HUMAN DIGNITY AND NEURORIGHTS IN THE DIGITAL AGE

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Abstract: In this paper we explore the emerging field of neurorights, which has gained significance due to the advancements in neurotechnologies and artificial intelligence. The once-fictional notion of mind invasion or manipulation by technological devices has now become a pressing concern, necessitating further study and legal regulation. Neurorights encompass a range of rights associated with the interface between neuroscience and law, including brain-machine interfaces, wearable and implantable devices, and advanced algorithms. This article seeks to define and classify neurorights, providing a systematic framework for their study. It also delves into the complex concept of human dignity, examining how neurorights relate to this fundamental principle. The paper begins by tracing the evolution of neurorights studies and classifications, highlighting the global research movement in this area. It then explores existing and proposed regulations concerning neurorights, with a specific focus on the innovative Charter of Digital Rights being developed in Spain. The authors argue that human dignity serves as the foundational principle for neurorights, emphasizing its importance in shaping the discourse and implementation of these rights. Although this article presents an introductory approach to the topic, it contributes to the ongoing discussion on neurorights. By addressing the need for further research and regulation, this paper aims to raise awareness and foster a comprehensive understanding of the challenges and opportunities posed by the intersection of neuroscience and law.

Keywords: neurorights; neurotechnologies; Artificial Intelligence; human dignity; legal regulation.

INTRODUCTION

Some time ago, the expectation of mind invasion or manipulation of individuals through technological devices was merely a concept relegated to the realm of movies and science fiction literature. Examples of this notion included the erasure of people's memories in films like "Men in Black," the modification of criminal behavior in "A Clockwork Orange," and the arrest

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of individuals about to commit crimes in "Minority Report." These cinematic depictions not only entertained audiences but also prompted contemplation about potential future scenarios.

However, in today's world, the proliferation of data and advancements in science, particularly in the fields of neurotechnologies and artificial intelligence, have transformed these once-fanciful ideas into a burgeoning field that demands in-depth examination and regulation within the legal community. The emerging discipline known as "neurorights" has garnered international attention, with a growing body of research led by scholars at the intersection of Law and Neuroscience. Advanced technologies, including brain-machine interfaces, wearable and implantable devices, and sophisticated algorithms, have propelled neurolaw into an increasingly prominent position.

This article aims to establish a comprehensive framework for the study of neurorights by defining and categorizing them. Additionally, it will explore the relationship between these rights and the intricate concept of human dignity. The first section will endeavor to trace the evolution of studies and classifications of neurorights. Subsequently, the article will delve into existing and proposed regulations concerning neurorights, with a specific focus on the innovative Charter of Digital Rights currently in development in Spain. Finally, this collection of propositions will be examined in the context of the authors' assertion that human dignity serves as the foundational and guiding principle of neurorights. In conclusion, while this article provides an introductory overview of the subject, it acknowledges its limitations but seeks to contribute to the ongoing discourse surrounding neurorights.

I. EVOLUTION AND CLASSIFICATION OF NEURORIGHTS

While neuroscience has been a field of study for well over a century, its rapid evolution in the last two decades, driven by the advent of real-time brain imaging devices[1], has yielded numerous practical applications in medicine, marketing, and even the legal realm.

The nexus between Law and Neuroscience, as highlighted by Francis X. Shen[2], traces its origins to this period. A significant milestone in the emergence of Neurolaw in the United States was the 2007 article "The Brain on the Stand," featured in the New York Times Magazine[3]. This article explored the use of forensic evidence rooted in the understanding of brain functionality, thus bridging the gap between neuroscience and the legal

[1] Gazzaniga, Michael S. "The law and neuroscience." *Neuron* 60, no. 3 (2008): 412-415.

[2] Shen, Francis X. Law, and neuroscience 2.0. *Ariz. St. LJ*, v. 48, p. 1043, 2016.

[3] Rosen, Jeffrey. The Brain on the Stand, *N.Y. Times Magazine*. (Mar. 11, 2007) http://www.nytimes.com/2007/03/11/magazine/11Neurolaw.t.html

system.

Notably, the intersection of Criminal Law and Neuroscience has received considerable attention, to the extent that in 2009, German authors Jan Christoph Bublitz and Reinhard Merkel delved into the subject. In their paper, they examined interventions in the brain concerning the right to autonomy and authenticity[4]. Their inquiry encompassed both direct interventions, such as pharmaceuticals, and indirect ones, like hypnosis and subliminal advertising. They raised concerns about the "illegitimate influence" exerted by third parties, thereby positing the violation of the rights of individuals subjected to external interventions.

Another seminal article from 2012[5] tackled the impact of neuroscience advancements on legal proceedings and advocated for a new framework to address the principle of non-self-incrimination. Nita Farahany argued that the traditional protection of this principle primarily focused on safeguarding spoken statements, whereas contemporary society should also consider shielding citizens from unwarranted intrusion into their cognitive processes. This argument prompted the suggestion of a "Neuroscience Information Technology Act" to protect mental privacy and cognitive freedom. Farahany's work played a pivotal role in coining the term "neuro-rights" and catalyzed a movement in their support.

