

Neuro-Interventions in Criminal Justice: An Analysis of Article 3 ECHR

Naomi van de Pol*

☞ Consent; Inhuman or degrading treatment or punishment; Medical treatment; Necessity; Neuroscience; Rehabilitation of offenders; Torture

Abstract

Neuro-interventions are under consideration for use in the near future in criminal justice contexts, in order to rehabilitate offenders and reduce recidivism rates. However, potential use of neuro-interventions raises concerns about human rights, specifically the offender's physical and mental integrity. This article will therefore consider whether the framework provided by art.3 of the European Convention on Human Rights offers protection for offenders against state-initiated neuro-interventions. As there is no case law on this topic (yet), this article draws an analogy with medical procedures in detention. Based on this analogy, the article discusses three factors used by the European Court of Human Rights to decide on medical interventions (consent, medical necessity and manner of execution) and analyses to what extent these would be applicable in the context of neuro-interventions. Although art.3 seems to provide a degree of protection against neuro-interventions, a number of lacunae in the Court's current case law are identified.

Introduction

Recidivism rates worldwide are high. In the Netherlands, for instance, about 70% of all criminal cases concern people who have been convicted or otherwise sanctioned by the prosecution before.¹ This is a problem because recidivism imposes a heavy burden on society as crime leads to physical, emotional, financial and social costs.² Society therefore values rehabilitating offenders and reducing recidivism. Current interventions aim to target a variety of causes of recidivism, such as societal factors (like poverty and lack of education) and psychological characteristics (like problems with impulse-control). In scholarly literature, a novel approach to rehabilitation has been proposed: neuro-interventions that aim to alter the brain.³ These interventions are not yet employed for rehabilitation purposes, but they may become available in the near future.

Although emerging neuro-interventions may contribute to successful rehabilitation, they also give rise to fundamental questions. In particular, they raise concerns about offenders' human rights, such as their

* PhD Candidate Criminal Law, Utrecht University, Willem Pompe Institute for Criminal Law and Criminology, Utrecht Centre for Accountability and Liability Law. The author would like to thank Gerben Meynen, Antoine Buyse and Johannes Bijlsma for their comments on earlier versions of this article. This article is part of the project Law and Ethics in Criminal Justice (LENC), funded by the Dutch Research Council (NWO), project number VI.C.201.067.

The views expressed in the material contained in the European Human Rights Law Review are not necessarily those of the Editors, the Editorial Board, the publisher, or other contributors.

¹ G. Weijters et al, *Recidive onder justitiabelen in Nederland. Verslag over de periode 2006-2018* (Wetenschappelijk Onderzoek- en Documentatiecentrum, 2019), p.12.

² M.A. Cohen, *The Costs of Crime and Justice*, 2nd edn (New York: Routledge, 2005), p.121; S.S. Yeh, "Cost-benefit analysis of reducing crime through electronic monitoring of parolees and probationers" (2010) 38(5) *Journal of Criminal Justice* 1090; A. Chalfin, "Economic Costs of Crime" in *The Encyclopedia of Crime & Punishment* (Hoboken: John Wiley & Sons Ltd, 2015), p.1.

³ F. Focquaert, "Neurobiology and crime: A neuro-ethical perspective" (2019) 65 *Journal of Criminal Justice*; E. Shaw, "Neuroscience, Criminal Sentencing, and Human Rights" (2021) 63 *William & Mary Law Review* 1409.

autonomy, dignity, privacy, and physical and mental integrity.⁴ More precisely, the question is whether, and if so, to what extent, the current human rights framework provides protection for offenders against the (coerced) application of neuro-interventions.

This article aims to contribute to answering this question. In this article, which is limited in its scope to Europe for reasons of feasibility, the focus will be on the normative framework provided by the European Convention on Human Rights (ECHR/the Convention). Although neuro-interventions potentially interfere with a variety of ECHR principles (such as autonomy, dignity, privacy and identity), this article will focus on neuro-interventions from the perspective of physical and mental integrity, reflected in arts 3 and 8 of the Convention. As this article will zoom in on more severe human rights interferences, it will specifically discuss art.3—which has, although recognised as relevant, not yet received thorough attention in the literature. The main question to be answered in this article is: does art.3 ECHR offer protection for detainees against state-initiated neuro-interventions, and if so, to what extent?

