests.

[1] *Brainhacking* and *brainjacking* are related terms that refer to different concepts in the context of neurotechnology: they both involve unauthorized access or manipulation of the brain, but differ in their specific meanings.
Brain hacking refers to unauthorized access or manipulation of neural signals or BCIs without the individual's knowledge or consent. It involves exploiting vulnerabilities in neurotechnological systems to gain control over or extract information from the brain. Brain hacking can encompass various activities, such as intercepting or altering neural signals, accessing neural data, or even taking control of neuro implants or BCIs remotely.
Brain jacking implies unauthorized and coercive control of a person's brain, typically through external means, such as hacking into or taking control of their neuro implants or BCIs. In brain jacking, the individual's brain functions or decision-making processes are manipulated without their consent, potentially leading to a loss of control over their thoughts, actions, or bodily movements. This concept is often associated with dystopian scenarios in science fiction, where malicious actors take control of individuals' minds for their own purposes.

Over time, it will be necessary to formulate guarantees that protect human autonomy. In the next decade, the spread of artificial intelligence neuroimplants is predicted, which not only restore lost functions but also enhance human capabilities. It might stimulate the growth of the number of people with improved physical and mental abilities, significantly exceeding the capabilities of an ordinary person, due to how the rights of people who do not use such neuroimplants and the rights of people with neuro implants should be regulated (Barfield, Williams 2017). Some evidence suggests that neuroimplants are becoming more accessible, affordable, and sophisticated, and that there is a growing demand and interest for their enhancement uses among healthy individuals. According to a report by Grand View Research, the global neurostimulation devices market size was valued at USD 5.1 billion in 2016 and is expected to grow at a compound annual growth rate of 12.9% from 2017 to 2025 (Grand View Research). According to a survey by the Nuffield Council on Bioethics, 18% of the UK public would be willing to use a device that could improve their memory or concentration, and 9% would be willing to use a device that could improve their mood or personality (Ricci, 2020). The rights of people who do not use neuroimplants and people with implanted devices should be regulated in a way that respects human dignity, autonomy, justice, and solidarity.

4.4. NEUROLAW: CHALLENGES AND CONTROVERSIES

As neurotechnology continues to advance, society must adapt its approaches to safeguard personal autonomy and human rights. The development of neurorights, informed by scientific understanding and ethical considerations, can provide the necessary foundation for protecting individuals' autonomy in the face of neurotechnological interventions. Through comprehensive regulation, prioritizing informed consent, privacy, non-discrimination, and ethical practices, we can embrace the transformative potential of neurotechnologies while upholding the fundamental rights and dignity of every individual.

The concept of neurorights and their implementation in the context of neurotechnology is not without challenges and controversies. The definition, scope, content, implementation, and enforcement of neurorights present complex issues that require careful consideration:

Defining Neurorights: The very definition of neurorights is a subject of debate. There is a need to reach a consensus on what neurorights entail and how they relate to existing human rights frameworks. Determining the specific boundaries and articulating the content of neurorights in a way that adequately addresses the unique challenges posed by neurotechnology is a complex task.

Balancing Autonomy and Societal Interests: Neurorights aim to protect personal autonomy, but there is a fine line between individual freedom and broader societal interests. Balancing the rights and freedoms of individuals with the potential impacts of neurotechnology on social dynamics, public safety, and ethical considerations is a delicate task that requires nuanced approaches.

Technology-Specific Regulations: Neurotechnology encompasses a wide range of interventions and applications, each with its own ethical and legal implications. Crafting regulations that account for the diversity of neurotechnologies while maintaining a coherent framework is a considerable challenge. Differentiating between therapeutic applications and enhancements, as well as addressing emerging technologies, such as brain stimulation or neural network manipulation, requires ongoing assessment and adaptation.

Cross-Border Implementation: Neurotechnology transcends national boundaries, and its implications may have international repercussions. Implementing and enforcing neurorights consistently across different jurisdictions becomes challenging due to variations in legal systems, cultural norms, and levels of technological development. International cooperation and coordination are necessary to address these challenges effectively.

Ethical Considerations: Ethical dilemmas arise when considering the potential consequences of neurotechnological interventions on personal autonomy, privacy, and societal values. Questions regarding the authenticity of choices made under the influence of neurotechnologies, the potential for coercion or manipulation, and the implications of cognitive enhancements need careful ethical scrutiny. Ethical frameworks should be continuously revised and updated to account for emerging neuroscientific knowledge and societal concerns.

Enforcement and Accountability: Developing effective mechanisms for enforcing neurorights and holding individuals, organizations, or governments accountable for violations is essential. Establishing regulatory bodies with the expertise and authority to oversee the implementation of neurorights, investigate complaints, and impose appropriate penalties when necessary is a complex undertaking that requires collaboration between policymakers, legal experts, and relevant stakeholders.

Addressing these challenges and controversies surrounding neurorights requires multidisciplinary collaboration, including input from neuroscientists, ethicists, legal experts, policymakers, and representatives from affected communities. It is crucial to engage in robust public debates and consultations to ensure that the definition, scope, content, implementation, and enforcement of neurorights reflect diverse perspectives and uphold the principles of human dignity, autonomy, and justice.

By acknowledging and actively addressing these challenges, we can foster a regulatory environment that balances the potential benefits of neurotechnology with the protection of individual autonomy and human rights. In doing so, we can navigate the complexities of this rapidly evolving field and ensure that neurorights effectively safeguard personal autonomy in the face of technological advancements.

Neurolaw, preventive justice, and implications of neuroscience

One of the most significant and ethically challenging potential applications of information received from the usage of neurotechnological inventions is in the criminal justice system. For instance, there is evidence that brain structure differences are associated with scores on the PCL-R, a tool designed to assess psychopathy (Hare, 1991; Hart and Hare, 1997). It is also well-known that psychopaths have high rates of reoffending for violent crimes. Therefore, *neuroimaging* could potentially be used to provide information about an individual's risk of recidivism. Is it fair for courts to base their decisions on sentences or parole on such data? Is it not like punishing someone for crimes they have not done? Or is it just another way of using statistical information, such as age, gender, and income level, that is already in use? In the worst case, one could think of using predictive information to lock up people who have not committed a crime yet, stopping them before they act. This dark scenario, shown in the movie Minority Report (Spielberg, 2002), also shows how our predictive abilities can raise hard ethical and policy questions when they clash with our beliefs about the importance of free will and autonomy. In general, neuroethics could have important practical consequences for the law and is often called by another name, "neurolaw" (Roskies, 2021).