In 2014, Bublitz and Merkel, distinguished figures in the evolving Neurolaw field, posed a thought-provoking question:

> "[…] a multibillion-dollar industry with the sole and explicit purpose of studying and influencing decision-making proudly and successfully applies its findings to people, changing their desires, altering their behavior, inducing them to enter contracts while lying for the same purpose could land those doing it in prison?".[6]

This inquiry transcended the confines of criminal law and illuminated the necessity of safeguarding the rights of individuals susceptible to manipulation by industries, particularly relevant in the context of contemporary social media platforms. It marked a shift in research focus from concerns within the judicial system to the protection of neurorights infringed upon in daily life.

Furthermore, Bublitz and Merkel introduced the concept of "the human right to mental self-determination" in their 2014 paper. They argued that this right should extend protections to the mind akin to how bodily integrity

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[4] Bublitz, Jan Christoph, and Reinhard Merkel. Autonomy and authenticity of enhanced personality traits. *Bioethics*, v. 23, n. 6, p. 360-374, 2009.

[5] Farahany, Nita A. Incriminating thoughts. *Stan. L. Rev.*, v. 64, p. 351, 2012.

[6] Bublitz, Jan Christoph, and Reinhard Merkel. Crimes against minds: on mental manipulations, harms, and a human right to mental self-determination. *Criminal Law and Philosophy*, v. 8, n. 1, p. 51-77, 2014.

safeguards the physical body. As the authors elucidated:

> "The scope of the right is twofold: in its negative dimension, it protects freedom from severe interference by the state and third parties by establishing a defensive wall against unwanted intrusions through factual interventions and normative obligations (e.g., legal provisions regulating what is going on or in your mind). It also grants what we can call positive rights, freedom to self-determine your inner realm, e.g., the content of your thoughts, consciousness, or any other mental phenomena. So, it affects, for example, current debates about neuro improvements. But here, we should leave the positive dimension aside and inquire about the freedom of factual interventions."[7]

Another influential article on the topic was published in 2017 by Marcello Ienca and Roberto Andorno, titled "Towards new human rights in the age of neuroscience and neurotechnology"[8]. This study explores emerging neural technologies and devices, including advancements in Human Electroencephalography (EEG), functional magnetic resonance imaging (FMRI), brain-computer interfaces (BCIs), and transcranial direct current stimulation (TDCS) devices, which collectively fall under the umbrella of generalized neurotechnology. The article also delineates several Neurorights, which can be categorized as follows:

- ❖ Cognitive Freedom or mental determination, as posited by Bublitz and Merkel.
- ❖ Right to mental privacy, intended to safeguard brain waves not merely as data but also as generators of data or sources of information, whether consciously or not.
- ❖ Right to mental integrity, which pertains to the unauthorized alteration of an individual's neural processes resulting in harm.
- ❖ Right to psychological continuity, which strives to maintain personal identity and behavioral coherence against non-consensual alterations by third parties.

These Neurorights draw upon foundational legal principles, specifically privacy, free choice, and integrity, and are intimately connected to the concept of human dignity. However, these principles are currently under threat due to the pervasive influence of a transformative technology—Artificial Intelligence (AI). Subsequent sections will elaborate on the risks

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[7] Bublitz, Jan Christoph, and Reinhard Merkel. Crimes against minds: on mental manipulations, harms, and a human right to mental self-determination. *Criminal Law and Philosophy*, v. 8, n. 1, p. 51-77, 2014.

[8] Ienca, Marcello, and Roberto Andorno. Towards new human rights in the age of neuroscience and neurotechnology. *Life sciences, society and policy*, v. 13, n. 1, p. 1-27, 2017.

posed by AI to these rights.

The previously mentioned article by Francis Shen, titled "Law and Neuroscience 2.0," also delves into this concern, emphasizing its significance in the realm of Neuroscience and Law. Neurolaw scholars find this topic not only pivotal in addressing the rights of individuals whose dignity is affected by AI systems but also in comprehending these systems as a manifestation of intelligence and deciphering the neural networks they form.

Issues associated with the neuroscientific impacts of AI have garnered attention from Rafael Yuste and his team of scholars at Columbia University. Yuste, a neurobiologist instrumental in establishing the Brain Research Through Advancing Innovative Neurotechnologies Initiative (BRAIN Initiative) in the United States in 2013, is renowned for the NeuroRights Initiative (NRI), which emerged in 2017 and published a seminal article in the journal Nature that same year. In their article titled "Four ethical priorities for neurotechnologies and AI"[9], Yuste and over 20 co-authors put forth four priorities that have driven the development of neurorights.

These priorities include:

(a) Privacy and consent, which aims to protect data and information stemming from brain activity, commonly referred to as neural data. Such data can be accessed through neurotechnology, including non-invasive methods like analyzing typing patterns. Neural data holds valuable insights that, without proper regulation, could be exploited for manipulative purposes, such as targeted advertising or other vested interests.