The article is structured as follows. Section 2 will define the neuro-interventions relevant for this article and highlight their key characteristics. Section 3 will explain in more detail the concerns about physical and mental integrity that have been raised in the literature regarding neurotechnological development and the relevance of art.3 ECHR in this respect. Section 4 will discuss the general legal framework of art.3. In section 5, an analogy is drawn between neuro-interventions and medical procedures in detention. This analogy yields three factors that the European Court of Human Rights (ECtHR/the Court) uses to determine whether such medical procedures fall within the scope of art.3 ECHR: consent, medical necessity and manner of execution. Section 5 will describe how these factors could be applicable in the context of neuro-interventions. From this analysis, the legal implications and boundaries of neuro-interventions will be established. Section 6 will draw conclusions.

Neuro-interventions

Neuro-interventions are interventions that change a person's brain characteristics, for instance they can increase or decrease a person's brain activity.⁵ They are already used in the medical domain to treat some neurological and psychiatric disorders such as Parkinson's disease, epilepsy and clinical depression.⁶ In literature, their potential use in the criminal justice system as a means to reduce recidivism is a topic of legal and ethical debate.⁷ For instance, Canavero argues that neuro-interventions could be used as an intervention for psychopaths and repeat offenders.⁸ Similarly, Fuss and others write that sex offenders with paraphilic disorders might be eligible candidates for neuro-interventions, as those offenders have a high risk for serious offences and to date there are few treatment options (with limited side-effects) available.⁹

⁴ D. Hübner and L. White, "Neurosurgery for Psychopaths? An Ethical Analysis" (2016) 7(3) *AJOB Neuroscience* 140; J. Ryberg, "Neuroscience, mind reading and mental privacy" (2017) 23 *Res Publica* 197; G. Meynen, "Ethical Issues to Consider Before Introducing Neurotechnological Thought Apprehension in Psychiatry" (2019) 10(1) *AJOB Neuroscience* 5; and G. Meynen et al, "Neurotechnology to reduce recidivism: Ethical and legal challenges" in *Handbook of Clinical Neurology* (Amsterdam: Elsevier, 2023).

⁵ F. Focquaert, "Neurobiology and crime: A neuro-ethical perspective".

⁶ S. Kim et al, "Closed-Loop Neuromodulation for Parkinson's Disease: Current State and Future Directions" (2020) *IEEE Transactions on Molecular, Biological and Multi-Scale Communications* 209; A. Schulze-Bonhage, "Brain stimulation as neuromodulatory epilepsy therapy" (2017) 44 *Seizure* 169; P.E. Holtzheimer and H.S. Mayberg, "Neuromodulation for treatment-resistant depression" (2012) 4 *F1000 Medicine Reports*.

⁷ C. Chew, T. Douglas and N.S. Faber, "Biological interventions for crime prevention" in *Treatment for crime: Philosophical essays on neurointerventions in criminal justice* (Oxford: Oxford University Press, 2018), p.11; L. Hofhansel et al, "Stimulating the criminal brain: Different effects of prefrontal tDCS in criminal offenders and controls" (2020) 13(4) *Brain Stimulation Journal* 1117; S. Lighthart et al (eds), *NeuroLaw: Advances in Neuroscience, Justice and Security* (Cham: Palgrave Macmillan, 2021).

⁸ S. Canavero, "Criminal minds: neuromodulation of the psychopathic brain" (2014) 8 *Frontiers in Human Neuroscience*.

⁹ J. Fuss et al, "Deep brain stimulation to reduce sexual drive" (2015) 40(6) *Journal of Psychiatry Neuroscience* 429.

Neuro-interventions might contribute to the rehabilitation of offenders because neurological research has demonstrated that certain brain characteristics correlate with behaviour linked to criminality.¹⁰ For example, reduced activity in the prefrontal cortex is associated with antisocial behaviour, especially aggression and impulsivity.¹¹ As neuro-interventions can change those brain characteristics, they may—at least in theory—lead to improved behaviour.¹² For example, a neuro-intervention targeting the prefrontal cortex has been shown to reduce aggression in a forensic population in a research setting.¹³