Neurolaw is a relatively young area of interdisciplinary research on the prospects and risks of neuroscience for law, often focusing on criminal law and criminal justice. It covers a variety of topics and approaches, some of which are more theoretical, such as studying the fundamentals of punishment, and others more practical, such as the use of a brain scan of the accused (defendant). A central question for neurolaw is how neuroscience can contribute to justice and security.

Neuroscience provides an understanding of the causes and mechanisms underlying human actions and can contribute to the consideration of individual cases in assessing the reliability of evidence obtained in a trial and deciding on the answer to the identity of the offender and his danger.

Implications of neuroscience and protection of neural data

According to the Council of Europe, the use of AI and neurotechnologies can directly affect equality of access to fundamental rights, including the right to privacy and protection of personal data, access to justice and the right to a fair trial, in particular with regard to the presumption of innocence and the burden of proof, access employment, education, housing and health care; and access to public services and social security. Neurotechnologies have been found to cause or exacerbate discrimination in these areas, resulting in the denial of access to rights (PACE Resolution 2343, 2020). The complexity of AI

systems, and the fact that they are often developed by private companies and treated as their intellectual property, can lead to serious issues related to the transparency of decisions made using these systems and the responsibility for such decisions. This can make it very difficult to prove discrimination and impede access to justice in violation of the presumption of innocence.

As these neurotechnologies become more accessible and prevalent, they would generate massive amounts of neural data that are highly confidential, raising the issue of who should have the right to access and use such data, and for what reason. There is also a great risk that these technologies may be used for security and military purposes, including non-state actors. Moreover, in the long term, these devices may gradually undermine some of the essential aspects that define the human being, such as the individual's mental privacy, cognitive freedom, and personal autonomy. The individual's control over their neurocognitive dimension may also be jeopardized, which may have implications for the functioning of our societies. This may also facilitate totalitarian or authoritarian tendencies through, for example, invasive monitoring, unauthorized evaluation, and the alteration of brain states and/or behavior (Trascasas, 2022).

Neuroscience, judicial decision-making and sentencing

In 1991, the authors of an article on head injuries as a mitigating circumstance first used the term "neurolaw" (Taylor et al., 1991). Over the next two decades, a boom in neuroscientific evidence began in American courts, which provoked protest from some legal minds.

In 1993, a case of a family from the Netherlands came to the attention of researchers (Bruner et al., 1993): several generations of men suffered from borderline personality disorder and were characterized by aggressive, antisocial behavior. The scientists found that all of the men carried a rare mutation of the gene responsible for the synthesis of the enzyme monoamine oxidase involved in the metabolism of neurotransmitters. Further studies (Buades-Rotger & Gallardo-Pujol, 2014) have shown that this mutation in itself does not yet make a person a criminal: its carriers are simply more susceptible to adverse external conditions (grow up aggressive if they are abused in childhood and react more sharply to stress) (Bernet et al., 2007).

Decision-making is a complex multi-step process, and in order to judge what was behind the actions of the criminal, it is necessary to consider them from the point of view of neuroscience, genetics,

psychiatry, and psychology (Kremen & Jakobson, 2010). Therefore, it can be difficult for judges and juries to understand the quality of the evidence presented: even irrelevant MRI scans and doctor's reports strengthen the position of those who present them (Weisberg et al., 2005).

Experiments and real-life forensic cases have led researchers to speak of the dangerous "fascination of neurobiological explanations" (Weisberg et al., 2005, p. 429). People who easily distinguished correct explanations from incorrect ones began to trust incorrect ones more if they appealed to neuroscience. In a number of staged trials (experiments in which subjects are given information about a certain crime and asked to pass a sentence), an elementary neurobiological educational program was generally enough to mitigate the verdict. A 2013 analysis found that fascination is somewhat exaggerated, but researchers continue to look for significant correlations between neurobiological evidence and sentences - imaginary and real.

There is a danger that judges, faced with the need to ensure public safety, could consider neurological developments as a reliable tool, indispensable in assessing the degree of danger of an offender. In this context, concerns have been raised that judges may rely too heavily on neurobiological evidence and prefer harsher sentences or "perpetuating" post-sentence measures based on the neurobiological profile of offenders, which supposedly proves that offenders are predisposed to criminal behavior. and therefore, more prone to relapse (Ligthart et al., 2021).

According to some researchers, if neurobiological data are interpreted as evidence of danger, it is very likely that the judge will issue more severe sentences and/or - in European continental systems - security measures or therapeutic measures, the duration of which can be uncertain (Ligthart et al., 2021). Thus, the use of neurology in a criminal psychiatric examination can be risky for defendants. This is the "double-edged sword" effect of neurology in court, described by several commentators: even if research and neurobiological data are presented by defense lawyers in a criminal trial through a psychiatric examination in order to mitigate responsibility, these same data can be interpreted by judges as an indication of the danger of the defendant and lead to long-term sanctions or measures based on the assumption of a high probability of relapse in subjects with brain dysfunction.

Preventive justice

Preventive justice is the use of legal measures to prevent potential harm or wrongdoing, rather than to punish or redress actual harm or wrongdoing. It can take various forms, such as pre-emptive criminalization, civil preventive orders, preventive detention, or preventive surveillance.