It's worth noting that the authors advocate for transparency in processing and utilizing new techniques and technologies, such as blockchain, to manage neural data. These technologies offer secure and transparent means of storing and monitoring data usage, thereby ensuring ethical use and respecting individuals' rights. By implementing these measures, the authors aspire to empower individuals with greater control over their neural data, ensuring its ethical and privacy-compliant utilization.

(b) Agency and identity, a concept that encompasses the capacity for intentional influence over one's own functioning and life circumstances, as outlined by Bandura[10]. This notion extends beyond conventional theories of free will, which often overlook factors like human interaction and environmental influence.

Albert Bandura's framework identifies four components of human agency: intentionality, premeditation, autoreactivity (or self-regulation), and self-reflexivity. According to Bandura, individuals formulate intentions,

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[9] Yuste, Rafael, Sara Goering et. al. Four ethical priorities for neurotechnologies and AI. *Nature*, Londres, 8 nov 2017.

[10] Bandura, Albert. Toward a psychology of human agency. *Perspectives on psychological science*, v. 1, n. 2, p. 164-180, 2006.

including action plans and strategies, set goals, and anticipate outcomes to guide and motivate their efforts. They possess the ability to construct appropriate courses of action and engage in self-reflection on the appropriateness of their thoughts and actions.

In the contemporary landscape, neural technologies and devices have the potential to interfere with these characteristics. Artificial intelligence (AI) can manipulate the agency of large groups by processing neural data from a select few. AI can influence intentionality, impede or distort premeditation and self-reactivity, and skew the feedback and perceptions necessary for self-reflection.

(c) Augmentation, which raises concerns about the impact of brain-machine interfaces on individuals' self-perception. For example, targeted bombardment through social networks and the utilization of food delivery apps based on behavioral data can distort one's self-image. This issue touches upon the same notion of mental integrity as agency, which relates to cognitive freedom or mental self-determination, as mentioned by other authors.

To mitigate these risks, Rafael Yuste and his collaborators propose an International Declaration on Neurorights and an International Convention with enhanced effectiveness[11]. They critique current consent forms, which typically address only physical risks, and advocate for the inclusion of education about the potential cognitive and emotional effects of neurotechnologies in a global document.

(d) Biases, a final ethical concern addressed in the renowned Nature article, pertains to the biases that can emerge from the processing of big data through artificial intelligence systems. The text highlights the risks of biases against historically marginalized groups, as well as distortions concerning gender and race. It cites instances of problems stemming from algorithms used in hiring processes that exhibited biases against women and algorithms employed in criminal justice proceedings that detrimentally affected black individuals.

Furthermore, the article suggests that these biases could be integrated into neurotechnological devices that incorporate artificial intelligence. The presence of biases represents a substantial challenge posed by new technologies reliant on extensive data, particularly artificial intelligence. This issue was already under consideration when the regulatory wave addressing AI and neurorights commenced.

In 2019, the Committee of Ministers of the European Union aptly recognized the potential pitfalls of AI, drawing "attention to the growing threat to the right of human beings to form opinions and make decisions independently of automated systems emanating from advanced digital

[11] Yuste, Rafael, Sara Goering et. al. Four ethical priorities for neurotechnologies and AI. *Nature*, Londres, 8 nov 2017.

technologies".[12] According to the Committee:

> "Fine-grained, subconscious and personalized levels of algorithmic persuasion can have significant effects on individuals' cognitive autonomy and their right to form opinions and make independent decisions. These effects remain underexplored but cannot be underestimated."[13]

It's crucial to emphasize that when AI is employed to influence decisions, it effectively becomes a non-invasive means of manipulating the mind, posing a potential threat to cognitive freedom and mental privacy. Several instances of such manipulation, which can arise from the utilization of neural data or conventional data typically gathered from social networks, have been elucidated by Shiner and O'Callaghan in their 2021 article.

> "[...] This data can be analyzed by machine learning tools, making it possible to infer detailed and potentially intimate information about individuals. This data can then be used to micro-direct and optimize processes to govern online user experiences that differ based on their evaluation of their data. The extraction of insights reveals the things that are on our minds, whether through our history on search engines, our engagement with certain news stories, or the interactions we have with other users on social media platforms.
>
> Furthermore, our choices can be predicted, and our emotions, opinions and behaviors can be influenced by these media. From here, benign choice architecture can become coercive; consider, for example, the phenomenon of "hypernudging" which is a label for algorithmic decision-guiding techniques that channel user attention and decision-making in directions preferred by the digital "choice architect." The sheer amount of information available online can also make some knowledge inaccessible, depending on the ranking of information; think of YouTube's search and recommendation algorithms, which have become potential engines of misinformation. This not only becomes a barrier to accessing factual information, but also fuels misinformation and disinformation presented as reliable information. [...]
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> In addition to hypernudism, which modulates our choices and decisions,

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[12] Europe. Committee of Ministers of the Council of Europe: *Declaration on the manipulative capabilities of algorithmic processes*. (Adopted by the Committee of Ministers on 13.2.2019 at the 1337th meeting of the Ministers' Deputies). Available at https://search.coe.int/cm/pages/result_details.aspx?ObjectId=090000168092dd4b

