CORA Cork Open Research Archive
Cartlann Taighde Oscailte Chorcaí

Title	Private law and the inner self: comparative perspectives on the governance of neurotechnology
Authors	Deibel, Talya
Publication date	2025-08-13
Original Citation	Deibel, T. (2025) 'Private law and the inner self: comparative perspectives on the governance of neurotechnology', Global Journal of Comparative Law, 14(2), pp. 105-134. https://doi.org/10.1163/2211906X-14020001
Type of publication	Article (peer-reviewed)
Link to publisher's version	10.1163/2211906X-14020001
Rights	© 2025, Brill Academic Publishers.
Download date	2026-10-27 18:14:28
Item downloaded from	https://hdl.handle.net/10468/18163

UCC
University College Cork, Ireland
Coláiste na hOllscoile Corcaigh

Private Law and the Inner Self: Comparative Perspectives on the Governance of Neurotechnology

Dr. Talya Deibel

The final published version is available in the Global Journal of Comparative Law.

Deibel, Talya. "Private Law and the Inner Self: Comparative Perspectives on the Governance of Neurotechnology" Global Journal of Comparative Law, 2025, 14 (2), 105-134.

Abstract

The main focus of this article is to demonstrate that the legal governance of disruptive technologies requires a nuanced, historically informed, and comparative approach to law. The article takes neurotechnology as its central case study and investigates how private law can reposition itself with respect to potential harm caused by the usage of neurotechnologies. It employs the concept of 'the inner self' to conceptualize damage to incorporeal personality interests and analyzes how such damage can be remedied through various instruments offered by comparative private legal theory and practice. The article illustrates how the governance of neurotechnologies demands judicial creativity and a dynamic conception of personality that can adapt to technological transformations while preserving the essential core of personhood.

Introduction

This article proposes to harness comparative perspectives from private law theory to address potential legal problems posed by neurotechnologies and to inform future governance frameworks. Its primary focus is on 'the inner self' in private law, with a particular emphasis on its protection through civilian remedies. The article takes the inner self as a conceptual metaphor to illustrate the intangible elements and unmanifested phenomena which belong to the *forum internum* of natural persons. Accordingly, it argues that the inner self is increasingly becoming central to debates about disruptive technologies.

Understanding the inner self as particularly relevant to legal scholarship implies being aware of a broad spectrum of socio-technological practices that directly affect the construction of natural personhood. A vivid example is neurotechnologies that affect human beings' sense of self and experience of reality. This creates a plethora of moral, social, and economic challenges, including legal questions about how to understand and protect 'the mind' and 'the psyche' as part of natural personhood is required - one built on a comparative vision of how personhood is understood and protected in European private law in response to emerging technologies.

This article takes tort law remedies, and in particular non-material damage such as wounded feelings, mental anguish, or emotional pain and suffering to explore how private law tools can potentially offer protection for the inner self. The focus of this article is twofold. First, it argues that the protection of the inner self in private law theory was developed and reconfigured as a response to emerging technologies. Second, it highlights the richness of comparative private law, particularly French, German, and Swiss legal scholarship, in providing new ways to

reconceptualize the inner self in the age of neurotechnology that can address future challenges. It suggests that legal discussions around neurotechnology should be analysed as part of a wider tradition in European legal theory, such as the theoretical framework of protecting the mind and psyche against any unwanted, unconsented violations.

The overarching aim of this article is to provide a theoretical and comparative lens to examine the inner self in the context of neurotechnologies, which will inform future legislative initiatives and governance of technologies. Its methodology contributes to law and technology scholarship by offering a pluralistic vision of the governance of innovation and emerging technologies. It also illustrates the importance of comparative research in private law as a vital means for adopting a preventive approach towards current socio-technological challenges that create a wide variety of ambiguities and grey zones.

1. Neurotechnologies and the Construction of the Inner Self

Neurotechnologies comprise a wide array of practices including neuroimaging and neuromodulation through invasive or non-invasive methods. Even though they were initially developed in the medical industry, new neurotechnologies are rapidly expanding into the consumer sphere and workplace, particularly in the form of non-invasive wearable neurotechnologies used for wellness, fitness, lifestyle, education, entertainment, and safety. [1] Common examples include special headbands using EEG technology for meditation and relaxation, intelligent caps which detect the attention span, cognitive load, and fatigue of employees such as truck drivers, or open source neurotechnology kits for researchers and do-it-yourself enthusiasts.[2] Invasive non-medical usage of neurotechnologies is on the way, explicitly marketed as *"unlocking human potential for tomorrow."*[3]

Furthermore, these examples are not yet regulated. Even within European markets, these devices often fall outside of the scope of current EU Medical Devices Regulation. On the one hand, neurotechnologies are quickly becoming part of ordinary life, with many new examples that will show high levels of integration with personal spheres and bodies. On the other hand, it is important to recognize that this type of novelty does not imply that it is 'new' in its legal sense, as they pose similar risks and legal challenges to advancements in biotechnology and AI technology. What sets neurotechnology apart, as a case study for the law and governance of technology, is its direct relationship with the mind as the symbol of the inner self, where individuality, authenticity and autonomy are located.

In this context, neurotechnologies blur the line between the artificial and the organic. This presents a normative problem as modern civil laws are built on a seemingly distinct separation between person and things. This interpretation dates back to the famous tripartite division of the Roman jurist Ulpian, stating '*the whole of the law which we observe relates either to persons, or to things, or to actions.*'[4] This *summa divisio* was later transferred to modern European civil codes, in particular the Code Napoléon and became illustrative of how civil law

[1]Jared Genser, Stephen Damianos, and Rafael Yuste, "Safeguarding Brain Data: Assessing the Privacy Practices of Consumer Neurotechnology Companies" (2024) *Neurorights Foundation Report*, 1-100, 2.
[2]Ekaterina Muhl and Roberto Andorno, "Neurosurveillance in the Workplace: Do employers Have the Right to Monitor Employees' Minds?" (2023)5 Frontiers 1-11; Nita Farahany, *The Battle for Your Brain. Defending the Right to Think Freely in the Age of Neurotechnology* (Macmillan Publishers, 2023).
[3]https://neuralink.com/ (last access: 26.11.2024).
[4]*See* Ins.1.2.12 in *Iustinian's Intitututes*, (tr. John B. Moyle, OUP, 1911).

takes a different approach to persons and things. Moreover, it was also studied in German law, in particular through the *usus modernus pandectarum*, and accordingly became one of the founding pillars of the European legal tradition.

Neurotechnologies are good examples of how this subject-object dichotomy does not reflect contemporary realities. They present us with a new type of legal assemblage, and with new types of hermeneutical relationships that are established between humans and machines. What all of this means is that the traditional understanding of the boundaries between personhood and property is transformed. This is clearly visible in the case of brain imaging technologies like functional magnetic resonance imaging (fMRI) and electroencephalogram (EEG) which record brain states based on measuring hemodynamic response or electrical activities. Coupled with brain imaging technologies, the current range of neurotechnologies include neural devices in the form of brain-computer (BCI) or brain-machine interfaces (BMI). These technologies include invasive and non-invasive methods of connecting humans to a computer screen or robotic arm. BCIs create new legal agents which merge the computer with the human mind/brain. Neural devices sometimes automatically translate the inner realm of humans into control actions manifested on a computer screen or a machine.

Accordingly, neurotechnology becomes a constitutive element of both the inner and the physical self. This direct relationship between the technology and the inner intangible sphere demonstrates the novelty of neurotechnologies. Technologies that are implanted as well as neuroimaging technologies have the potential to directly affect how we process external and internal information. Moreover, these technologies operate on the quantification of psychological states such as cognitions, feelings, intentions via neurophysiological data.[5] The collection of brain data, alteration of brain activities such as emotions, thoughts, and memories and intervention in cognitive processes are potential risks directly related to the core elements of personhood and the protection of the intangibility of the inner self. Against this background, there are many initiatives to develop global, local, and supranational normative frameworks and ethical guidelines to encourage the responsible use of neurotechnology and to mitigate these potential challenges.[6] One famous example is the neurorights movement, which advocates for the introduction of a new set of human rights to protect the mind.[7]

In other words, neurotechnologies raise concerns regarding the impenetrability of the mind, which was once understood as an inaccessible fortress.[8] They have the potential to alter the legal construct of the mind as a private and autonomous realm. As such, they pose potential challenges to liberal conceptions of autonomy and freedom. Wearable devices and neural

---

[5]Katherine Hayles, *How We Become Posthuman: Virtual Bodies in Cybernetics, Literature, and Informatics.* (Chicago University Press, 1999).