The concept of preventive justice was created with the aim of enhancing public safety and security, deterring potential offenders, reducing opportunities for crime, and protecting vulnerable groups. However, preventive justice is not without implications: it violates the presumption of innocence, which is a fundamental principle of criminal law that requires the state to prove the guilt of the accused beyond a reasonable doubt, rather than the accused to prove their innocence (Ferzan, 2014), as it infringes on the rights and liberties of individuals who have not committed any actual harm or wrongdoing but are merely suspected or deemed to be dangerous or risky (Green, 2013). It may also undermine the legitimacy and trust in the legal system and the police, especially if preventive measures are applied in a discriminatory, arbitrary, or disproportionate manner, which creates a slippery slope or a net-widening effect, where more and more conduct is criminalized or subjected to preventive intervention, without clear limits or safeguards. Finally, it may divert resources and attention from addressing the root causes of crime and harm, such as social, economic, or psychological factors. It is therefore extremely important to abstain from implementing neurotechnological advancement in the justice system, as it may result in totalitarian methods.

One example of a case involving the use of BCIs in court is the case of Gary Smith, who was accused of killing his former roommate. Smith's defense team attempted to introduce evidence from a functional magnetic resonance imaging (fMRI) test, which is a type of BCI that measures brain activity related to blood flow, to prove that he was telling the truth when he claimed that the victim had committed suicide. However, the judge rejected the evidence, ruling that fMRI-based lie detection was not sufficiently reliable or generally accepted in the scientific community.

Another example of a case involving the use of BCIs for memory retrieval is the case of Aditi Sharma, accused of murdering her former fiancé. Sharma's defense team attempted to introduce evidence from an EEG test, which measures brain activity related to electrical signals, to show that she had no memory of the crime. This evidence was rejected with the same reasoning.

The use of neuroscience as a neurocognitive biomarker also risks labeling offenders based on their neurobiological profile and discriminating against them in everyday life after release. This trend may be

exacerbated by the fact that neurobiological evidence is often perceived as more objective, reliable, and "scientific" evidence, despite the limitations and difficulties of reliably linking current brain function to future behaviors. Thus, courts may be forced to use neuroscience to justify liability and risk assessment, which may open the door to more aggressive use of preventive detention for potentially dangerous individuals, undermining the principle of proportionality. These technologies also threatens the right to a fair trial, one of the fundamental human rights enshrined in various human rights instruments.

The more data scientists get about brain function, the stronger the realization that they cannot prevent—and to do so predict—antisocial behavior. Free will is not just another brain function that can be turned off, says Robert Sapolsky: "Whether that person's disinhibition will take the form of serial murder or merely being unable to praise a nearly inedible meal prepared by a host <…> In these interstices of unpredictability seem to dwell free will" (Sapolsky, 2004, p. 1794). Those gaps are shrinking as science builds up new knowledge about how the brain works, but to suggest that neuroscience can provide unambiguous interpretations of legal cases would be highly arrogant, says Sapolsky). The judicial system is not very good at multivariate analysis: when a crime is committed by several people - for example, the mastermind and the perpetrator – it can be difficult to determine the degree of guilt of each. The addition of neurobiological evidence does not simplify, but only complicates the work of judges and juries: in fact, genes, brains, and traumas of the past are in the dock.

By calling into question the old notions of free will and capacity, neuroscience offered nothing to jurisprudence in return. Even the compromise assumption that the will exists somewhere in the gaps between biological processes is difficult to use in legal practice because this would require clearly defining the boundaries of these same gaps. However, it is worth recognizing that law in general quite often focuses on discreteness where there is only continuity. For example, the concept of coming of age: the ability to be responsible for one's actions and emotional maturity does not come suddenly at the moment when a person turns 18 years old, but that is how the law interprets it.

From the point of view of legal theory, the debate between supporters and opponents of neurobiological evidence boils down to the question of which is more inhuman - to consider all humans as biological mechanisms or sinners. Steven Morse (2006) considers the first approach discriminatory and compares it to a situation where women are banned from working in professions associated with serious physical exertion. Sapolsky argues with Morse, assuring that ignoring the biological causes of even

the most criminal acts is like "burning an epileptic at the stake, believing that he sold his soul to the devil".

Sapolsky himself does not suggest how to live with such attitudes (because this would require refusing to acknowledge not only guilt, but also merit), but he offers an alternative way to introduce neuroscience into legal practice: to pay attention not to what is happening in the brain of the accused at the time of the crime, but what goes on in the brain of the judge or jury at the time of the verdict. When assessing guilt, the dorsolateral cortex, responsible for rational decisions, is activated, whereas while making a verdict, the ventromedial cortex, responsible for emotions, is in action.

Despite the fact that the results of neuroscience can help to some extent in assessing the future danger of the offender, there is a risk of returning to a simplistic explanation of violent behavior if neurobiological evidence is presented by experts or understood by judges as the ultimate scientific and objective tool capable of to prove a causal relationship between some structural or functional anomaly of the brain and a tendency to manifest criminal behavior. The supposed ability to detect danger, based solely on brain malfunctions, maximizes social expectations of identifying a category of potentially dangerous people and exercising social control over them.

From discipline to control: a historical perspective

The last two centuries changed the attitude towards punishment, establishing as one of the basic principles of international law a humane attitude towards criminals and humanitarian norms for conditions of detention. Correction and re-education of a person were proclaimed as the goals of imprisonment, but at the same time, conditions for serving a sentence should not violate the prisoner's fundamental rights and freedoms, and should not be inhumane. Physical suffering was replaced by moral one. The main goal of prison is to make a person "normal", that is, predictable; to make sure that the sequence of actions is worked out to automatism; to teach the prisoner discipline and rules; to make him accept that he must obey. Human life was saved, but free will, the essence of human life that allows an individual to act according to his own understanding was then officially taken away in the penitentiary system.

And this juxtaposition is useful not only in relation to prisoners: a totalitarian state as if it was a senior manager, is always looking for ways of ideal control of the masses. After all, it is much more

convenient to manage groups of people who act according to patterns, rules, and routines, and in this sense, it is not important which group of people is considered - students, workers, or prisoners.

Michel Foucault's *Discipline and Punish* (1975) is devoted to rethinking the history of penal institutions through the prism of disciplinary practices of rational management. A little later, Foucault (2008) supplemented his findings and developed them into the concept of biopolitics. Prison as a form of punishment replaced executions and torture not at all because of considerations of humanity, but because of the desire of the state for total control over the individual. The prison, as an organization, has even more tightly entered our lives, becoming a model of any institution - from school to enterprise.