[13] Europe. Committee of Ministers of the Council of Europe: *Declaration on the manipulative capabilities of algorithmic processes*. (Adopted by the Committee of Ministers on 13.2.2019 at the 1337th meeting of the Ministers' Deputies). Available at https://search.coe.int/cm/pages/result_details.aspx?ObjectId=090000168092dd4b

> there is an element of surveillance through large-scale data collection. The theory of "chilling effects" has emerged from assumptions that state (and non-state) actions can deter people from exercising their legal freedoms or engaging in legitimate activities. Internet users may refrain from engaging in certain legal activities online because they fear some sort of legal reprisal or feel social pressure to conform to avoid being labeled as deviant. Even if someone is not aware of being watched, but is aware of the possibility of being watched, the panopticon effect can arise, whereby behavior is inhibited for fear of being watched at any time. Here, then, the freedom to think online is curtailed, albeit by the self. The full exercise of autonomy is stifled, and thoughts are not even explored, much less expressed."[14]

The topics mentioned, such as hypernudging, the Chilling Effect, and the panopticon effect, represent emerging subjects at the forefront of well-established areas of law. Hypernudging, for instance, is a derivative of nudging, a form of manipulation grounded in behavioral economics, which finds discourse within Consumer Law, Constitutional Law, and the intersection of Political Science and Law. Hypernudging distinguishes itself by incorporating data and artificial intelligence to finely direct individuals' actions, rendering it a novel concept within the field and aligning it with the contemporary discourse on neurolaw. The employment of intricate mechanisms and methods to indirectly delve into people's minds infringes upon core values such as cognitive freedom, mental privacy, mental integrity, psychological continuity, and identity.

The inhibitory ramifications of new technologies and technological surveillance also contribute to this discourse on neuro-legal matters. It is intriguing to contemplate what safeguards individuals will possess in this domain without the presence of neurorights.

A notable concern within this sphere arises from profiling, as elucidated by Büchi, Fosch-Villaronga, Lutz, Tamò-Larrieux, Velidi, and Viljoen[15]. Profiling entails the systematic and deliberate collection and categorization of data pertaining to individuals, orchestrated for the purpose of classification and clustering into distinct categories. The authors underscore two consequences of this practice, which have become so pervasive and normalized that they underscore the necessity for proposed neurorights: behavior customization and behavioral manipulation.

Customization manifests as indirect pressure for conformity to perceived

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[14] Shiner, Bethany, and Patrick O'Callaghan. The right to freedom of thought in the European Convention of Human Rights. *European Journal of Comparative Law and Governance*, 2021.

[15] Büchi, Moritz *et al*. The chilling effects of algorithmic profiling: Mapping the issues. *Computer law & security review*, v. 36, p. 105367, 2020.

behavioral norms. When governments develop profiles, individuals may tend to align with one model or another, and a similar phenomenon occurs when private entities with category-based rankings (such as insurance companies, banks, and healthcare providers) channel individuals into specific groups. This customization extends into the realm of politics and poses a risk to democracy, as individuals may refrain from producing and seeking information that they would openly share if they were not under surveillance due to concerns about being labeled as too radical or too nonconformist.

Parallel to customization are the repercussions of de-individualization and the propagation of stereotypes. Schermer[16] had already addressed these concerns stemming from profiling even before the proliferation of Artificial Intelligence. Schermer expounded on how profiling can give rise to the formation of stereotypes and de-individualization, which can yield adverse consequences for both individuals and society as a whole.

> In many cases, profiling is largely related to classification and therefore there is a risk that people will be judged based on group characteristics rather than their own individual characteristics and merits (Vedder 1999). Group profiles usually contain statistics, and therefore the characteristics of group profiles may be valid for the group and for individuals as members of that group, although not for individuals as such. For example, people who live in a particular neighborhood may have a 20% higher chance of defaulting than the average person. This characteristic holds for the group (i.e., people who live in that neighborhood), for the individuals as members of that group (i.e., randomly chosen people who live in the neighborhood), but not necessarily for the individuals as such (i.e., for John, Mary, and William who all live in the same neighborhood). When individuals are judged by group characteristics that they do not possess as individuals, this can affect them negatively. Not only can group profiling have direct negative effects on individuals, but it can also lead to stigmatization of group members. Furthermore, the division into groups can harm social cohesion. When group profiles, whether correct or not, become public knowledge, people may begin to treat each other accordingly.
>
> For example, when people begin to believe that individuals from a certain neighborhood default on their loans more often, they may conclude that these individuals live in a "bad" neighborhood.
>
> Closely related to the risk of deindividualization and stigmatization is stereotyping. A profile casts us based on predetermined categories (e.g.,

[16] Schermer, Bart. Risks of profiling and the limits of data protection law. In: *Discrimination and privacy in the information society*. Springer, Berlin, Heidelberg, 2013. p. 137-152.