[6]Christoph Bublitz, "My mind is Mine!? Cognitive Liberty as a Legal Concept" in Elisabeth Hildt et al (eds.) *Cognitive Enhancement* (Springer, 2013) 233-264; Christoph Bublitz, Jennifer Chandler and Marcello Ienca, "Human–Machine Symbiosis and the Hybrid Mind: Implications for Ethics, Law and Human Rights" in Marcello Ienca et al (eds.), *The Cambridge Handbook of Information Technology, Life Sciences and Human Rights* (CUP, 2022) 285-303; Timo Istace, "Human Rights Law: An Incomplete but Flexible Framework to Protect the Human Mind Against Neurotechnological Intrusions", Law, Innovation and Technology 16 (2024), 309-340.

[7]Marcello Ienca and Roberto Andorno, "Towards New Human Rights in the Age of Neuroscience and Neurotechnology" Life Sci. Soc. Policy 13(5) (2017), 1-27; Rafaël Yuste, Jared Genser and Stephanie Herrmann, "It's Time for Neuro-Rights; New Human Rights for the Age of Neurotechnology" 18 (2021) Horizon 155-157; Sjors Ligthart et al, "Minding Rights: Mapping Ethical and Legal Foundations of 'Neurorights'' Camb Q Healthcare Ethics 15 (2023) 1-21.

[8]Patrick O'Callaghan and Bethany Shiner, "Privacy 6.0: Privacy as Mental Integrity" in Marc J. Blitz and Christoph Bublitz (eds) *The Law and Ethics of Freedom of Thought: Volume II (London: Palgrave Macmillan, forthcoming 2025).*

implants are seen as potential threats to cognitive liberty and autonomy because they can directly affect decision-making processes.[9] Cognitive liberty includes both the negative freedom from coercion or interference and the positive freedom to control one's own brain and mind.[10]

This includes the concept of the 'inner self', which reflects the understanding of how modernity approaches the 'natural person' primarily as a dual entity: both a psychological and a physical being.[11] First, the person has a body; she is an embodied creature.[12] Second, the corporeal person has a spiritual world which contains emotions, thoughts, consciousness, will, desires and so on. It is a realm that is deep and rich in how it contains unmanifested yet legally relevant phenomena such as intentionality, authenticity, creativity, identity, and dignity.[13] It is both the mind and the psyche – conscious and unconscious cognitive processes.[14] Private law is posited on the assumption that human beings have a continuous inner self.

This natural person is the subject of law. She has certain rights, protections, privileges, duties, responsibilities, and liabilities. Moreover, many legal rights and obligations arise only in the context of her interaction with others. In other words, the law also treats the person as having a relational self.[15] Put differently, her personhood is constructed through her social relations with others.[16] In this sense the inner self, as a concept, reflects a tradition of liberal thought that is manifested in the modern history of the European legal idea of personhood.[17]

In the age of neurotechnology, the term 'inner self' has more complex methodological implications: bringing into focus what are *prima facie* challenges relating to personhood, with the brain and mind symbolizing essential components of personality. Here again, we are referring to the central role of the orthodox view on personhood, as the product of modern civilian codifications. This has been a common issue with disruptive technologies, and the associated challenges are addressed through legal frameworks designed to protect human dignity. Methodologically, neuroimaging technologies and neural devices clearly demonstrate the transgression of boundaries between the body and the inner self. As Resta argues, *'in the context of increasing mechanization and dehumanization of personal relationships, the*

---

[9]Christoph Bublitz, "The Nascent Right to Psychological Integrity and Mental Self-Determination" in Andreas von Arnauld, Kerstin von der Decken, and Mart Susi (eds.), The Cambridge Handbook of New Human Rights (CUP, 2020) 387-404; Andrea Lavazza and Rodolfo Giorgi, "Philosophical Foundation of the Right to Mental Integrity in the Age of Neurotechnologies", Neuroethics 16(3) (2023) 1-12; Ligthart et al, *supra* note 7.

[10]Bublitz , *supra* note 6.

[11]Johann Neethling, "Personality Rights: A comparative Overview" *The Comparative and International Law Journal of Southern Africa*, 28(2005) 210-245; Andreas Bucher, *Personne Physique et Droit de la Personnalité*, (Bale, 1985), 142.

[12]The private law significance of the human body and biological material is highlighted especially in debates concerning biotechnology. See the Convention for the Protection of Human Rights and Dignity of the Human Being with regard to the Application of Biology and Medicine: Convention on Human Rights and Biomedicine, Oviedo, 04.04.1997.

[13]Roger Brownsword, "Human Dignity from a Legal Perspective" in Marcus Düwell et al eds., *The Cambridge Handbook of Human Dignity* (CUP 2014), 1-22.

[14]Carl Gustav Jung, *On the Nature of Psyche* (tr. Richard F.C. Hull) (Routledge 1969), 81.

[15]Jonathan Herring, *Law and Relational Self* (CUP, 2019) 1-23; Jennifer Nedelsky, *Law's Relations: A Relational Theory of Self, Autonomy and Law* (Oxford University Press, 2011), 94-98.

[16]Nedelsky, *ibid,* 542.

[17]Charles Taylor, *Sources of the Self: The Making of Modern Identity* (Harvard University Press, 1998). For the emergence and development of the concept of the inner self in law see the law and the inner self project see Patrick O'Callaghan, Talya Deibel, Felicitas Benziger, https://www.lawinnerself.org/ (26.11.2024)

emphasis on dignity clearly has the purpose of locating the body in the sphere of the inner self, opposing its objectification.'[18]

For instance, wearable non-medical neurotechnologies used at home or at the workplace have access to the brain which is generally seen as the *locus* of human dignity and identity.[19] Such 'access' implies an evolving understanding of the 'private sphere', as it reconfigures the liberal understanding of the human mind: what was once considered a categorically closed and private inner realm is now a semi-open sphere. Additionally, neurotechnology is not a unitary thing. It does not only refer to a wearable device which becomes part of the human sensory system. Rather, it involves a wide range of techno-scientific practices including AI technology.[20] For instance, certain neurotechnologies incorporate AI technology and others analyse brain data using AI-driven algorithms. The protection of the private sphere, and in particular the sphere of secrecy/confidentiality as part of the inner self requires immediate attention.

Neurotechnologies challenge the established boundaries between different spheres, as well as between the brain as the organ and the mind or psyche as the seat of the inner self.[21] They not only have access to the inner realm, but can also potentially stimulate, change, or manipulate it. Currently neurosurgeons use three methodologies to stimulate the brain: transcranial direct current stimulation (tDCS), transcranial magnetic stimulation (TMS), and deep brain stimulation (DBS). Implantable neural devices, also known as neurotransplants or brain chips, usually use DBS technologies designed to stimulate the deeper tissues of the brain. These invasive neurotransplants are embodied and as such they end up having a symbiotic relationship with the organic body. A popular example is Elon Musk's firm Neuralink which implanted a BCI in a second person in August 2024. Neuralink's ultimate goal is explicitly publicized as creating technologies "*that allow humans to enter into symbiosis with artificial intelligence.*"[22] This not only highlights the narrative of progress and immortality, but also emphasizes its dystopic potential with respect to the protection of the inner self and human dignity.

The risks associated with neurotechnologies revolve around the fear of 'cyborgization' of human beings and the widening of, as van Beers puts it, *"the gap between the flesh-and-blood human (homo) and the natural person (persona)"*.[23] On the one hand, natural personhood has always been a fiction in European legal theory, and *"has gone through waves of artificialization and naturalization"*.[24] The Western conception of personhood and the protection of personality interests have been developed as status-based legal constructs.[25] Personhood refers to the legal status of being capable of holding the rights, obligations, duties, privileges, corporeal and

[18]Georgio Resta, "The New Frontiers of Personality Rights and the Problem of Commodification: European and Comparative Perspectives" *Tulane European and Civil Law Forum* 26 (2011), 33-58, 56.
[19]Jürgen Habermas, *Future of Human Nature* (Polity 2003).
[20]Noordje Marres, *Digital Sociology: The Reinvention of Social Research* (Polity, 2017)
[21]Clark and Chalmers famously argued that the human cognition is extended through a set of social and material elements and the extended mind also implies an extended self. Andy Clark and David Chalmers, "The Extended Mind" 58 (1998) *Analysis* 7-19, 18.
[22]Miryam Naddaf and Liam Drew, "Second Brain Implant by Elon Musk's Neuralink: Will it Fare Better Than the First?" (2024) *Nature*.
[23]Britta van Beers, "The Obsolescence of Human Beings and the Non-Obsolescence of Law's Natural Persons: Transformations of Legal Personhood Through the Lens of "Promethean Shame"" in Marc de Leeuw and Sonja van Wichelen (eds.), *Personhood in the Age of Biolegality: Brave New Law* (Palgrave MacMillan 2019), 187-204, 189.
[24]*Ibid.*
[25]Visa Kurki, *A Theory of Legal Personhood*, (Oxford: OUP), 44; Georgio Resta, *"Personnalité, Persönlichkeit, Personality"* 1(2014) European Journal of Comparative Law and Governance 215-243, 231.

incorporeal interests that every human being possess simply by virtue of being born. The emergence of 'personhood' and 'legal capacity' can be traced back to classical Rome, where legal subjectivity was granted based on the status of freedom, citizenship, and family. Roman persons were the free citizens of Rome, who were not under any sovereign power. They were characterized by the legal capacity to have the right of 'ownership'. Slaves, non-citizens, other members of the family fell into the intermediate space between persons and non-persons. Moreover, slaves were seen as 'persons which can be owned'. This resulted in a Western idea of personhood, characterized by property ownership.