Foucault recalls Jeremy Bentham, who in the XIX century proposed "a model of our society of universal orthopedics in miniature: the notorious panopticon" (Foucault, 2005, p. 108). It is an architectural structure that allows one person to exert an imperious influence on others; a type of institution suitable for both schools and hospitals, prisons, correctional facilities, orphanages, and factories. According to Foucault (1975), we all live in a society that is constantly monitored and supervised, i.e., we all live in a prison.

4.5. Interim Conclusions

The proclaimed goal of neurotechnological progress is to map all the neural activity of the human brain in order to understand how it functions. If this goal is achieved, the consequences might be various: from the possibility of treating Parkinson's and Alzheimer's diseases to the creation of prostheses that will allow connecting the human brain to the Internet, learning about past events, predicting behavior and, ultimately, changing future patterns of human behavior. Potential changes will affect certain ways of life, and the very legal nature of what it means to be *a human being*.

The development of technologies opens up the possibility of directly interfering with brain activity and, thus, manipulating it in numerous ways. A potential negative consequence could be the usage of medical and technological capabilities to decipher the neural code. Based on the existence of this threat in terms of the application of modern biotechnologies, a group of neuroscientists led by Rafael Yuste (2017) published a series of ethical rules, four ethical priorities that new human rights (neurorights) should cover: privacy, augmentation, algorithmic bias and identity or agency, the purpose of which was to regulate the use of neurotechnologies. The concept of neurorights was then developed by Ienca and

Andorno (2021), who suggest four new human rights that partly coincide with the four ethical priorities identified by Yuste: they argue for a right to mental privacy, a right to mental integrity, a right to psychological continuity and a right to cognitive liberty.

Experts called them neurorights and the goal was to provoke a discussion about the need for legal regulation of this issue, about the rights, duties, and legal responsibilities of subjects of public relations. It seems important to agree with the group of experts who propose to add a neurolaw framework to the UDHR and recommend the development and adoption of an international treaty that qualifies prohibited actions related to the use of neurotechnologies and harm to health as an international crime, in particular, as a crime against humanity, and the Monitoring Committee will be able to determine the admissibility and necessity of using modern neurotechnologies.

The recent adoption of Recommendations regarding the application of neurotechnologies by the UNESCO International Committee on Bioethics acknowledges that existing human rights protection mechanisms do not adequately cover all aspects of the neurosciences, such as mental integrity and free will. Some experts propose the proclamation of new human rights called neurorights, while others argue that collective rights may replace individual rights. However, due to the aforementioned reasons, it is possible to conclude that neurotechnologies expose limitations of current human rights doctrine as the doctrine of truly individual rights. Hence, collective action is necessary to enhance the articulation of autonomy as the foundation of human rights while ensuring the triumph of *individual rights,* rather than collective rights.

Nevertheless, legal regulation in the field of neurotechnologies is crucial, notwithstanding their largely voluntary nature. By creating and implementing legal frameworks, the degree of uncertainty surrounding their further development can be diminished. This, in turn, diminishes the likelihood of adverse consequences for humanity by effectively managing both technogenic and social risks.

While the use of neurotechnologies is largely voluntary, legal regulation remains necessary for several reasons. On the one hand, voluntary participation does not negate the potential risks associated with these technologies. Even when individuals willingly engage with neurotechnological interventions, there may be unintended consequences or unforeseen risks that require oversight and regulation to mitigate.

On the other hand, legal regulation helps establish clear boundaries and ethical guidelines for the development and use of neurotechnologies. By defining standards, protocols, and safeguards, we can

ensure that these technologies are developed and applied responsibly, safeguarding individuals' rights, privacy, and autonomy.

Moreover, legal regulation provides a framework for accountability and recourse in case of potential harm or violations. It enables individuals to seek legal remedies, ensure informed consent, and hold responsible parties accountable for any unethical or harmful practices. This is particularly important given the complex and potentially manipulative nature of certain neurotechnological interventions.

Additionally, legal regulation fosters public trust and confidence in the field of neurotechnologies. It assures individuals that their rights and well-being are protected, encouraging greater acceptance and adoption of these technologies. Clear regulations also provide guidance to researchers, developers, and practitioners, promoting responsible innovation and reducing the likelihood of unethical or reckless practices.

It should be noted that biological and medical research, developments in the field of technology have led to impressive achievements in the field of healthcare. However, these achievements raise ethical issues that affect the personality and protection of human rights and dignity (national and personalized biobanks, health databases (mental /neural data), etc.). Some human rights experts express the view that the era of individual rights will be replaced by the concept of collective rights for all mankind (Brander et al., 2020).

In this regard, there is a need in the international community to create a regulatory framework that includes legal grounds for restricting the use of neurotechnologies, criteria for the legality of the use of modern medical technologies in relation to individuals, as well as ensuring comprehensive protection of the rights and fundamental freedoms of patients through the responsible development of neurotechnologies, as in domestic and international law.

The development of neurotechnologies presents a unique challenge for the legal system, as it requires a thoughtful response to the new opportunities and complexities they introduce. As these technologies continue to spread throughout society, it becomes necessary to consider significant amendments to the legislation and maybe even rethinking (reevaluating) of some traditional human rights.

When it comes to the reaction of the law to the development of neurotechnologies, several options can be considered: 1) a moratorium on the application of the results of the development of

neurotechnologies due to the inability to take into account all the risks; 2) use of existing legal structures for new relations; 3) flexible regulation and the creation of norms that take into account the emergence of new relationships and previously unknown risks.

Moratorium: One possible approach is the imposition of a temporary moratorium on the application of the results of neurotechnological development. This would involve suspending the widespread use of these technologies until all potential risks are thoroughly assessed and appropriate regulations are in place. A moratorium would provide an opportunity to gather more comprehensive scientific data, engage in public dialogue, and develop robust regulatory frameworks. However, implementing a moratorium may also impede the potential benefits and advancements that neurotechnologies can offer. This option was used by most developed countries to regulate another rapidly developing area - genetic engineering - in relation to human cloning. The ethical justification for the moratorium was that a large percentage of failures in cloning can lead to the appearance of people with developmental disabilities, unpredictable genetic changes, and such a goal of cloning as obtaining biological material for transplantation implies the cultivation of clones as donors. In the case of neuroprosthetics, such a ban will doom a large number of people to suffering or death, while there are no such serious ethical obstacles as cloning.