> "valuable customer," "young urban professional," but also "security risk" or "dubious debtor"). For a profiling exercise to remain effective and efficient, there are a finite number of general categories. These profiles are, almost by definition, incapable of accurately reflecting all the nuances of our personality. As such, the profile we fit into will become a stereotype based on which we are judged. Furthermore, these profiles can also make it more difficult for a person to 'escape' the stereotype."[17]

The author also highlighted additional issues associated with profiling, including informational asymmetry, diminished accuracy, potential abuse (fraud), and discrimination. These challenges are exacerbated in today's landscape due to the explosion of big data and the widespread utilization of artificial intelligence, which creates and utilizes clusters or groupings of profiles on a scale previously unattainable. The external management of individuals' identities can directly influence behaviors that conform to problematic norms within the "communities" that either self-identify or are induced to identify themselves on social networks. A disconcerting study from 2019 revealed that exposure to self-harm content on Instagram was correlated with suicidal ideation, self-harm, and emotional disturbances, even after accounting for exposure to other sources with similar content[18]. This situation fosters a "contagion effect among vulnerable users" as behaviors become standardized through the sharing of images.

Behavioral manipulation stands apart from persuasion, which is explicit, and coercion, which openly challenges individual freedoms. Manipulation constitutes a clandestine subversion of individuals' decision-making abilities, exploiting their cognitive or emotional vulnerabilities. In the words of Büchi, Moritz *et al.*, quoting Susser *et al.*[19]:

> "Manipulation, in the digital world, not only has a technical component - namely, the ability to tailor content to individuals based on collected data traces through the use of advanced data analysis tools - but also a psychological component through the exploitation of psychological vulnerabilities."[20]

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[17] Schermer, Bart. Risks of profiling and the limits of data protection law. In: *Discrimination and privacy in the information society*. Springer, Berlin, Heidelberg, 2013. p. 137-152.

[18] Arendt, Florian, Sebastian Scherr, and Daniel Romer. Effects of exposure to self-harm on social media: Evidence from a two-wave panel study among young adults. *New Media & Society*, v. 21, n. 11-12, p. 2422-2442, 2019.

[19] Susser, Daniel, Beate Roessler, and Helen Nissenbaum. Online Manipulation: Hidden Influences in a Digital World (December 23, 2018). 4 *Georgetown Law Technology Review* 1 (2019), Available at SSRN: https://ssrn.com/abstract=3306006

[20] Büchi, Moritz *et al*. The chilling effects of algorithmic profiling: Mapping the issues. *Computer law & security review*, v. 36, p. 105367, 2020.

This manipulation represents a subtle form of control that impacts the capacity for choice, or agency, as previously mentioned. The proliferation of social media, the utilization of big data, profiling, and AI introduces an unprecedented level of digital mediation, and this medium—the data-driven, AI-managed electronic systems—is not neutral. Whether driven by commercial, electoral, or even state domination motives, these systems may endeavor to manipulate individuals' behavior and curtail their cognitive freedom.

In addition to these four ethical concerns, Rafael Yuste's influential group[21] introduced a new category specifically addressing identity in the article titled "It's time for neurorights." In this text, composed in collaboration with a prominent human rights lawyer and a co-author, an updated roster of neurorights was formulated:

> "The proposed neurorights include (1) the right to identity, or the ability to control both physical and mental integrity; (2) the right to act [agency], or the freedom of thought and free will to choose one's own actions; (3) the right to mental privacy, or the ability to keep one's thoughts protected from disclosure; (4) the right to fair access to mental enhancement, or the ability to ensure that the benefits of improvements in sensory and mental capacity through neurotechnology are fairly distributed in the population; and (5) the right to protection from algorithmic bias, or the ability to ensure that technologies do not introduce bias."[22]

In a similar vein, Marcello Ienca[23] presented an influential article delineating a catalog of neurorights stemming from four primary categories: privacy, freedom of thought, mental integrity, and personality. These neurorights were further categorized into subcategories, encompassing concepts like informational self-determination, mental privacy, cognitive liberty, and freedom from bias and discrimination. The suggested compilation seeks to safeguard individuals' rights and principles in the era of neuroscience and the burgeoning field of neurotechnologies.

The following figure, extracted from the article, illustrates the author's comprehensive classification:

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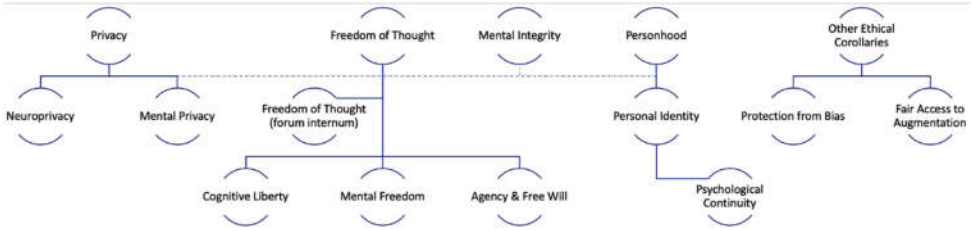
[21] Yuste, Rafael, Jared Genser, Jared, and Stephanie Herrmann. It's Time for Neuro-Rights. *Horizons: Journal of International Relations and Sustainable Development*, n. 18, p. 154-165, 2021.