Working its way through classical Roman philosophy, the Byzantine era, renaissance humanism, and enlightenment philosophy the concept of natural personhood has undergone several periods of change. It has transformed from the capacity to own to the right not to be owned. However, its historical legal design continues to be relevant, especially in how personhood is organized in market contexts, and most visibly in how personality interests are understood and governed in response to emerging technologies. In other words, personhood and property have been two sides of a coin in the Civilian tradition.

Even though personhood developed as a status-based exclusionary concept in European legal history, the protection of the intangible inner realm and incorporeal aspects of personhood has been central to civil law, and in particular through the development of tort law.[26] For example, damage to non-material personality interests was recognized in ancient Rome through the Roman delict *iniuria*. In other words, the civil law tradition conceptualized and protected the inner self through private law remedies and theories. However, it is important to note that Romans understood 'the inner' as intertwined with 'the outer.' The inner realm was understood and conceptualized primarily in its relation to economic and social status. For instance, compensation for damage to dignity, honour, and reputation were determined based on the social status of the victim as opposed to 'his' intrinsic value of being a human being.[27]

The modern interpretation of an inner self reflects Kantian philosophy, according to which humans can claim higher value because of their autonomy and identity.[28] As opposed to the Roman philosophy which emphasized the relationship between the inner and the outer, the Kantian emphasis on autonomy and identity sustains the binary view of personhood, composed of a separate inner self and the body. As such, the inner self becomes a closed and private sphere with a metaphysical nature.

On the one hand, the age of neurotechnology demonstrates that the concept of the inner self reflects how the brain as part of the corporeal body is integral to identity and autonomy. In this sense, it vividly illustrates the *"collapse of the traditional subject/object dichotomy"*.[29] On the other hand, even though its connection with the outer has been reconceptualized throughout European legal history, the inner self remained an essential component of natural persons. Accordingly, several private law mechanisms rooted in contract law and tort law doctrines were developed to protect and foster the inner realm.

The Protection of the Inner Self Through Personality Rights

Emerging and potential future threats arising from the increased usage of neurotechnologies are often characterized as violations of privacy, unfair data collection and usage, restriction of

[26]Resta, *supra* note 25, 35.
[27]Talya Deibel, "The Civil Law and the Inner Self: Roman Iniuria and the Transformation of the Private Sphere", (2024) *Journal of Civil Law Studies*, 54-95.
[28]Charles Foster and Herring Jonathan, *Identity, Personhood and the Law* (Springer, 2017) 23-24.
[29]Resta, *supra* note 25, 41.

freedom of thought, or discrimination.[30] Advances in neuroimaging and AI technologies will enable the large-scale collection and decoding of brain data in the future.[31] Such developments raise significant ethical and legal concerns, as brain data is directly connected to personhood and can lead to exploitative practices like neurosurveillance.

Moreover, this leads to the commodification of mental data and may potentially exacerbate intersectional challenges for more vulnerable groups such as women, immigrants, ethnic minorities, disabled individuals, people dealing with addiction and so on. The economic value of corporeal and incorporeal elements of personhood is a significant consideration of personality right regimes in today's surveillance capitalism. Yet, this is also simply a continuation of how the boundaries between patrimonial and extra-patrimonial rights, between alienable and inalienable, and between different material and immaterial spheres have been blurred since antiquity.[32]

The spheres theory, which was developed in German law, traditionally assumes that personality interests exist in separate, yet sometimes overlapping spheres such as the public sphere, the private sphere, and the intimate sphere.[33] Even though personal data can exist in every sphere, private law provides categorical protection for both the private and the intimate spheres . The private sphere refers to a rather wide area; it includes an outer layer which is in principle potentially open to the public, accessible without concern if others become aware of it. Moreover, it also contains an inner layer only shared with people with whom the data owner is in close relationship. The intimate sphere is characterized by secrecy and confidentiality. It refers to a realm which the person desires to keep only for herself or shared only with trusted individuals. This realm constitutes the most secluded part of the inner self and as such, may include sexual preferences, religious views, emotional states, beliefs and private thoughts. Potentially any violation of this area of the inner self might lead to discrimination and prejudicial treatment.[34] Yet, any interference with the broad private sphere is considered a violation of personhood.

Recognizing data as information that carries economic value highlights the essential role of contract law in protecting the inner self. For example, the private and the intimate spheres can substantially be limited with the data owner's consent. Yet, in order to foster autonomy and identity in the age of neurotechnology primary legal questions include: who has the right to control the exploitation of the mind and what are the limits of contractual freedom in relation

[30]Patrick O'Callaghan et al, "The Right to Freedom of Thought: An Interdisciplinary Analysis of the UN Special Rapporteur's Report on Freedom of Thought" 28 (2024) *International Journal of Human Rights* 1–23.
[31]Marcello Ienca and Gian Claudio Malgieri, "Mental Data Protection and the GDPR" *J. Law Biosci* 9(1) (2022) 1-19.
[32]Resta, *supra* note 25, 43. See the landmark *Marlene Dietrich* decision: BGH, 1-12-1999.
[33]See the elaboration of the Oberlandesgericht of Hamburg in 1967 (1967) O.L.G., N.J.W. 2314. In German law, the protection of privacy, private life, as well as personal data falls under the informational self-determination *(informationelle Selbstbestimmung*). See the Census decision of BGH. The self-determination in German legal theory is seen as a necessary component of personhood, which originated in private law and later migrated to the constitutional theory. The principle of self-determination is seen as a reflection of the corporeal self, becoming increasingly integral to the inner self. Resta, *supra* note 25, 41, 237;. For its application in Swiss law see Peter Jäggi, *Fragen des privatrechtlichen Schutzes der Persönlichkeit* (Basel Juristenvereins) 1960; Pierre Tercier, *Le Nouveau Droit de la Personnalité* (Schultess, 1984) 67.
[34]Muhl and Andorno, *supra* note 2, 2.

to personality interests, and what broader measures exist in the tort law ecology to protect the inner self?[35]

This is not a simple task as the boundaries between different spheres have always been context dependent. The advancements in neurotechnology and neurosciences create and sustain epistemic complexities which makes it difficult both to delineate the spheres, and to determine the consent of the data owner. The resulting complexity intensifies further when one considers the difficulties in anonymizing brain data especially in cross-domain data transfers. Current data protection measures, such as anonymization, are seen as inadequate for safeguarding individuals and personhood.

Moreover, brain data, as a type of biometric data, can also relate to groups, enabling third party inferences and potential discriminatory practices.[36] For this reason, human rights and neuroethics scholars have called for new frameworks to address the relationship between privacy, personal data, and neurotechnology.[37] Proposals include formally recognizing a 'right to mental privacy' and shifting from individualistic to more collective conceptions of privacy. This confirms that privacy exists in between separate spheres and it cannot be reduced to data protection laws. The techno-scientific practices of neurotechnology move privacy and personal data away from the individual and make it a social concern. The collective vision of privacy is aligned with a European private law theory which is suited to understand privacy as a social practice of freedom, allowing individuals to fully realise their potential. [38] This is different from the mainstream interpretation of privacy in American law, which defines it simply as 'the right to be let alone' or to be secluded. [39] In other words, the legal questions regarding the protection of the mental data illustrate the already ongoing shift from the *ex-post* individual approach of private law to an *ex-ante* collective protection model, with comprehensive delictual and contractual governance.[40]

Civilian legal theory protects personhood and personality interests against third party infringements, as well as against the right holder herself in cases where she may de facto consent to unacceptable violations. The legal interests and values associated with personhood are *ex ante* protected through a specific legal tool called 'personality rights' (*droits de la personnalité/Persönlichkeitsrechte*) in the civilian tradition. Personality rights refer to a bundle of subjective rights which give the right holder the power of sovereignty over her body and the inner self.[41]

The key term is the 'power of sovereignty' when it comes to understanding personality rights and their relationship to absolute freedom, which is especially central to the discussions around