Use of Existing Legal Structures: utilizing existing legal structures to address the new relationships and challenges posed by neurotechnologies. This approach would involve interpreting and applying current laws to the unique circumstances presented by neurotechnology. Existing legal frameworks, such as privacy laws, informed consent requirements, and non-discrimination statutes, can be adapted to accommodate the implications of neurotechnologies. However, this approach may have limitations, as current laws may not adequately cover the novel aspects and potential risks associated with these technologies.

This option was chosen to regulate robots with artificial intelligence. Despite discussions about the status of AI systems within the legislation of various countries and in the European Parliament, such autonomous systems remain objects, not subjects of law. This means that legal frameworks primarily focus on the responsibilities of human operators and manufacturers rather than attributing legal status or rights to the AI systems themselves.

However, when it comes to neurotechnologies, especially in the context of individuals using neurotechnological advancements, the application of existing norms designed for AI systems may not be

directly applicable, because individuals utilizing neurotechnologies, such as those with artificial intelligence neuroprostheses, are already recognized as legal subjects, as they are human beings. However, the integration of humans with neurotechnological devices introduces unique considerations and differences that require special regulatory attention.

People connected to neurotechnological devices acquire certain characteristics or capabilities that distinguish them from individuals without such enhancements. These differences could include enhanced cognitive abilities, altered decision-making processes, or the potential for external manipulation of neural functions. Consequently, the legal framework must account for these specific aspects and address the potential implications and risks associated with neurotechnological interventions.

As such, applying existing norms, such as those designed for AI systems does not fully capture the complexities and nuances presented by neurotechnologies. Instead, special regulation is necessary to address the distinctive aspects of neurotechnological integration, ensuring that the rights, autonomy, and well-being of individuals utilizing these technologies are protected.

Flexible Regulation and New Norms: A third option is to implement flexible regulation that adapts to the emergence of new relationships and previously unknown risks. This approach involves creating specific legislation that addresses the unique characteristics and challenges of neurotechnologies, is limited in time, and allows to maintain a balance between a person's biological past and the future in a high-tech society (Charo, 2015). Flexible regulation would allow for continual evaluation and adjustment as scientific knowledge and societal understanding of neurotechnologies evolve. It would involve the creation of new norms and legal frameworks that specifically consider the implications of neurotechnology on human rights, privacy, autonomy, and societal well-being.

Engaging in experimental legal regimes involves creating a controlled environment where the development and application of neurotechnologies can occur under specific guidelines and oversight. This allows regulators to closely monitor the progress and implications of neurotechnological advancements while ensuring that the risks are appropriately managed.

Experimental legal regimes offer several advantages over the previous options:

- This approach seeks to find a compromise between the interests of individuals requiring neuroprosthetics or other neurotechnological interventions and those who may not have a

personal interest in such technologies. Regulations that balance competing interests will benefit in conflict mitigation and societal acceptance;

- Instead of imposing a complete moratorium or relying solely on existing legal structures, experimental legal regimes enable continuous advancement of research and development in the field of neurotechnologies and encourage scientific exploration while ensuring oversight and accountability;
- The experimental nature allows for ongoing assessment and response to changing situations. It enables regulators to monitor the progress of neurotechnologies, identify emerging risks or ethical concerns, and adapt the regulations accordingly. This approach ensures that potential risks are minimized and that the state can proactively address challenges;
- By embracing experimental legal regimes, states can competitively position themselves at the forefront of the global technological landscape by supporting and regulating neurotechnological developments, attracting researchers, innovators, and investment, while upholding ethical and legal standards.

At international and national levels, legal consolidation of such terms as *neurolaw, cognitive liberty, neurohacking, brainjacking, neurodoping, neurocide, transplantation of implants in the human brain,* etc. might be required. Universally agreed and accepted rules and norms of behavior that would be effective in preventing the manipulation of human thoughts, feelings, and neural information can be established with the help of modern digital end-to-end technologies.

The engagement of regulation within experimental legal regimes involves designing comprehensive frameworks that address informed consent, privacy protection, non-discrimination, accountability, and other relevant aspects of neurotechnologies. It requires the collaboration of stakeholders, including policymakers, researchers, legal experts, and affected individuals, to ensure that the regulations are comprehensive, fair, and reflective of societal values. By embracing experimental legal regimes, society can explore the potential of neurotechnologies while mitigating risks, resolving conflicts of interest, and maintaining a balance between individual rights and societal well-being. These regimes provide a dynamic and responsive approach to regulation that allows for innovation while safeguarding the interests of all stakeholders involved.

In determining the most appropriate response, it is important for lawmakers to engage in interdisciplinary collaboration, incorporating insights from neuroscientists, ethicists, legal experts,

policymakers, and affected communities. Additionally, public dialogue and consultation are crucial to ensure that the legal response aligns with societal values and concerns.

Ultimately, the law's reaction to the development of neurotechnologies will likely involve a combination of these options. It may include elements of temporary suspension, utilization of existing legal structures, and creation of new norms and regulations that are adaptable to the unique challenges and opportunities presented by neurotechnologies. By adopting a forward-thinking and flexible approach, the law can effectively address the implications of neurotechnologies and protect the rights and well-being of individuals within this rapidly evolving field.

Conclusion

In conclusion, this research was aimed at exposing the intricate relationship between neurotechnological progress and the concept of free will, shedding light on challenges posed to the core principles of the human rights doctrine. Through an interdisciplinary analysis encompassing philosophy, ethics, neuroscience, and law, several key arguments and findings have emerged.

Approach to the concept of free will

Neuroscientific evidence for free will or its absence is not conclusive or definitive, but rather contingent and context-dependent. Interpretation and application of such evidence require careful consideration of the methodological and epistemological issues that affect its validity and reliability.