Neuro-interventions come in various forms, but this article will focus on neuro-interventions that modulate brain activity through the targeted delivery of electrical stimulation to specific brain regions, often referred to as neurostimulation or neuromodulation.¹⁴ Electrical stimulation can be delivered to targeted brain areas in different ways. Since electric currents can pass through the skull, neuromodulation can be non-invasive. For example, transcranial direct current stimulation (tDCS) is a form of neuromodulation that delivers electricity to the brain through electrode pads on the scalp.¹⁵ Another non-invasive form of neuromodulation is transcranial magnetic stimulation, which transfers electrical stimulation to a targeted brain region through a magnetic coil that is placed close to the scalp.¹⁶ tDCS and TMS are relatively safe and simple techniques with no serious side-effects.¹⁷

To influence brain activity in deeper brain regions, a more invasive method can be employed: deep brain stimulation (DBS). This is a neurosurgical treatment in which an electrode is implanted in a specific brain region. The electrode is connected with a subcutaneous wire to an electrical neurostimulator that is implanted under the skin, usually beneath the collar bone. Through the stimulator, the implanted electrode can deliver electrical stimulation to adjust brain activity.¹⁸ Although DBS is generally safe and effective, risks and potential side-effects such as infection and headache do exist.¹⁹

The Protection of Physical and Mental Integrity

Neuro-interventions, in principle, offer a number of potential benefits; more successful rehabilitation of convicted offenders, including lower recidivism rates and ultimately a safer society.²⁰ However, they also

¹⁰ A.L. Glenn and A. Raine, “Neurocriminology: Implications for the punishment, prediction and prevention of criminal behaviour” (2014) 15 *Nature Reviews Neuroscience* 54; R.J.R. Blair, “Neuroimaging of Psychopathy and Antisocial Behaviour: A Targeted Review” (2010) 1 *Current Psychiatry Reports* 76.

¹¹ J.R. Fanning et al, “Neural correlates of aggressive behavior in real time: A review of fMRI studies of laboratory reactive aggression” (2017) 4 *Current Behavioral Neuroscience Reports* 138; A. Calzada-Reyes et al, “EEG abnormalities in psychopath and non-psychopath violent offenders” (2013) 20 *Journal of Forensic & Legal Medicine* 19.

¹² Most likely in combination with other interventions as criminal behaviour has complex origins that are not only related to the offender’s brain. See: R. Knehans et al, “Modulating Behavioural and Self-Reported Aggression with Non-Invasive Brain Stimulation: A Literature Review” (2022) 12(2) *Brain Sciences* 200; C.S. Sergiou et al, “Transcranial direct current stimulation (tDCS) as an intervention to improve empathic abilities and reduce violent behaviour in forensic offenders: study protocol for a randomized controlled trial” (2020) 21(1) *Trials* 1.

¹³ C.S. Sergiou et al, “Transcranial direct current stimulation targeting the ventromedial prefrontal cortex reduces reactive aggression and modulates electrophysiological responses in a forensic population” (2022) 7(1) *Biological Psychiatry: Cognitive Neuroscience and Neuroimaging* 95.

¹⁴ M. Inca, *Common human rights challenges raised by different applications of neurotechnologies in the biomedical fields* (Committee on Bioethics of the Council of Europe, 2021) 1, 17; Chew, Douglas and Faber, “Biological interventions for crime prevention” in *Treatment for Crime: Philosophical essays on neurointerventions in criminal justice* (2018), p.30.

¹⁵ L. Van Boekholdt et al, “tDCS peripheral nerve stimulation: a neglected mode of action?” (2021) 26(2) *Molecular Psychiatry* 456.

¹⁶ A. Curtin et al, “A systematic review of integrated functional near-infrared spectroscopy (fNIRS) and transcranial magnetic stimulation (TMS) studies” (2019) 13 *Frontiers in Neuroscience*.

¹⁷ P. Sudbrack-Oliveira, L.B. Razza and A.R. Brunoni, “Chapter One—Non-invasive cortical stimulation: Transcranial direct current stimulation (tDCS)” (2021) 159 *International Review of Neurobiology*.

¹⁸ A.M. Lozano et al, “Deep brain stimulation: current challenges and future directions” (2019) 15(3) *Nature Review Neurology* 148.

¹⁹ See for example F.P. Martinho, G.S. Duarte and F.S. do Couto, “Efficacy, effect on mood symptoms, and safety of deep brain stimulation in refractory obsessive-compulsive disorder: a systematic review and meta-analysis” (2020) 81(3) *Journal of Clinical Psychiatry*.