---

[35]Resta, *supra* note 25, 46.
[36]Ienca and Malgieri, *supra* note 31, 19.
[37]Roger Brownsword, "Regulating Brain Imaging: Questions of Privacy, Informed Consent, and Human Dignity" in Sara Richmond, Geraint Rees and Sarah Edwards (eds.), I Know What You're Thinking. Brain Imaging and Mental Privacy (OUP 2012) 223-244.
[38]Resta, *supra* note 25, 238.
[39]James Q. Whitman, "The Two Western Cultures of Privacy: Dignity Versus Liberty" *Yale Law Journal* 113 (2004) 1151-1221; Samuel Warren and Louis Brandeis, "The Right to Privacy" *Harvard Law Review* 4 (1890) 193-220,193; Gert Brüggemeier, "Protection of Personality Rights in the Law of Delicts/Torts in Europe: Mapping Out Paradigms" in Gert Brüggemeier, Aurelia Colombi Ciacchi and Patrick O'Callaghan (eds.) *Personality Rights in European Tort Law* (CUP, 2010), 5-37.
[40]Resta, *supra* note 25, 38.
[41]Elspeth C. Reid, "Personality Rights: A Study in Difference" in Vernon Palmer and Elspeth Reid (eds.) Mixed jurisdictions Compared Private Law in Louisiana and Scotland. (Edinburg University Press, 2010) 387-410.

neurotechnology. The civilian theory of 'subjective rights' is modelled on ownership.[42] Doctrinal debates about their nature are characterized by the famous tension between theories of will and interest. The theory of will which is often attributed to Windscheid and Savigny takes the right as the power of will, granted by the positive law. The theory of interest, pioneered by von Jhering defines rights as interests that deserve legal protection.[43] Modern civil laws prefer a *media sententia* between these views and take rights as interests that are legally protected by granting subjects the power of will. When it comes to the protection of personhood and private property, this power of will is manifested as a form of sovereignty, which can only be restricted for particular reasons. In this framework, it reflects the complexity of recognizing a sphere of absolute sovereignty while simultaneously providing a limiting framework against its unethical utilization.[44]

This power of sovereignty is manifested in the legal realm as the right to ask others to refrain from any attack which violates her corporeal and incorporeal interests of personhood. These legal interests are primarily what make an individual 'human' and include bodily integrity, health, dignity, reputation, respect of the private sphere and personal data.[45] However in certain civilian jurisdictions they also include interests in image, voice, economic freedom, commercial reputation, as well as intellectual or artistic works. This creates doctrinal complexity as it becomes difficult to pinpoint a shared definition and content of personality rights in European legal theory.

In other words, there is no global consensus on the legal nature of personality rights. Some legal traditions accept that 'personality rights' refer to a general category of subjective rights, each of which demonstrates a separate character.[46] According to others there is only one personality right in essence and its concrete applications are scattered in various civil law instruments.[47] Practically, national and supranational private law designs include a variety of general and special clauses to protect personality interests as part of their normative private law design.

German, Dutch, and Austrian laws recognize a general personality right and regulate specific personality rights under individual provisions of their positive law.[48] The contemporary doctrine on personality rights and primarily its terminology is often attributed to German legal scholarship and its underlying Kantian influence. German law developed a theory of personality rights incorporating the protection of life, bodily integrity, health, freedom, honor, name, and image.[49] Yet, as Resta emphasizes, civilian personality rights doctrines are hybrid products of the interaction between German and French laws.[50]

---

[42]Resta, *supra* note 25, 47.
[43]Bernhard Windscheid and Theodor Kipp, *Lehrbuch des Pandektenrechts,* (Neudruck der Ausgabe Frankfurt am Main, 1906) (Aaalen 1963); Bernd Hüpers, *Karl Larenz Methodenlehrere und Philosophie des Rechts in Geschichte und Gegenwart* (Berliner, 2010) 370.
[44]Resta, *supra* note 25, 47.
[45]See Pfeifer v Austria [2007] ECHR 12566/03: *"a person's reputation constitutes a part of his/her personal identity and psychological integrity and therefore falls within the scope of private life."*
[46]Étienne E.H. Perreau, *Des Droits de la Personnalité* (Larose et Tenin, 1909).
[47]Klaus Martin, *Das Allgemeiner Persönlichkeitsrecht in seiner historischen Entwicklung* (Hamburg, 2007) 230-233.
[48]Neethling, *supra* note 11.
[49]Otto van Gierke, *Deutsches Priavatrecht Allgemeiner Teil und Personenrcht* (3. Auflage) (Humblot 1936) 355.
[50]Resta *supra* note 25, 228.

French civil law protects personhood through a general clause of extracontractual responsibility, and through the recognition of individual personality rights in the *Code Civil* (C.Civ.). According to C.Civ. Art. 1240, any action which causes harm to another creates an obligation to make reparation for it. In parallel, Art. 1241 suggests that everyone is liable for harm which caused intentionally or through negligence. In other words, French law does not have a concept of 'one general personality right'. However, it contains a general clause on delictual responsibility, applicable to violations of personality interests.[51] As such, it provides private law protection for the legal interests associated with personhood and recognizes rights such as privacy, identity, physical integrity, dignity and the protection of emotions in specific legal provisions.[52] This is a reflection of the natural law tradition and the judicial activism which centred around French law and the Romanist Code Napoléon.[53]

A third example is Swiss law, which presents us with a functional mixture of the German and French legal traditions. It contains a general clause recognizing personality rights and a general clause on extracontractual responsibility in Art. 41 *Obligationenrecht* (OR) in addition to several individual provisions scattered throughout the *Zivil Gesetzbuch* (ZGB).[54] Swiss law's usage of general clauses makes it an important case study when analysing the modern theory of personality rights today. Art. 27 ZGB reads: "*No person may, wholly or in part, renounce his or her legal capacity or his or her capacity to act. (1) No person may surrender his or her freedom or restrict the use of it to a degree which violates the law or public morals. (2).*" Consequently, according to Art. 28 ZGB: "*Any person whose personality rights are unlawfully infringed may petition the court for protection against all those causing the infringement. (1) An infringement is unlawful unless it is justified by the consent of the person whose rights are infringed or by an overriding private or public interest or by law. (2)*"[55]

There are several reasons why the Swiss model is specifically relevant when considering future legal challenges which can potentially arise through the intensive usage of neurotechnology. First, it emphasizes freedom and sovereignty when it comes to the legal essence of personality protection. Second, it contains provisions which are formulated in an open and general manner. This gives the positive law provisions flexibility and dynamism. It permits the norm to be changed, adjusted, and recalibrated for the needs of the era, based on a variety of extra-legal requirements such as social, economic, moral, and technological ones. Today when the integration of digital technology with minds creates uncertainties and challenges existing definitions, flexibility and openness become essential.[56] Accordingly, the protection of the inner self can be interpreted as implied in the Swiss formulation of personality rights.

This is because Swiss law presents us with a clear model which does not limit personality interests *numerus clausus*. In the civilian tradition, the determination and balancing of legal interests in question becomes part of the judicial duty. The usage of open and general clauses permits the judge to fill the gap and to complement the legal system through interpretation. Judicial interpretation becomes a particularly important and sensitive activity in the age of neurotechnology because of how technology creates uncertainties for individuals outside of the

[51]Geneviève Viney, *Introduction à la Responsabilité* (Traité de Droit Civil) (4. Édition, LGDJ, 2019)
[52]Resta, *supra* note 25, 228.
[53]André Tunc, "Grand Outlines of the Code Napoleon", *Tulane Law Review* 29(3) (1954-1955), 431-452; Alain Levasseur, "Code Napoléon or Code Portalis" *Tulane Law Review* 43(4) (1968-1969), 762-774.
[54]Resta, *supra* note 25, 36.
[55]For the official translation in English see https://www.fedlex.admin.ch/eli/cc/24/233_245_233/en. (last access: 26.11.2024)
[56]Tercier, *supra* note 33.

epistemic community of neuroscience and AI. As a result, the primary activity carried out by legal scholars inevitably becomes interpretation. This includes hermeneutical and semantical work to clarify the legal concepts, determine legal interests at stake, find out the applicable legal rules and decide the modus of their application. Swiss law in this sense presents a forward-looking, yet realistic approach suitable for socio-technological transformations. This guides the judge in establishing a Jheringian balance of interests at stake *in concreto,* and as such is also complementary to the protection of fundamental rights.