Based on the debates surrounding determinism, compatibilism, and neuroscientific evidence, a clear conclusion emerges regarding the concept of free will in the context of neurotechnological progress. While there is no credible neuroscientific evidence for the existence or absence of free will, a compatibilist view offers a robust perspective that aligns with the realities of neuroscientific research and philosophical considerations.

Determinism, the notion that all events, including human actions, are causally determined by prior causes, poses a significant challenge to the traditional understanding of free will as an absolute and unconstrained choice. However, compatibilism reconciles determinism with free will by asserting that compatibility lies in the ability to act in accordance with one's desires and motivations, even if those desires and motivations are causally determined.

Neuroscientific evidence, while not providing a final verdict on the nature of free will, underscores the complex interplay between biological processes and human behavior. Advances in neurotechnology have shown that neural activity and brain states can influence decision-making, calling into question the

traditional notion of unbounded free will. However, this evidence does not negate the possibility of free will within a compatibilist framework.

By embracing compatibilism, we recognize that although human actions may be influenced by various factors, including neurobiological processes, societal conditioning, and genetic predispositions, individuals can still exercise meaningful agency and make choices aligned with their desires and values. Compatibilism allows for a nuanced understanding of free will that acknowledges the constraints imposed by determinism and the interplay of various influences on human behavior.

Impact of neurotechnological progress on free will

Neurotechnology can enhance or diminish free will in various contexts, depending on the type, purpose, and mode of use of the technology. The use of neurotechnology for such purposes requires careful consideration of the ethical and social issues that affect its benefits and risks.

In the context of human rights, the advancement and application of neurotechnology should adhere to the principles of human dignity, autonomy, privacy, and non-discrimination. Respecting individuals' autonomy implies ensuring informed consent and empowering them to make autonomous decisions regarding the use of neurotechnology. Privacy concerns must be addressed to safeguard individuals' control over their neural data and protect against unauthorized access or misuse. Measures should be in place to prevent undue influence, coercion, or discrimination based on neurotechnological profiles.

There is a need to establish legal frameworks and regulatory mechanisms that address unique challenges posed by neurotechnology. These frameworks should encompass areas such as data protection, informed consent, privacy, non-discrimination, accountability, and ethical use of neurotechnology in research and clinical settings. They should also consider dynamic nature of neurotechnological advancements and be flexible enough to adapt to emerging risks and societal changes.

Inequality in access to neurotechnologies creates the basis for deepening inequality and possible new forms of discrimination. Neurotechnologies can be both used to improve cognitive abilities – to gain more control over one's mind and body, and to augment them in such a way, that the individual loses the sense of self-control and become self-estranged. This raises the question of the legal capacity of people using neurotechnologies such as brain implants, which should be also considered through the

prism of constitutional law and human rights. The application of universal human rights becomes problematic when we are dealing with humans who are, so to speak, a little more than humans, or when the human brain is combined with machines and AI through neurotechnology.

Moreover, the potential for external manipulation and coercion enabled by neurotechnology undermines the principles of non-discrimination and equal treatment. If certain individuals or groups are subject to covert manipulation or control through neurotechnological interventions, it challenges the notion of equal protection and equal access to rights. The potential for abuse of neurotechnology by powerful entities or the violation of individual autonomy for societal or political goals presents a significant ethical and human rights dilemma.

All of this requires establishing robust legal frameworks, promoting public awareness and education, and interdisciplinary collaboration. By addressing these aspects, we can navigate the ethical and human rights implications of neurotechnology, fostering its responsible development and protecting the rights and well-being of individuals in an increasingly technologically advanced society.

Neurotechnology can assess or affect criminal responsibility and justice in various scenarios, depending on the quality, relevance, and impact of the information or intervention. The use of neurotechnology for such purposes requires careful consideration of the legal and judicial issues that affect its admissibility and appropriateness.

The information obtained through neurotechnology can contribute to assessing factors such as intent, volition, impulse control, or diminished capacity. It may provide a deeper understanding of the biological underpinnings of criminal behavior and help differentiate between cases of culpability and cases that require rehabilitation or treatment.

However, it is crucial to acknowledge that the causal relationship between neurotechnology and its impact on criminal responsibility is complex and multifaceted. Neuroscientific findings alone should not determine legal culpability, as criminal responsibility is a nuanced legal concept that incorporates moral, legal, and societal considerations.

The answer to the research question is:

• Neurotechnology threatens the concept and practice of free will by undermining the validity and reliability of our subjective experiences, beliefs, and decisions, and by exposing humans to new forms of manipulation and coercion by external agents or forces.

This threat arises due to several factors inherent in the application and impact of neurotechnology.

Firstly, neurotechnology can challenge the validity and reliability of our subjective experiences by revealing the neural correlates and mechanisms underlying our thoughts, emotions, and behaviors. By accessing and analyzing neural data, neurotechnology can potentially unveil unconscious processes and influences that shape our actions, even when we are unaware of them. This raises questions about the true origin and autonomy of will, casting doubt on the authenticity and self-determination of our decision-making processes.

Moreover, neurotechnology can directly influence our beliefs and decisions through interventions targeting neural activity or brain states. Techniques like DBS or TMS can modulate neural circuits and alter cognitive processes, potentially influencing our thoughts, attitudes, and choices (Adamczyk & Zawadzki, 2020). This manipulation of neural activity raises concerns about the authenticity of our beliefs and decisions, as external forces can exert control or influence over our cognitive processes.

Additionally, neurotechnology introduces new possibilities for external manipulation and coercion. By gaining access to an individual's neural data, malicious actors could exploit this information to manipulate or coerce individuals into certain behaviors or decisions. This manipulation can take various forms, including the unauthorized control of neuroimplants, the use of neurofeedback to influence emotions or behavior, or the manipulation of neural information for persuasive purposes. These emerging risks highlight the potential for external agents or forces to undermine personal autonomy and manipulate individuals against their will.

The threat to free will is further exacerbated by the growing capabilities of data analytics and machine learning algorithms. The ability to analyze vast amounts of neural data collected through neurotechnology allows for the identification of patterns, correlations, and predictive models. This raises concerns about the potential for predictive algorithms to anticipate and manipulate human behavior, eroding individual agency and diminishing the freedom to act according to one's own values and desires.