²⁰ See for example Sergiou et al, “Transcranial direct current stimulation targeting the ventromedial prefrontal cortex reduces reactive aggression and modulates electrophysiological responses in a forensic population” (2022) 7(1) *Biological Psychiatry: Cognitive Neuroscience and Neuroimaging* 95.

raise fundamental concerns about human rights, specifically about the physical and mental integrity of the person undergoing the intervention.²¹

The right to physical integrity, the inviolability of the physical body, is a well-established principle in both ethical and legal thinking.²² For example, the ECtHR has established a fairly rich legal doctrine on informed consent necessary for medical treatments which by their very nature interfere with physical integrity.²³ Physical integrity refers to the right of each human being to have self-determination over their own body and to be free from interferences with their body which they did not consent to. As neuro-interventions interfere with the body (the brain), they have the potential to violate a detainee's physical integrity, especially if applied coercively.

Mental integrity, as part of art.3 (the prohibition of torture and inhuman and degrading treatment) and art.8 (the right to respect for private life) of the ECHR, has been defined in different terms.²⁴ The right covers, at least, the protection of mental health, mental stability and reputation, and protects against certain kinds of mental suffering and harm.²⁵ Mental integrity is not as developed as physical integrity in case law and literature because the majority of human rights traditionally pertain to the visible, outside world and therefore protect physical objects and actions.²⁶ As our minds used to be inaccessible to others, less attention has been directed towards the internal and mental domain, such as emotions, intentions, and other mental states.²⁷ For instance, many constitutions and conventions guarantee the right to physical integrity, but only a small number afford express protection to mental integrity.²⁸ With the emergence of new and more advanced (neuro)technologies, our mental world is becoming more and more accessible, both in terms of neural information that can be obtained and neuronal activity that can be changed. Protection for mental integrity will therefore need to be considered, as recognised by the United Nations and the Council of Europe.²⁹

In order to provide protection (for minds) against emerging neurotechnologies, it has been argued that the law must recognise a specific right to mental integrity. Some scholars assert that a novel human right (a neuroright) must be created. They argue that existing human rights are insufficient to offer adequate legal protection from emerging neurotechnologies, because at the time these rights were created, no one

²¹ Ienca, *Common human rights challenges raised by different applications of neurotechnologies in the biomedical fields* (Committee on Bioethics of the Council of Europe, 2021) 50; D. Hübner and L. White, "Neurosurgery for Psychopaths? An Ethical Analysis"; M. Ienca and R. Andorno, "Towards new human rights in the age of neuroscience and neurotechnology" (2017) 13(5) *Life Sciences Society and Policy* 1.

²² T. Douglas and L. Forsberg, "Three Rationales for a Legal Right to Mental Integrity" in *NeuroLaw: advances in neuroscience, justice and security* (Cham: Palgrave Macmillan, 2021), p.179; J.C. Bublitz and R. Merkel, "Crimes Against Minds: On Mental Manipulations, Harms and a Human Right to Mental Self-Determination" (2014) 8(1) *Criminal Law and Philosophy* 51; Ienca and Andorno "Towards new human rights in the age of neuroscience and neurotechnology" (2017) 13(5) *Life Sciences Society and Policy* 1.

²³ *Glass v United Kingdom* (App. No.61827/00), judgment of 9 March 2004; (2004) 39 E.H.R.R. 15; *VC v Slovakia* (App. No.18968/07), judgment of 8 November 2011; (2014) 59 E.H.R.R. 29; *MAK v United Kingdom* (App. Nos 45901/05 and 40146/06), judgment of 23 March 2010; (2010) 51 E.H.R.R. 14.

²⁴ Sometimes, the Court also refers to "mental" and "moral" integrity, but the case law suggests that psychological, mental, and moral integrity are interchangeable terms (see K. de Vries, "Right to Respect for Private and Family Life", in *Theory and Practice of the European Convention on Human Rights*, (Antwerp: Intersentia, 2018), p.690).

²⁵ J.C. Bublitz, "The Nascent Right to Psychological Integrity and Mental Self-Determination" in *The Cambridge Handbook of New Human Rights: Recognition, Novelty, Rhetoric* (Cambridge: Cambridge University Press, 2020), p.387; *Bensaid v United Kingdom* (App. No.44599/98), judgment of 6 February 2001; (2001) 33 E.H.R.R. 10; S. Ligthart, "De mens in detentie. Over de relevantie van het recht op mentale integriteit" in *Opstellen over menselijkheid in het strafrecht* (Den Haag: Boom Juridisch, 2022); *Pfeifer v Austria* (App. No.12556/03), judgment of 15 November 2007; (2009) 48 E.H.R.R. 8; P. Tiedemann, *Philosophical Foundation of Human Rights* (Cham: Springer Nature Switzerland, 2020), pp.140–151.