The complexities and differences in personality rights theories are often traced back to the late medieval recontextualization of Roman law in Europe. For instance, the Germanic reception of Roman law also known as *usus modernus pandectarum* contributed to the development of a different legal tradition from the Romanist Code Napoléon which embodied natural law. However, despite the differences, the civilian doctrine on personality rights reflects certain common characteristics and demonstrates a level of homogeneity in how personhood is protected.[57]

First, even though personality rights may have a constitutional legal basis in some legal systems, they are fundamentally private law rights by nature, protected through private law mechanisms such as delicts/torts and contracts. Second, they are highly personal and closely connected to the holder. As such they are in principle non-transferable, non-hereditable, and non-patrimonial.[58] Individuals may incur patrimonial loss. Moreover, personality interests protected by personality rights may include patrimonial elements. However, by nature, the civilian tradition accepts that personality rights do not have patrimonial character.[59]

In parallel, personality rights have a monopolistic nature. For example, while more than one person can jointly own a thing, personality rights cannot be shared.[60] Third, they are in principle absolute.[61] They create *erga omnes* obligations. The legal interests protected by personality rights are seen as *d'ordre public*, and, as such, deserve absolute protection. This means every other juridical subject, including the right holder herself, is obliged not to obstruct the enjoyment of these rights. These *erga omnes* obligations also characterize property rights, often referred to as *rights in rem*.[62]

As explained above, the absolute nature of personality rights does not mean that they can never be restricted. Rather, it emphasizes the scope of their strong protection and symbolizes that the core elements which constitute personhood are ethically inalienable. It is instructive to note that even though damage to personality interests was recognized in ancient Rome through

---

[57]Resta, *supra* note 25, 219; Koen Lemmens, "The Protection of Privacy Between a Rights Based and a Freedom-Based Approach: What the Swiss Example Can Teach Us" *Maastricht Journal of European and Comparative Law* 10(4) (2003), 381-403, 394.
[58]Gierke, *supra* note 49.
[59]Neethling *supra* note 11, 240.
[60]One exception is the *droits moral* and their transfer to the family members. Agnès Lucas-Schloetter, *Droit Moral et Droits de la Personnalité: Étude de droit Comparé Français et Allemande* (Paris 1, 2000): Brüggemeier, *supra* note 39, 1; Lemmens, *supra* note 53, 390.
[61]Pierre Tercier, *Contribution a l'Étude du Tort Moral et de Sa Reparation en Droit Civil Suisse* (Fribourg 1971).
[62]Historically, the distinction between *rights in personam* and *rights in rem* dates back to the distinction between different types of Roman actions, *actiones in rem* and *actiones in personam*. *Actiones in personam* referred to the personal actions between two parties which arise from obligations, whereas *actiones in rem* were actions arising from the power of sovereignty of the claimant. William W. Buckland, *A Textbook of Roman Law from Augustus to Justinian* (CUP, 1950), 676; Reinhard Zimmermann, *The Law of Obligations: Roman Foundations of the Civilian Tradition* (OUP, 1996) 114.

iniuria, the term *'Persönlichkeit'* originated in the Enlightenment, and particularly in Kantian philosophy.[63] Resta traces this back in the tension between the Romanist and the Pandectist approaches to property.[64] The Pandectist school's approach to ownership and property were strictly limited to corporeal things, as opposed to the Romanist idea of property which could be established over both *res corporeales* and *res incorporeales*. As a pragmatic solution, the German theory of personality rights was developed to provide flexibility, so as to contain a variety of tangible and intangible legal interests aligned with the ideas of individualism and liberalism.

The term 'personality rights' is alien to the common law tradition. The protection of personhood in the Anglo-American legal theory is intertwined with an idea of negative civil liberties.[65] As such, in common law jurisdictions personality interests are protected through the recognition of individual rights and tort law protection of physical and mental integrity. For instance, the common law takes the legal protection of reputation and privacy as a starting point for safeguarding personhood.[66] Privacy is characterized as a right to be isolated, to be protected from the unauthorized intrusion of the private sphere, and an area of non-interference.[67] Yet, in parallel to the civilian tradition personality interests are protected through tort law. Torts which include but are not limited to assault, battery (direct application of force), false imprisonment, negligent infliction of injury, defamation (libel and slander), intentional infliction of mental suffering, breach of confidence and misuse of private information are well-equipped to protect personhood and the inner self.

In the Anglo-American sphere, personhood is often seen as an absolute right of self-ownership, which is a reflection of the Lockean self-possessive individual. [68] Yet, in the civilian legal tradition personality rights belong to a category clearly distinct from property rights. On the one hand, this perspective creates a conceptual and a logical problem where the right and its subject become indistinguishable. In Roman law, the bodies of free people were considered outside the realm of property rights. This principle which became the fundamental component of human dignity and the Kantian non-instrumentalism stemmed from natural law and was grounded in rational equity.[69] On the other hand, the patrimonial character of rights over the human body have been a central discussion in the European legal tradition in several contexts such as slavery or the categorization of the biological material in the age of biotechnology.[70] Today, in parallel, considering the legal implications of the protection of the inner self through personality rights *prima facie* requires revisiting these boundaries to be able to limit the commodification of humans and to safeguard human dignity, while also compensating victims from any injuries to the incorporeal elements of personhood.

2. Conceptualizing Damage to the Inner Self

The protection of personhood in private law guarantees two meta interests: freedom and existence. Each personality right above all secures the individual's right to freedom and right

[63]Immanuel Kant, *The Metaphysics of Morals* (trans. Gregor, Mary). (CUP, 1996).
[64]Resta *supra* note 25, 230- 232.
[65]Resta, *ibid,* 242.
[66]Resta *supra* note 25, 34.
[67]Warren and Brandeis, *supra* note 39.
[68]Kant, *supra* note 63; Rohan Hardcastle, *Law and the Human Body: Property Rights, Ownership, and Control* (Hart Portland, 2007).
[69]Brüggemeier, *supra* note 39, 20.
[70]Resta, *supra* note 25, 53; Sakari Tamminen and Eric Deibel, *Recoding Life* (Routledge, 2018).

to have a dignified life. These meta interests are so essential, that personality rights are not only protected against third parties, but also against the right holder herself. Primarily, personality interests are protected against external violating actions through tort law remedies.

Tort law provides protection against any harm to personality as well as infringement of personality rights.[71] It is predominantly accepted that delictual actions are compensatory by nature. Their primary purpose is not to punish the wrongdoer but to compensate the loss incurred due to the harmful action. The compensation is not supposed to be a method of enrichment of the victim. Accordingly, the compensation matches the loss and cannot in principle be set above its upper limit.[72] Moreover private law theory does not necessarily require free will and voluntary actions for establishing extra-contractual responsibility. Strict liability and liability without fault are illustrations of how extra-contractual responsibility law objectively aims to compensate the loss, and not primarily to punish the wrongdoer is secondary.

Nonetheless, the civilian protection of personhood has historically demonstrated both compensatory and punitive elements. For instance, the *actio iniuriarum* which provided protection against the infringement of corporeal and incorporeal personality interests was an action of dual character: it was both punitive and compensatory. Rooted in Roman *iniuria*, today compensatory actions against the violation of personality rights and particularly the inner realm aim to soothe the feelings of the victim. Therefore, they are sometimes referred to as actions *vindictam spirans* (actions which satisfy the feeling of vindication).[73] The compensation covers pecuniary elements, including material damage such as medical bills or loss of profit, as well as non-material damage such as emotional pain and suffering or mental anguish.[74] These are phenomena which belong to the inner sphere, and which cannot be in principle accurately quantified in economic terms.

As explained above, in the French and Swiss legal traditions, recovery from damage to personality interests is regulated through general clauses on extra-contractual responsibility. This gives more discretion to judges and provides them with a large space for judicial interpretation for determining the existence of the normative elements. Accordingly, general rules on extra-contractual responsibility emphasize that any person who unlawfully causes damage to another, whether wilfully or negligently, is obliged to provide compensation.[75] Yet, there are many examples of what can turn an unlawful act into a lawful one, including medical necessities, lawfully given consent, and overarching public or personal interests.[76] The application of neurotechnology in medicine can often be seen as an example of overarching public and personal interests, as the use of technology secures the individual's right to life and right to health.

---

[71]Although torts are civil law wrongs specific to common law jurisdictions, this paper uses the same terminology to refer to both civilian and common law traditions for conceptual harmony. The official translation of the Swiss ZGB and OR also prefers to use 'tort law' to refer to the law of delicts for practical reasons. https://www.fedlex.admin.ch/eli/cc/24/233_245_233/en (last access: 26.11.2024) Zimmermann, *supra* note 62.

[72]An exception to this rule is punitive damages. For instance, treble damages are widely applied in EU competition law. *See* Cass Civ II 28 Oct 1954, JCP 55 - Ed G II, 8765.

[73]Andreas von Tuhr, *Allgemeiner Teil des Schweizerischen Obligationenrechts* (Schulthess ,1984) 126.

[74]Bettina Hürlimann-Kaup and Jörg Schmid, *Einleitungsartikel des ZGB und Personenrecht* (3. Auflage, (Schulthess, 2016)

[75]Olivier Moréteau, "French Tort Law in the Light of European Harmonization" *Journal of Civil Law Studies* 6 (2013) 759-797, 769.

[76]Wrongfulness is established by weighing up the conflicting interests. Neethling *supra* note 11, 219.