Overall, the impact of neurotechnology on free will not only challenges the traditional understanding of human agency and autonomy but also directly targets the foundation of the human rights doctrine. The human rights doctrine upholds the inherent dignity and worth of every individual, recognizing their autonomy as a central aspect of their humanity. Autonomy enables individuals to exercise control over their own lives, make choices aligned with their values, and pursue their own vision of a meaningful existence. If individuals' decisions and actions are compromised or manipulated, the exercise of their rights becomes compromised as well. The integrity of rights such as freedom of expression, privacy, and conscience relies on the assumption that individuals have the freedom and agency to exercise them in a meaningful and self-directed manner.

The thesis provides a critical and comprehensive analysis of the current state of affairs concerning neurotechnology and its implications for the concept of free will. By adopting an interdisciplinary approach that integrates perspectives from philosophy, ethics, neuroscience, psychology, sociology, and law, the thesis delves into the complexities and challenges posed by neurotechnology to the understanding of free will. However, a critical examination of this interdisciplinary analysis reveals certain limitations and areas of contention that warrant further exploration. While the interdisciplinary approach is commendable for capturing the multifaceted nature of the subject matter, it is essential to recognize the inherent tensions and conflicts that arise when different disciplines engage with the concept of free will. These disciplines often have distinct epistemological frameworks, methodologies, and assumptions that shape their understanding of free will. Integrating these diverse perspectives can be challenging, as they may lead to disparate interpretations and contradictory findings.

Moreover, the reliance on interdisciplinary insights requires careful scrutiny of the underlying assumptions and biases inherent in each discipline. For instance, neuroscience may provide valuable empirical data on neural processes, but its reductionist approach and focus on determinism can potentially overlook the complexities of human agency and subjective experiences. Conversely, philosophical and ethical perspectives may emphasize the importance of personal autonomy and moral responsibility, but they may struggle to fully account for the intricate interplay between biology, environment, and decision-making processes.

Furthermore, the interdisciplinary approach should not disregard the societal and cultural dimensions that shape the understanding of free will and the ethical implications of neurotechnology. Sociology, anthropology, and other social sciences play a vital role in elucidating the broader societal

impacts and power dynamics associated with the development and implementation of neurotechnology. Neglecting these perspectives risks overlooking crucial factors that shape the discourse and impact of neurotechnological advancements on free will.

Future research should explore more empirical data and case studies to gain a deeper understanding of the actual use and impact of neurotechnology on human agency and free will in various contexts and domains. Such as:

1. Longitudinal Studies that follow individuals over an extended period of time and examine experiences and decision-making processes before and after engaging with neurotechnology can provide valuable insights into the long-term effects of neurotechnology on human agency and free will.

2. Qualitative In-Depth Interviews and Surveys can capture subjective experiences and attitudes regarding the use of neurotechnology. These methods can shed light on how individuals perceive their own agency, the factors influencing their decision-making processes, and the ethical considerations they associate with neurotechnological interventions.

3. Case Studies in specific contexts, examining real-life scenarios, can provide detailed insights into the complexities and nuances of individuals' decision-making processes, the role of external influences, and the potential ethical implications of neurotechnology.

4. Experimental Research conducted under controlled conditions can contribute to assessing the direct impact of neurotechnology by manipulating variables such as the type of neurotechnology, the level of intervention, or the presence of external influences.

5. Public engagement and participation in deliberative processes on neurotechnologies and free will. Citizen forums, stakeholder consultations, or participatory design can provide an avenue for collective intelligence, fostering a more inclusive, democratic, and socially responsible approach to shaping policies on neurotechnology and free will. By involving the public and stakeholders, these participatory processes enrich policy discussions, enhance the quality of decision-making, and contribute to the development of policies that reflect the values and aspirations of society as a whole.

6. *International cooperation and coordination* might benefit to protection of free will by developing ethical guidelines and standards for neurotechnology design and use, such as codes of conduct, best practices, or certification schemes. Negotiations for developing these guidelines and standards should ideally ensure

broad and inclusive participation in the negotiation process: relevant stakeholders, including researchers, policymakers, ethicists, neurotechnology developers, healthcare professionals, civil society organizations, and affected communities, should be included. This ensures that diverse perspectives and interests are taken into account, preventing any party from being marginalized or disadvantaged. International negotiations should prioritize equity and fairness among participating parties, ensuring representation of both developed and developing countries, as well as giving voice to marginalized communities that may be disproportionately affected by neurotechnology.

7. Cultural and contextual differences of participating nations should be taken into consideration, without imposing a one-size-fits-all approach. The negotiation process should be transparent, with clear mechanisms for accountability, preferably open to scrutiny and contributions to the discussions from civil society. Transparent negotiations help build trust among participating parties and increase the legitimacy and acceptance of the resulting guidelines and standards.

Finally, future research in this area should be focused on exploring alternative conceptualizations and interpretations of free will based on indeterminism or libertarianism or derived from other cultural, religious, or legal traditions. By examining diverse viewpoints, society can gain a more nuanced understanding of free will and its importance for policy development. Policymakers can benefit from engaging in interdisciplinary dialogue with experts from the philosophy and ethics field, who can provide valuable insights into the philosophical underpinnings and ethical dimensions of free will, helping to shape the language, principles, and values embedded in the legislation.

While these conditions are important to consider, it is also crucial to acknowledge that achieving them in practice can be challenging. Power imbalances, resource disparities, and varying levels of expertise among participating parties can present obstacles to fair and inclusive negotiations. However, with a commitment to transparency, equity, and open dialogue, it is possible to mitigate these challenges and foster a cooperative and collaborative approach to the development of ethical guidelines and standards for neurotechnology at the international level.

Afterword

Totalitarianism encroached on freedom of thought in a way never before imagined <…> A totalitarian state necessarily tries to control the thoughts and feelings of its subjects at least as effectively as it controls their actions (Orwell, 1941).

Since the time of the French Revolution, humanity has been living in a state of permanent revolutions. With the development of science and technology, our understanding of ourselves is changing. Along with the scientific, technological, and political revolutions, an equally important one is taking place - the psychological one. And neuroscience significantly influences the convergence of these processes. The development of neurotechnologies impacts not only technological progress but also our perception of self and the evolution of political and legal systems.