²⁶ Bublitz, "The Nascent Right to Psychological Integrity and Mental Self-Determination" in *The Cambridge Handbook of New Human Rights: Recognition, Novelty, Rhetoric* (2020); S. Michalowski, "Critical Reflections on the Need for a Right to Mental Self-Determination" in *The Cambridge Handbook of New Human Rights: Recognition, Novelty, Rhetoric* (Cambridge: Cambridge University Press, 2020), p.404.

²⁷ J.C. Bublitz and R. Merkel "Crimes Against Minds: On Mental Manipulations, Harms and a Human Right to Mental Self-Determination" (2014) 8(1) *Criminal Law and Philosophy* 61; S. Ligthart, *Coercive Brain-Reading in Criminal Justice: An Analysis of European Human Rights Law* (Cambridge University Press, 2022), p.248.

²⁸ One of the few provisions that explicitly mention mental integrity are art.3 of the Charter of Fundamental Rights of the European Union and art.17 of the United Nations Convention on the Rights of Persons with Disabilities.

²⁹ Ienca, *Common human rights challenges raised by different applications of neurotechnologies in the biomedical fields* (Committee on Bioethics of the Council of Europe, 2021) 37; United Nations, *Our Common Agenda: Report of the Secretary General* (2021); see also: Shaw, "Neuroscience, Criminal Sentencing, and Human Rights" (2021) 63 *William & Mary Law Review* 1409.

could have foreseen the possibilities neurotechnology currently offers.³⁰ For example, Ienca and Andorno argue that mental integrity should be reconceptualised to a broad term, not only guaranteeing access mental health schemes for individuals with mental conditions (which they argue is how the ECtHR understands the right), but also safeguarding the right of all individuals to protect their mental domain from potential harm.³¹ Bublitz and Merkel propose a similar right: the right to mental self-determination. In its negative dimension, this is a right against mental manipulations and severe, non-consensual intrusions (like the right to mental integrity), and in its positive dimension, it is a freedom to self-determine one's inner realm.³² In the same vein, Sommaggio and Mazzocca argue that the concept of cognitive liberty—the right to control one's own mind—must be integrated into the current human rights framework.³³

Others argue that mental integrity is already sufficiently embedded in existing human rights law, and that current human rights are able to offer adequate legal protection from neurotechnologies. For example, Michalowski states: “While it is hard to argue against the suggested importance of the rights and interests to be protected by a right to mental self-determination, this is not sufficient justification for the creation of a new right, as long as the relevant rights and interests are already sufficiently protected through already existing rights”.³⁴ She refers to arts 3 and 8 ECHR, in which physical and mental integrity are implicitly embedded. Similarly, Lighthart and others argue that novel human rights are not necessary because existing rights will “rule out the obviously impermissible uses of brain-reading, and provide the resources for deciding on others”.³⁵ Although the ECHR does not explicitly mention mental integrity, this principle is thus implicitly embedded in various rights and freedoms. Article 3 in particular protects against *severe* interferences with physical and mental integrity, and may be relevant for the possible employment of neuro-interventions in criminal justice.

Article 3 ECHR: The Prohibition of Ill-treatment

The prohibition of ill-treatment in art.3 ECHR—“No one shall be subjected to torture or to inhuman or degrading treatment or punishment”—is one of the most fundamental provisions in the Convention. It has the core purpose of protecting a person's dignity and personal integrity.³⁶ The fundamental character of the prohibition is affirmed by the fact that art.3 ECHR is absolute.³⁷ This means that infringements can never be justified:

“the philosophical basis underpinning the absolute nature of the right under Article 3 does not allow for any exceptions or justifying factors or balancing of interests, irrespective of the conduct of the person concerned and the nature of the offence at issue.”³⁸

³⁰ Lighthart, *Coercive Brain-Reading in Criminal Justice: An Analysis of European Human Rights Law*, (2022), p.248.