The German BGB does not contain a general provision on delictual responsibility. This has historical reasons and is in particular often attributed to the tension between Germanist representatives of the historical school such as Gierke and Kohler who advocated for a general personality right as opposed to Romanist Savigny. The German historical school was characterized by the desire to uncover the Romanist jurisprudence, separated from its Canonical elements to establish modern German jurisprudence.[77] In classical Roman law, law of delicts was intertwined with criminal law, as delicts were seen as *crimina privata*.[78] Following the Roman tradition where delicts were subject to the principle of *numerus clausus*, the 19th century design of BGB initially did not contain any express mention of the protected interests in the inviolability of personality and the provisions on delicts were designed much narrower than other Continental civil codes.[79]

The German *Bundesgerichtshof* only recognized a general personality right in 1954 towards all kind of unlawful violations based on Article 1(1) (Dignity) and Article 2(1) (Right to free development of one's personality) of the German Constitution (*Grundgesetz*).[80] One reason of this change in jurisprudence was the advancements in technology, which permitted small scale cameras and voice recorders to enter into highly personal spheres of individuals. The second, and primary, reason was the social context after WW2 and the change in the German constitution in 1949 on the protection of human dignity, honour, and self-determination.[81] Swiss law, which was heavily influenced by German jurists, in particular Larenz and Canaris, followed the German constitutional developments. In this sense, a general personality right was recognized as the basis of the protection of personhood, ancillary to general clauses in tort law.[82]

The tort law protection of personality rights primarily manifests in the protection of physical integrity. This is an extension of natural personhood based on embodiment, as a prerequisite of the right to exist and the right to life. Historically, physical integrity was seen as having a material and physical value as opposed to the metaphysical inner realm. However, today, the right to physical integrity includes mental integrity and psychological continuity.[83] This is a result of the co-constitutive relationship between law and technology. Decades-long developments in scientific areas, including psychology, physiology, anatomy, endocrinology, and radiology, establish that many incorporeal elements which belong to the inner self are already represented in the physical material realms such as change in the physio-chemical states of the body. Scientific measurements such as electrical activity, hormones, and neurotransmitter matters are indicative of physical harm when there is damage to the inner self. A wide interpretation of physical integrity is emblematic of how law acknowledges the relationship of the inner self to the exterior realm. Accepting otherwise would be to sustain the

---

[77]Brüggemeier, *supra* note 39, 9.
[78]Deibel, *supra* note 27.
[79]Heinrich Hübmann, *Das Persönlichkeitsrecht* (Böhleau, 1967), 288; Neethling *supra* note 11, 211.
[80]See BGHZ 13 334. The art. 1 of the European Charter of Fundamental Rights is derived from the art 1 of the German Constitution (Grundgesetz). Also see Resta, *supra* note 25, 38; Chantal Mak, "Europe-Building Through Private Law: Lessons from Constitutional Theory", *European Review of Contract Law* 3(2010), pp. 321-341.
[81]Brüggemeier, *supra* note 39.
[82]In German legal theory this aspect was referred as being a '*mutterrecht*'. Neethling, *supra* note 11, 212.
[83]These interests are considered under the 'right to respect for private life' by the broad interpretation of the ECtHR. This had a transformative affect in private law scholarship by demonstrating how to carefully limit or extend the protection of personhood. *Handyside v. the United Kingdom*, judgment of 7 December 1976; *McFeeley & Ors v. the United Kingdom*, 15 May 1980; Dudgeon v. the United Kingdom, judgment of 22 October 1981; *Niemietz v. Germany*, judgment of 16 December 1992.

often-challenged mind and body dualism, rooted in Cartesian philosophy. Yet, for tort law scholarship, the manifestation of the damage in the external realm is necessary to be able to assess physical integrity.

In other words, because of how the natural person is conceptualized in law, bodily integrity is still considered a primary element, whereas psychological integrity is secondary. Nevertheless, they are intertwined and separated by a false normative boundary. The violation of the physical integrity of the person, such as the destruction or removal of the body parts, simultaneously constitutes an attack on mental integrity, and on the inner self. In this context, today, neurotechnology presents private law scholarship with an opportunity to develop a novel interpretation of 'the inner self'. On the one hand, it has the potential to dismantle the distinction between mental and physical injury, as the developments in neuroscience suggest that all injury is fundamentally physical and provides more advanced ways of detecting injury.[84] On the other hand, the relationship of the 'interior' realm to the exterior is not always accurately captured solely by neuroscience and requires a pluralistic analysis.

The risks and challenges to the inner self are particularly high in consumer and workplace neurotechnologies. These legal relations are built on information and power asymmetries, which create additional complexities that cannot be sufficiently addressed by a purely personal or contractual governance regime.[85] Harm to physical and mental integrity can be caused by product defects or simply by their technical vulnerability, and hazardous characteristics. Neurotechnologies are seen as vulnerable due to poor design choices, like hardcoded passwords.[86] This leads to questions of safety, extending to 'the mind'. One example of the potential consequences of the cyber-security weaknesses of neurotechnologies is unauthorized access to the mind. For example, there might be third party bad faith 'hacking' of another person's neurotechnological device, as a strong and radical illustration of invasion of personality rights.[87] As highlighted by Gierke, any unauthorised interference to personhood, including the mind and intellectual activities would constitute an invasion of the person's existence.[88]

When it comes to consumer neurotechnologies, damage arising from software flaws or failure to supply necessary upgrades against cybersecurity risks in neurotechnological implants, can be claimed through product liability. Similarly, if a neurotechnological implant is defective and vulnerable to hacking, and the defect causes damage to other bodily components such as the brain, the damage can be claimed under product liability. However, this does not exclude traditional fault-based liability.[89] The potential risks are amplified when considering extreme interconnectivity between agents.[90]

---

[84]Peter A. Alces, *The Moral Conflict of Law and Neuroscience* (University of Chicago Press, 2018)
[85]Resta, *supra* note 25, 62.
[86]Andrea Matwyshyn, "The Internet of Bodies", *William and Mary Law Review*, 61 (2019), 77- 167, 112.
[87]Jens Clausen et al, "Help, hope, and Hype: Ethical Dimensions of Neuroprosthetics" *Science* 356 (6345)(2017). 1338-1339
[88]Peter R. Handford, "Moral Damage in Germany." *International and Comparative Law Quarterly* 27(4) (1978), 849-875, 856.
[89]Muireann Quigley and Laura Downey, "Integrating the Biological and the Technological: Time to Move Beyond Law's Binaries?" in Edward Dove et al (eds.), *Law and Legacy in Medical Jurisprudence* (CUP 2022) 279-306, 285.
[90]Matwyshyn introduces the term 'Internet of Bodies' to illustrate the new hybrid society. Jones emphasizes the possibility of using everyday brain-to-brain interfaces, using a combination of EEG and transcranial magnetic

A significant development is the new EU Product Liability Directive, which explicitly recognizes medically acknowledged psychological harm as a form of personal injury.[91] The Directive eases the burden of proof by introducing the rebuttable presumptions of defectiveness and causation, thereby providing consumers with stronger legal protections. Under the Directive, a product's defectiveness or the causal link between its defectiveness and the damage may be presumed when it is excessively difficult to prove them due to the scientific complexity of the product, or when it is 'likely' that the product is defective or that there is a causal link to the damage. Even though the current legal framework is still based on the medical and neuroscientific understanding of the mind, the 'likelihood' standard, combined with the techno-scientific complexity of neurotechnology products, makes psychological damage resulting from the use of defective neurotechnologies a key area for future tort law cases.

Historically, legal issues arising from the complex interaction of science, technology, and society have required innovative legal solutions which were aligned with the general theory of private law. Examples from French, German, and Swiss law include strict liability models in respect of one's sphere of control, duties of care, equity, ultra-hazardous nature of technologies, or based on the economic analysis of law such as holding the cheapest cost avoider liable.[92] These solutions are designed to be sector-specific and innovation-sensitive as there is no one-size-fits-all approach. Yet, they also illustrate a pattern in how they are pragmatically designed to govern and foster innovation.

The central problem for tort law will not be maintaining a sphere into which others cannot penetrate but fostering autonomy and identity in this new techno-scientific society. This might require generating new strict liability rules to secure cognitive liberty, or simply adopting a broad interpretation of damage to the inner self to be able to disincentivize exploitative behaviour. This would illustrate how tort law remedies not only have reactive character, but also provide a preventive framework of governance against present and future challenges.[93]

The inner self in private law refers to a broader concept than the neuroscientific mind; it also encompasses the psyche, identity, emotions, and the sense of self, which deserve legal protection, especially considering that the home and workplace usage of neurotechnology exacerbates potential risks of harm. The following case will illustrate how tort law can reposition itself when the knowledge is uncertain and when there is a risk of severe harm to the broad understanding of the inner self due to increasing usage of neurotechnologies.