As individuals, we are born into predetermined orders, such as social, cultural, economic, legal, and political systems, which shape our existence. However, these predetermined orders lack personal agency since they were not consciously chosen but rather imposed upon us - we fell into it by chance of birth, like a fly into a spider's web. This dissonance between the impossibility of absolute freedom of choice and the need to operate within existing systems has been a recurring theme in literature (starting with Dostoevsky and Kafka), art (from Romanticism to Russian avant-garde artists), and philosophical thought. All the artistic revolutions of modern times took place under the slogan of defending the rights of the "I", its autonomy in the face of tradition and order external to it. First of all, the artists strove to create "their own style", to make a "unique" artistic gesture, which since the days of Romanticism has usually been identified with originality and individuality. But at the same time, it soon became clear that individuality is not subjectivity (as Kierkegaard, for example, shows – Constantinnos, 1983). Further, science began to present more and more evidence that most brain activity occurs at a subconscious level (this led philosophers Deleuze and Guattari (1983) to identify the subconscious with a machine). The same theme was developed in a curious way by Ilya Kabakov, a Soviet and American artist, a representative of Moscow conceptualism. The meaning of the human "I", which the artist must express,

lies for Kabakov in the right and calling to be universal, in the fundamentally unlimited possibilities for this "I". Being inside the Soviet totalitarian system, in which almost every step was predetermined by ideological guidelines, he created installations and paintings in which he conveyed this feeling of predestination of any order into which a person is born. One could not choose it and did not like it, but he continues to live. You cannot identify with the role you are forced to play, with the mask you must wear, even with your own face on the screen or in the mirror. In this discrepancy between self-identification, self-awareness, and the image imposed by the external order, the social role, the idea of a person, in this gap, there is precisely a place where discontent, doubt, skepticism, protest arise, that is, a political reaction.

Out of this skepticism and dissatisfaction comes the notion and the desire to question any universal point of view on any value and truth, even about human rights, human autonomy, and free will. The main danger of the current stage of technological development, and neurotechnology in particular, is that they are able to destroy this gap, this place from which discontent comes, clearing the brain and mind from discontent, dissatisfaction, from autonomy.

The results of this study show that modern neurotechnologies challenge free will and personal autonomy and thus strike at the very heart of the idea of human rights. The challenges posed by neurotechnologies call into question the relevance of human rights in a world where the dominant scientific truth is the notion of limited or no free will. Most of the rights are based on the assumption that a person is capable of free action, capable of acting autonomously. However, the concept of human rights, as enshrined in the Universal Declaration of Human Rights and other international documents, is a response to the rise of the nation-state project.

To George Orwell, whose words are taken as the epigraph of this conclusion, totalitarianism cannot be reduced to a simple dictatorship, it grows out of the expansion of the state and those new mind control technologies that it puts at its service. With the dominance of the concepts of "national security" and "national interest" over the rule of law, with the increasing spread of such non-legal concepts as "potential threat", with the expansion of the practice of using preventive arrests, it can be stated with confidence that the concept of human rights is less and less restraining the "appetites" of the national states. In this struggle between national sovereignty and human autonomy, an individual is always destined to lose. Nothing will change the indisputable fact that states put 'national interest' higher than the interests of individuals. Thus, it becomes crucial to introduce a moratorium on the use of neurotechnologies in law

enforcement and the justice system, considering the inherent advantage held by the state in such relationships.

The main strategy for the evolution of human rights should be in their essence to become rights of individuals, rights of human beings: not collective rights of humanity. The basis of the human rights doctrine should be the principle of the integrity of personal autonomy and the free will of the individual because it guarantees the opportunity to possess and enjoy all other fundamental human rights. This does not correspond to popular scientific knowledge, but the paradox is that a human is not merely a scientific fact. Human and his being is an idea. The idea, which constantly evolves.

This entails safeguarding *the idea of human beings* from reductionist scientific approaches, securing personal autonomy from the dominance of state sovereignty and national interests. Although this approach may seem compromising and less solid from a scientific research perspective, it is essential to value and prioritize human life, personal autonomy, and human essence. However, when we talk about the direction of thought, it might be useful to remember one technique that aircraft pilots use. When pilots are flying a plane and they need to land it, they have to use a special technique and take the crosswind into account. In pilots' terminology, there is a technique called *crabbing*[2]. The orientation of aircraft during landing can be influenced by powerful winds, resulting in a lateral approach to the runway. This phenomenon, known as crabbing, is explained by how planes land sideways in high winds. The pilot here has to estimate the destination with a margin - and only in this case, the plane will be landed successfully.

The same can be applied to human rights and free will. Human, human life, personal autonomy and human essence are ideas that evolve but should always be valued above all else and perhaps it might be beneficial to always overestimate or even overrate it – with *a margin of safety*. This margin will ensure the universality and inseparability of human rights, the principles enshrined in the UDHR (UN General Assembly, 1948). The experiments reviewed in this study demonstrate that abandoning the concept of free will or succumbing to the influence of brain devices leads to a disregard for moral principles and ethical norms and, we can continue, to disregard for recommendations and declarations on human rights.

[2] The term crabbing derives from the resemblance of the aircraft's motion to the sideways movement of crabs on the shore. Crabbing is typically required when there are strong crosswinds (Apollonia & Kim, 2021).

Thus, adopting a marginally higher idealistic stance allows for a realistic approach to upholding human rights and ensuring our collective well-being. Sometimes we have to be idealists to be realistic.

The analysis of the neuroscientific experiments carried out as part of this study has shown that if scientific determinism becomes the most widespread idea - even if we assume that this determinism is a reality – it might cause the very structure of human society to collapse and lower the value for human life.

A strategy for full protection of human rights in the 21st century must be based on an approach to human autonomy and free will through the prism of compatibilism. This approach seems to be the most humanistic and objective, since it recognizes the existence of determinism in the formation of a person's free will, but does not deny human autonomy, figuratively speaking, leaving the last word to a human.

Like in a court of law, the last word should always be given to a human, and not to the technology.

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