[22] Yuste, Rafael, Jared Genser, Jared, and Stephanie Herrmann. It's Time for Neuro-Rights. *Horizons: Journal of International Relations and Sustainable Development*, n. 18, p. 154-165, 2021.

[23] Ienca, Marcello. On neurorights. *Frontiers in Human Neuroscience*, v. 15, p. 701258, 2021.

Figure 1: A taxonomy of neurorights.



Source: IENCA, 2021[24].

The well-established list above underscores the significance of safeguarding the right to protection against algorithmic biases. As per Ienca, the "potential" scope of neurolaw has been and can be advocated for in domains unrelated to the mental and neurocognitive realm, including fintech, web applications, chatbots, and automation. This marks one of the novel frontiers for neurorights, an emerging domain where fresh rights, such as the right to reasonable inferences concerning mental identity, can find inclusion.

This right to reasonable inferences, extending beyond data protection, is comprehensively contextualized and elucidated by Sandra Wachter and Brent Mittelstadt:

> "To explain why this new right is essential, it is first necessary to establish the source of risks in Big Data analytics and algorithmic decision-making systems. Automated decision making, profiling, and related machine learning techniques represent new opportunities for private decision making-invasive, discriminatory, and biased decision-making based on inferential analysis. Modern data analytics has access to unprecedented volumes and varieties of interconnected data to assess the behaviors, preferences, and private lives of individuals. Inferences can be used to nudge and manipulate us. The range of potential victims of such harm is diversified by the focus in modern data analytics on finding small but meaningful connections between individuals, and building group profiles from personal, third-party, and anonymized data".[25]

Arguably the most contemporary among neurorights, the right to reasonable inferences signifies a novel category that stems from the utilization of individuals' data, which is willingly or unwillingly exposed in their engagements with social, entertainment, and professional networks,

[24] Ienca, Marcello. On neurorights. *Frontiers in Human Neuroscience*, v. 15, p. 701258, 2021.

[25] Wachter, Sandra, and Brent Mittelstadt. A right to reasonable inferences: re-thinking data protection law in the age of big data and AI. *Colum. Bus. L. Rev.*, p. 494, 2019.

among others. While the inferences derived from these modern techniques do not result from devices implanted within individuals' brains, they possess substantial potential to disrupt not only one's identity but also, when integrated into marketing strategies, one's autonomy and agency.

Since 2007, neurorights have been solidifying their position as a novel suite of human rights, now actively delineated and being put into practice by certain countries.

II. CHALLENGES AND PROPOSALS FOR THE IMPLEMENTATION OF NEURORIGHTS

The Organization for Economic Cooperation and Development (OECD) encapsulated the evolving landscape in a recommendation regarding the responsible utilization of neurotechnologies. This context, wherein initial ethical concerns have now transitioned into regulatory concerns, has underscored the necessity for neurorights. As per the OECD:

> "Neurotechnology is redefining what is possible in terms of monitoring and intervention in clinical and non-clinical settings, with great promise for improving mental health, well-being, and productivity. Led by major national and international initiatives in brain science and fueled by clear medical need, research in both the public and private sectors has made considerable advances. In particular, the convergence between neuroscience, engineering, digitization, and artificial intelligence (AI) is becoming a key driver of innovation and will disrupt existing practices as well as traditional boundaries between medical therapies and consumer markets.
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> At the same time, neurotechnology raises several unique ethical, legal, and social issues that potential commercial models will have to address. These issues include data (brain) privacy issues, the prospects for human enhancement, the regulation and commercialization of direct-to-consumer devices, the vulnerability of cognitive patterns to commercial or political manipulation, and other inequities in use and access. Governance issues around neurotechnology affect the entire innovation pipeline, from fundamental brain research, cognitive neuroscience, and other brain-inspired sciences to commercialization and marketing issues."[26]

The ethical concerns and classifications of rights addressed in the

[26] Organisation for Economic Co-operation and Development (OECD), *"OECD Recommendation on Responsible Innovation in Neurotechnology"*, 11 December 2019: https://www.oecd.org/science/recommendation-on-responsible-innovation-in-neurotechnology.htm

preceding section, particularly the five neurorights proposed by the Columbia University research group, largely tackle the challenges outlined earlier. This article supplements the proposal by emphasizing the necessity to study not only biases but also manipulations and profiling, which directly impinge upon individuals' identity and agency in the 21st century. This proposition is, in fact, ingrained in the group's initial discourse in the Nature magazine article.

The combined utilization of personal data and AI begets more substantial issues than merely discriminatory biases. It is also characterized as a neuro-tool that impacts privacy, the capacity to make choices, and the very identity of individuals exposed to social networks and other forms of mediation between individuals and the real world (such as advertising, government propaganda, and electoral propaganda). Consequently, the detrimental consequences of AI and Big Data's usage in the realm of neurorights cannot be confined solely to biases and discrimination.