3. Moral Damage

One instrument that the civilian legal theory offers when dealing with potential harm to the inner self is recovery from moral damage. The term moral damage refers to the immaterial harm inflicted on the incorporeal elements of personhood. In European legal systems, this covers a broad range of qualitative damage such as deprivation of freedom, mental anguish,

---

stimulations in the near future. Bublitz, *supra* note 12; Matwyshyn *supra* note 86, 131; Jones, *supra* note 117, 1344.

[91] See Art.6. of 2024/2853 Directive (EU) 2024/2853 of the European Parliament and of the Council of 23 October 2024 on liability for defective products and repealing Council Directive 85/374/EEC.

[92] Guido Calabresi and Douglas Melamed, "Property Rules, Liability Rules, and Inalienability: One View of the Cathedral" 85(6) (1972) *Harvard Law Review,* 1089-1128.

[93] Resta, *supra* note 25, 38.

damage to honour, reputation, dignity, emotional suffering, experience of pain, and extreme and intolerable fear.[94]

A subjective perspective takes the damage to the inner self as the primary characteristic of the moral damage whereas an objective approach focuses on the violation of personality interests as the basis for compensation.[95] Nevertheless, in practice, the infringement of incorporeal personality interests is often seen as insufficient to claim moral damages. The consequence of the violation is required to be reflected in one's inner self, often in the form of emotional pain. This does not necessarily require the power of judgment or the full mental capacity of the victim. For instance, individuals who lack mental capacity can be eligible for moral damages, which can be claimed through their legal representative.[96] This illustrates the punitive function of the tort law remedies which protect personality rights.

In this context, recovery for moral damage is intended to remedy the intolerable distress that occurs in the inner self, and as such secures the personality rights of the injured party. These examples typically relate either to the victim's freedom and existence or to their emotional world. In this context, recovery for moral damage also guarantees the protection of the intimate sphere. For instance, the EU General Data Protection Regulation (GDPR) provides that a person who *"suffered material or non-material damage as a result of an infringement of this Regulation"* shall have the right to compensation.[97] Such a close relationship with the intimate sphere gives the moral damage its inevitable subjective character which also makes it inseparable from the individual's inner self. Similarly, it also illustrates the 'intrinsic worth of the inviolate personality', as emphasized by Warren and Brandeis when conceptualizing the nature of the 'right to privacy'.[98]

The development of moral damages in European law is often analysed in relation to emerging technologies, particularly through the increase in personality rights violations in mass media.[99] Nevertheless, the doctrine of the recovery for moral damage is underutilized for several reasons. In European tort laws, recovery for non-material damage, particularly damages from honour, reputation, or emotional pain and suffering, are seen as *ultima ratio*. They are often treated as the last resort because of their subjectivity and complexity.[100] For example, German law explicitly recognizes compensation for non-material damage only in exceptional cases such as intentional damage to bodily integrity, health, sexual self-determination, and freedom. According to §253 BGB, the injured party is entitled to demand equitable compensation for non-pecuniary loss only in exceptional cases. Similarly in French and Swiss law, it is accepted that the violation of physical integrity *per se* creates damage to the inner self and allows one to claim moral damages. The damage is assessed independently from the damage to bodily integrity even though the recuperations are complementary to each other.[101]

---

[94] Katri Anniki Havu, "Damages Liability for Non-material Harm in EU Case Law", *European Law Review,* 44(4), (2019), 492-514

[95]Karl Oftiner, *Schweizerisches Haftpflictrecht* (2. Auflage, Zürich Polygraphischer Verlag, 1962), 286.

[96]See the Swiss Federal Court's decision on this matter: BGE 108 II 422.

[97]Art. 82 Regulation (EU) 2016/679 of the European Parliament and of the Council of 27 April 2016 on the protection of natural persons with regard to the processing of personal data and on the free movement of such data, and repealing Directive 95/46/EC.

[98]Resta, *supra note 25*, 36.

[99]Tercier, *supra* note 33; Resta *supra* note 25, 25.

[100]Helmut Koziol and Reiner Schulze (eds.), *Tort Law of the European Community* (Vienna: Springer, 2008); James Gordley and Arthur Taylor von Mehren, *An Introduction to the Comparative Study of Private Law* (1st edition, CUP, 2009).

[101]Henri Deschenaux and Pierre Tercier, *La Responsabilité Civile* (Stämpfli, 1982)

The general reluctance to using moral damages as a justification of the protection of the inner self is aligned with the Kantian morality based on which the ideational elements belonging to the inner sphere cannot, and should not, be quantified. Moreover, as we have just seen, in exceptional cases recognized in German law, the quantification is done for the sake of equity and not for restitutive purposes.

The late 19th century design of the BGB intentionally excluded a general provision that allows victims to obtain a civil remedy for moral damage. One reason for this was the change of character of Roman *iniuria,* which initially provided recovery for moral damage to the inner self. To be specific, Roman *actio iniuriarum* provided civil (and criminal) remedies in case of damage to incorporeal personality interests such as honour (*honor*), reputation (*fama*), dignity (*dignitas*), and the violation of the mental integrity. However, the medieval re-conceptualizations of *iniuria* changed in character in Canon law. Its Christian interpretation prioritized its function as providing remedies for insults, which were seen as a violation of divine law. This affected the moral and legal significance of *actio iniuriarum* during the preparatory stages of the BGB.[102]

Accordingly, the German legal practice on the recovery for non-material damage was first developed *contra legem*. Judicial creativity was necessary as BGB was inadequate to provide appropriate remedies for the infringements of personality interests, after the recognition of the general personality right in the Basic Law. However, early cases in German law which remedied moral damage involved the protection of the reputation of 'businessmen' who were socially influential.[103] This illustrated the intertwined relationship between the intrinsic and instrumental reasons which lie behind the protection of the inner self. Moreover, it presented a clear continuity with the Roman approach where the *actio iniuriarum* provided protection against non-material damage to the inner self, but at the same time, determined its value based on gender and socio-economic status of the parties.

In contrast to the German legal tradition, French and Swiss laws do not limit the types of damage which can be claimed.[104] As such, general rules on extra-contractual responsibility establish liability both for material and non-material damage. However, this involves a two-stage process including the determination of non-pecuniary loss and the calculation of compensation. Whereas the first stage is general and abstract, the second stage inevitably requires a subjective and external evaluation based on general life experiences. The case-specific evaluation, primarily based on previous court decisions, includes the victim's job, economic status, public reputation, and similar socio-economic determinants.[105]

The quantification of monetary compensation involves a comprehensive assessment. The determinative criteria encompass the infringement's intensity, duration, gravity, and pertinent external contextual circumstances.[106] In addition, in practice a claim for moral damages also requires a threshold of culpability as either intention (*dolus*) or gross negligence (*culpa lata*). This evaluative methodology facilitates the precise calculation of the compensation that remains independent of any material damage incurred. Yet, as recovery for moral damage goes

[102]Handford, *supra* note 88, 855; Oftinger, *supra* note 95.
[103]RG, 28-10-1910, in RGZ 74, 308 (1910); BGH, 14-2-1958; Resta, *supra* note 25, 50; Handford, *ibid,* 870.
[104]Brüggemeier, *supra* note 39, 11; Eva Steiner, *French Law A Comparative Approach* (OUP 2018), 251.
[105]*See* BGHZ 26 349; NJW 1965 685.
[106]Oftinger, *supra* note 95, 295-296.

through a process of externalization, this results in the damage to the inner self and private sphere not being assessed on equal grounds with material harm.[107]

In other words, German law presents us with different characteristics to French and Swiss law in how it approaches the recovery of moral damages. Yet, certain transhistorical patterns are traceable when we look at comparative tort law. First, the protection of the inner realm from unauthorized harmful actions can in practice only be provided through a process of externalization. The damage to the inner self becomes quantifiable in its social and economic context. This is an illustration of how personality rights and other private law instruments such as contracts and property are complementary in a capitalistic market order.

Second, the main function of the moral damage is the restoration of equity. The primary purpose of compensation is the restoration of the economic and legal situation to the state that would have prevailed had the act in question not occurred, is the primary purpose of compensation for material harm. This objective can be achieved through in-kind restitution, such as injunctive relief, and if such measures prove to be insufficiently remedial, through monetary award.[108] However when it comes to moral damage, the purpose of compensation becomes the reversal of the negative effects suffered.[109] The developments of Roman *iniuria* confirm that the purpose of moral damages is not to restitute the victim *in integrum,* but rather to mitigate its negative consequences in the inner self. Accordingly, equitable satisfaction is provided to soothe the injured person's feelings. This aspect is highlighted in the EU Law when the courts award damages based on a 'fair evaluation *ex aequo et bono*' or 'on an equitable basis'.[110]

One challenge in the determination of moral damages is the difficulty of approaching the values and the core elements of personhood as monetizable elements. First, it is impossible to determine the true amount of the loss, as it pertains to the metaphysical domain of the inner self. This makes it difficult to demonstrate that the damage is actual and certain, and not speculative.[111] Second, it is against Kantian morality, as it has a commodifying effect. These criticisms are valid in case the function of the moral damage is seen as providing full compensation. However, as demonstrated above, moral damages have a *sui generis* nature as they are both punitive and restitutive in character.[112] Moreover, accepting otherwise runs the risk of depriving the victim of legal protection.

On the one hand, the integration of neurotechnologies with human bodies is seen as a challenge to the existing complexity of tort law when it comes to assessing moral damages. The key legal questions involve defining the status of the neurotechnological devices that integrate with the body and extend the mind. This legal classification affects the nature and amount of liability, whether it is fault-based or vicarious liability. Damage to a person's personhood can warrant higher compensation than property damage, as harm to bodily integrity has more serious moral consequences as part of right to health and right to life.[113] At the same time, any physical

[107]Descheneaux and Tercier, *supra* note 101.
[108]Handford, *supra* note 88, 852-854.
[109]Havu, *supra* note 94.
[110]*See* Safa Nicu (T-384/11) EU:T:2014:986 at [92]; Kendrion (T-479/14) EU:T:2017:48 at [135].
[111]Havu, *supra* note 94.
[112]Oftinger, *supra* note 95, 292.
[113]Muireann Quigley and Semande Ayihongbe, "Everyday Cyborgs: On Integrated Persons and Integrated Goods" *Medical Law Review,* 26(2) (2018) 276-308.

damage caused by neurotechnologies will also constitute damage to one's inner self, potentially including the mind, psyche, sense of identity, and dignity.[114] This creates complexities in determining non-material damage as well as the amount of the loss and compensation, For example the replacement value of a neurotechnological device may fail to capture the full extent of the user's loss.[115]

On the other hand, neuroscientific data is predicted to be used to measure pain and suffering in order to determine a 'more accurate level of compensation'. To be able to claim moral damages, the victim is required to prove the existence of the elements of extra-contractual responsibility such as the violation of the personality right, damage, causality, and fault, or in case there is an applicable strict liability regime, its special conditions.[116] In this context, advancements in neuroscience might offer a potential tool to demystify certain elements of the inner self. As demonstrated above, there has been a lack of objective and reliable criteria for measuring non-material damage such as from emotional pain and suffering and this has fundamentally shaped the civilian tort law doctrines, as well as causing legal battles in common law tradition.[117] The existence and severity of emotional anguish, pain, and suffering is usually seen as dependent upon the victim's report. In other words, it depends on a manifestation as a reaction to the infringement of the personality interests.

Neuroscientists today argue for the possibility of being able to distinguish between people in pain and people not in pain emotionally, mentally, or physically. For example, the fMRI technology is seen as suitable for scanning the blood supply of brains, which provides information about active brain tissue and the state of pain. This is potentially transformative for future tort law scholarship.[118] Furthermore the same type of analysis is also applicable to the fetuses and comatose patients, who are in principle not seen as conscious, and as such not capable of pain and emotional suffering. This can be a step towards the objectification of moral damages. Nevertheless, it also illustrates how, when it comes to personality rights, it is impossible to fully distinguish the inner and the outer realms. This is an insight which will inevitably become part of discussions in tort law scholarship and shape new doctrines on the potential recovery for damage to the inner self.

Comparative legal scholarship offers alternative remedies as inspirations for future regulations. One tool from German law is §826 BGB, which makes any conduct that causes damage *contra bonos mores* actionable. This paragraph primarily targets economic loss; however, §826 BGB can also be used to remedy the infringement of personality interests as a last resort.[119] The same principle is more broadly recognized in Swiss law. Art. 41 (2) OR provides that *"a person who wilfully causes damage to another in an immoral manner is likewise obliged to provide compensation."*[120] The prohibition of acts that are *contra bonos mores* is ancillary to the general principle of good faith and the state's duties to protect the individuals in their private legal relationships.[121] Even though *contra bonos mores* refers to a different category than

[114]Robert Young, "Autonomy and the 'Inner Self'" *American Philosophical Quarterly* 17 (1) (1980), 35-43.
[115]Quigley and Ayihongbe, *supra* note 113; Quigley and Downey, *supra* note 89, 291.
[116]Tercier, *supra* note 33,106-108.
[117]Owen D. Jones, "The Future of Law and Neuroscience", *Wm. & Mary L. Rev* 63 (2022). 63, 1317-1345.
[118]Jones, *ibid,* 1329.
[119]Handford, *supra* note 88, 857.
[120]For the official translation in English see https://www.fedlex.admin.ch/eli/cc/24/233_245_233/en (last access: 26.11.2024).
[121]Dieter Medicus and Jens Petersen, *Allgemeiner Teil des BGB*, (C.F. Müller, 11. Auflage, 2016) 67; Resta, *supra* note 25, 39.

simply *mala fide* behaviour, they heavily overlap. Accordingly, this doctrine could be used in cases such as damage to the inner realm in case the conditions to claim for non-material damages have not been established.

These examples are to be considered in the light of private law's role, a role that is not only protective but also transformative.[122] Private law does not only provide the institutional conditions to allow for the effective exercise of fundamental rights; it also reconfigures the common morality of the new technoscientific society through its governance frameworks and judicial interpretation. This is especially relevant considering that policy decisions and regulatory instruments still reflect older values of liberalism, primarily based on economic considerations of not inflicting heavy burdens on certain powerful actors.[123] Therefore, a techno-sensitive conceptualization of the inner self in private law would contribute to the existing set of instruments that aim to minimize risks of violations of the personal sphere, while also incentivizing innovation.[124] The advancements in neuroscience exacerbate already existing ambiguities, stemming from the complex characteristics of the inner self in law. But private law is well-equipped to provide tailored governance structures though its generative creativity.[125]

Conclusion

The emergence of neurotechnologies presents profound challenges to traditional legal frameworks, compelling a critical re-evaluation of private law's foundational concepts. The migration of the medical neurotechnology into the consumer sphere and workplace, as well as cross-border data transfers create ethical and legal challenges. This article has demonstrated that legal governance of disruptive technologies requires a nuanced, historically informed, and comparative approach to law.

This article started with an urgent legal question: how can private law reposition itself vis-à-vis potential harm caused by the usage of neurotechnologies? The governance of emerging technologies is one of the primary concerns of law and technology scholarship.[126] To be able to answer this question, this paper revisited comparative law, especially examples from the French, German, and Swiss legal traditions. These present us with illustrations of judicial creativity in adjusting their national tort law mechanisms to the necessities of the era. The key lies in recognizing that legal systems have consistently evolved in response to technological advancements of different eras. The complexity of neurotechnology requires similarly innovative legal solutions which are tailored to specific sectors and technological advancements rather than one-size-fits-all approaches.[127]

Moreover, this paper sought to use the concept 'the inner self' to conceptualize the damage to personality interests which can potentially be caused by neurotechnologies. Accordingly, it analysed the violation of mental and psychological integrity and moral damage as examples of

---

[122]Martijn Hesselink, *Justifying Contract in Europe: Political Philosophies of European Contract Law* (OUP, 2021), Ernest Weinrib, *Reciprocal Freedom: Private Law and Public Right* (OUP, 2022)
[123]Handford, *supra* note 88, 715.
[124]Resta, *supra* note 25, 39; Pierre Tercier, *Traité de Droit Privé Suisse, II/1*, (Helbing Lichtenhahn, 2008.), 202.
[125]Resta*, supra* note 25, 62.
[126]Sheila Jasanoff, "Serviceable Truths: Science for Action in Law and Policy" *Texas Law Review* 95 (2015) 1723-1749, 1745.
[127]Quigley and Ayihongbe, *supra* note 113, 290.

harm to the inner self, which can be remedied through various instruments offered by private legal theory and practice. Ultimately, the governance of neurotechnologies demands judicial creativity, nuanced understanding, and a dynamic conception of personality that can adapt to technological transformations while preserving the essential core of personhood.

Accordingly, this paper argued that the solution does not reside in creating entirely new legal constructs, such as new rights, but in creatively applying existing legal principles. The theory of personality rights and its tort law protection provide a critical framework, emphasizing that legal personhood transcends mere technical categorization. By drawing on comparative and historical legal perspectives, scholars and practitioners can develop tailored and context-sensitive approaches to govern neurotechnologies.

The main challenge is establishing a delicate balance between fostering technological innovation while simultaneously protecting the inner self. This requires a sophisticated approach that goes beyond simple regulatory models, acknowledging the blurred boundaries between human and technology, inner and outer spheres, and mind and body through a variety of perspectives, including legal philosophy, legal history and comparative law.