On the normative front, there exist recent specific proposals, but it's crucial to note that other norms and principles have historically addressed the defense of cognitive freedom, mental privacy, and freedom of action.

In Brazil, the principle of non-self-incrimination serves as an example of a subject that, despite having been deliberated upon for years within the realm of criminal law, could be examined in light of neurorights. Discussions surrounding the limits of habeas corpus have recently revitalized interest in this subject. The decision of the Federal Supreme Court in the motion for clarification in HC 204422 brought to light a gap in comprehending what constitutes the rights of the deponent/accused and the parameters for controlling excesses, such as the abusive use of non-auto incrimination, which obstructs the truth-seeking process against third parties. In this decision, Justice Judge Luiz Fux stated:

> "[...] Indeed, the right against self-incrimination has a constitutional basis, establishing a subjective right to be exercised by any citizen, not to produce evidence against oneself. Obviously, the first judgment about the content of this right belongs to its own holder, who is responsible for the initial evaluation of the impacts of producing certain information on their own legal sphere. In this sense, the holder of the right is the one who expresses the first manifestation of will regarding the exercise of the right against self-incrimination. On the other hand, no fundamental right is absolute, and even less can it be exercised beyond its constitutional purposes. At this point, the Parliamentary Inquiry Commissions, as authorities invested with judicial powers, have the power and duty to analyze, in light of each specific case, the occurrence of an alleged abuse

of the exercise of the right against self-incrimination. […]".[27]

This description underscores how undefined the boundary of the zone of self-defense for the accused can be and how challenging it can be to detect potential abuses. However, the issue could be addressed through the proposal presented in Nita Farahany's article[28], which emphasizes the necessity for a clear definition of the neurorights of the deponent/accused. In essence, the discussion of non-self-incrimination must encompass mental privacy, even without considering neurotechnological devices, but already from the perspective of neurorights.

In consumer law, there is a concern that the supplier may exploit psychological vulnerabilities in the consumer to take advantage of informational asymmetry. This manipulation represents a kind of "version 0.1" of contemporary algorithmic manipulation. Unfair terms are considered unfair because they exploit cognitive limitations, as does deceptive advertising. Moreover, apart from informational asymmetry, Consumer Law has always been concerned with the psychological vulnerability of consumers.

More recently, the issue of bullying, as addressed in Law 13.185/2015, pertains to "physical or psychological violence in acts of intimidation, humiliation, or discrimination," signifying systematic bullying. At that time, there was evident concern for the mental integrity of individuals, even when bullying transpired in the online realm (cyberbullying).

The 2021 legislation on over-indebtedness, Law 14.181/2021, which is also a consumer-focused issue, spotlights another facet of the violation of cognitive freedom. Article 54-C, included in the Consumer Protection Code, prohibits credit advertising that may "conceal or make it difficult to understand" for individuals, as well as advertising that "harasses or pressures the consumer to contract." In these instances, cognitive freedom, particularly that of the most vulnerable individuals, such as the sick and the elderly, is the actual protected legal right. The innovation was necessary because, in these cases, there is no coercion in the conventional sense or even explicit persuasion; instead, there is manipulation through advertising designed to undermine the power of choice.

This concern with the defense of psychological weaknesses aligns closely with the theory of neurorights, which are preexisting rights that could be regarded as the first stage of concern for mental privacy (the principle of non-self-incrimination); for mental integrity (the anti-bullying rule); and for

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[27] Brazil. Federal Supreme Court. *Habeas Corpus No. 204422/DF.* Rapporteur: Justice Roberto Barroso. Judgment: July 13, 2021. Deciding Body: Full Court. Available at: https://jurisprudencia.stf.jus.br/pages/search/ despacho1220267/false. Accessed on August 10, 2021.

[28] Farahany, Nita A. Incriminating thoughts. *Stan. L. Rev.*, v. 64, p. 351, 2012.

cognitive freedom (consumer law and protection against over-indebtedness). Perhaps they represent the first generation of neurorights.

In the international arena, this concern also existed; in the Universal Declaration of Human Rights, two articles indicate the need for the protection of neurorights:

> "Article 18
> Everyone has the right to freedom of thought, conscience, and religion; this right includes freedom to change his religion or belief, and freedom, either publicly or privately, to manifest his religion or belief in teaching, practice, or worship."
>
> [...]
>
> "Article 22
> Everyone, as a member of society, has the right to social security, to the realization by national effort and by international cooperation and in accordance with the organization and resources of each State of the economic, social, and cultural rights indispensable for his dignity and the free development of his personality."

Freedom of conscience, dignity, and the free development of personality are among the first-generation neurorights. However, more specific rights are now necessary. The phenomena identified in the OECD citation and this research paper, including neural devices and technologies, artificial intelligence, and extensive data collection, particularly on the internet and social media, demand rights that directly protect mental health, the mind, and neural data.

Protecting neural data and other personal data that could reveal vulnerabilities and aspects of individuals' behavior is essential to safeguard mental or psychic integrity in this new context. In this regard, the Brazilian proposal for a contemporary and specific treatment of the subject, included in Bill 1.229/2021, initially addresses the protection of neural data within the General Law of Data Protection, systematizing the protection of individuals' digital body and mind.

The Brazilian proposal introduces some interesting concepts and provides a basic definition for neural data: "any information obtained, directly or indirectly, from the activity of the central nervous system, and whose access is gained through invasive or non-invasive brain-computer interfaces" (proposed for Art. 5, XX). Additionally, the proposal suggests that:

> "The request for consent for the processing of neural data must indicate, clearly and prominently, the possible physical, cognitive and emotional effects of its application, the rights of the holder and the duties of the

> controller and operator, the contraindications as well as the rules on privacy and the information security measures adopted." (Proposed Article 13-D)

The text is well-written, but it does not explicitly address the use of data extracted through web browsing. However, even without explicit rules, it is possible to extend the proposed text to AI systems and social network data, as "non-invasive interfaces" and "indirect" data acquisition are covered. This way, the new rules would be suitable for providing basic protection for even the most contemporary neurorights.

An example of existing regulations is the Spanish Digital Rights Charter, which includes a chapter as follows:

> "XXVI
> Digital rights in the use of neurotechnologies
> 1. The conditions, limits and safeguards for the implantation and use in humans of neurotechnologies shall be regulated by law, for the purpose of:
> a) Preserving individual identity as a person's sense of self.
> b) Guaranteeing individual self-determination, sovereignty, and freedom in decision-making.
> c) Safeguarding the confidentiality and security of data obtained or regarding their brain processes, and full control over them.
> d) Regulating the use of human-machine interfaces which could affect physical or psychological integrity.
> e) Ensuring that decisions and processes based on neurotechnologies are not conditioned by the provision of data, programs, or information that are incomplete, undesired, unknown, or biased, or by interference with neuronal connections.
> 2. To guarantee the dignity of the person, equality, and non-discrimination, in accordance, when appropriate, with international treaties and conventions, the law shall regulate those situations and conditions for the use of neurotechnologies which, beyond their therapeutic application, are aimed at mental augmentation or the stimulation or enhancement of human capabilities."

This document, which has been under discussion since 2020, is expected to come into effect by 2025. It contains explicit references to neuro-rights and includes articles that specifically address digital identity and related topics such as anonymity and equality. Additionally, there are provisions related to the use of artificial intelligence that will be highly relevant for defending neurorights associated with the use of this technology. These rules cover non-discrimination, transparency, and the right not to be subjected to algorithmic decisions or the ability to challenge them when they occur. Finally, the Bill

of Rights also addresses protection against manipulation, which is crucial for safeguarding neurorights:

> "XXIII
> Rights as regards artificial intelligence
> [...]
> 4. The use of AI systems aimed at psychologically manipulating or disturbing persons, in any aspect affecting fundamental rights, is prohibited."

All these proposals are currently poised between two legal approaches to the subject: one suggests that updating existing norms is sufficient, while the other, seemingly more appropriate, advocates for the creation of new human rights in response to challenges to mental and psychic integrity, as well as to the identity and autonomy of individuals. Regarding this debate, and more specifically about mental self-determination, Nora Hertz explains that:

> "The process of legal recognition of new human rights is complex, and the introduction of new human rights is not per se more advantageous than the interpretation of existing human rights. With regard to the human right to freedom of thought and the proposed human right to mental self-determination, it is more convincing to evolve the interpretation of the former, e.g. by a general comment, protocol or soft law document, than to introduce a new human right to mental self-determination. However, the introduction and evolution of human rights are intertwined, and the introduction of a new human right to mental self-determination, e.g. in a soft law declaration, would probably also evolve the interpretation of the right to freedom of thought."[29]

Therefore, there are proposals to enhance existing norms, which encompass renewed judicial interpretations and the establishment of new internationally recognized human rights. While it is necessary to assess the effects and engage in discussions regarding the feasibility of implementing each suggestion, the ultimate objective should be to safeguard these newly formulated and updated rights, presently referred to as neurorights.

FINAL CONSIDERATIONS

The dignified existence of a human being is a fundamental principle enshrined in many modern constitutions. To lead a legally dignified life means, on the one hand, always being recognized as a person rather than an object in relationships, and on the other hand, having the minimum socio-

[29] Hertz, Nora. Neurorights–Do we Need New Human Rights? A Reconsideration of the Right to Freedom of Thought. *Neuroethics*, v. 16, n. 1, p. 5, 2023.

economic conditions necessary for living.

Studies on neurorights highlight that human dignity is being challenged by numerous emerging techniques, whether invasive or not, that have the potential to impede the exercise of human autonomy and agency, reducing individuals to objects devoid of personal desires or driven by externally induced desires. This situation resembles the depiction of robots in old movies, whose thoughts are mere executions of pre-programmed commands.

New knowledge and proposed solutions are vital tools for addressing these challenges and tackling the emerging issues presented by technologies based on big data and artificial intelligence.

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