³¹ Ienca and Andorno, “Towards new human rights in the age of neuroscience and neurotechnology” (2017) 13(5) *Life Sciences Society and Policy* 18; *Bensaid v the United Kingdom* (App. No.44599/98), judgment of 6 February 2001 at [47].

³² Bublitz and Merkel, “Crimes Against Minds: On Mental Manipulations, Harms and a Human Right to Mental Self-Determination” (2014) 8(1) *Criminal Law and Philosophy* 60.

³³ P. Sommaggio and M. Mazzocca, “Cognitive Liberty and Human Rights” in *Neuroscience and Law: Complicated Crossings and New Perspectives* (Cham: Springer, 2020), p.95.

³⁴ Michalowski, “Critical Reflections on the Need for a Right to Mental Self-Determination” in *The Cambridge Handbook of New Human Rights: Recognition, Novelty, Rhetoric* (2020), p.409.

³⁵ S. Lighthart et al, “Forensic brain-reading and mental privacy in European human rights law: Foundations and challenges” (2020) 14(2) *Neuroethics* 191, 201.

³⁶ E. Webster, *Dignity, Degrading Treatment and Torture in Human Rights Law: the Ends of Article 3 of the European Convention on Human Rights* (London: Routledge, 2018), pp.51–52.

³⁷ *Chahal v United Kingdom* [GC] (App. No.22414/93), judgment of 15 November 1996 at [79]; (1997) 23 E.H.R.R. 413; see also H. Battjes, “In Search of a Fair Balance: The Absolute Character of the Prohibition of Refoulement under Article 3 ECHR Reassessed” (2009) 22 *Leiden Journal of International Law* 583.

³⁸ *Gäfgen v Germany* [GC] (App. No.22978/05), judgment of 1 June 2010 at [107]; (2011) 52 E.H.R.R. 1.

Even in difficult circumstances, for example when preventing terrorism, ill-treatment cannot be justified. Additionally, the victim's conduct cannot in any way be regarded as a justification for prohibited behaviour, even when they committed a serious criminal offence.³⁹

Not all forms of harsh treatment will fall under the scope of art.3 ECHR. Whether treatment elicits absolute protection depends on the level of suffering and humiliation involved. In order to violate art.3 ECHR, treatment must attain a *minimum level of severity*.⁴⁰ Even though the protection is absolute, this threshold is relative and depends on the circumstances of the case. Relevant factors to determine the severity of a treatment are the characteristics of the intervention, such as its intensity, duration, physical and mental effects, and the manner and method of its execution. Additionally, the context in which the treatment takes place can be taken into account, as well as characteristics of the victim, for instance age, sex and state of health.⁴¹ Furthermore, the minimum level of severity threshold is not static. As the ECHR is a living instrument, what treatment is considered to reach the minimum level of severity changes over time to adapt to present-day conditions and perceptions.⁴²

If a specific treatment reaches the threshold of art.3 ECHR, and therefore breaches the prohibition, it can be qualified as one of the three distinct but related forms of ill-treatment: torture, inhuman treatment and degrading treatment. The Court defines torture as the intentional infliction of severe pain or suffering, whether physical or mental, with the aim, inter alia, of obtaining information, inflicting punishment or intimidation.⁴³ Ill-treatment that does not have the sufficient intensity or does not have a specific purpose, will be classified as inhuman or degrading treatment. The notion of inhuman treatment covers “at least such treatment that deliberately causes severe suffering, mental or physical, which is in the particular situation is unjustifiable”.⁴⁴ The suffering must go beyond the inevitable element of suffering or humiliation connected with a given form of legitimate treatment.⁴⁵ Degrading treatment does not require the finding of any severe or long-lasting physical or mental effects, although the minimum level of severity must still be reached. There are several benchmarks to determine whether treatment was degrading:⁴⁶ if treatment humiliates or debases an individual, showing a lack of respect for, or diminishing his or her human dignity;⁴⁷ if it arouses a feeling of fear, anguish or inferiority, capable of breaking an individual's moral and physical

³⁹ *Gäfgen* [GC] (App. No.22978/05) (2011) 52 E.H.R.R. 1; *Chahal* [GC] (App. No.22414/93), judgment of 15 November 1996 at [79].

⁴⁰ *Gäfgen* [GC] (App. No.22978/05), judgment of 1 June 2010 at [101]; *Kudla v Poland* [GC] (App. No.30210/96), judgment of 26 October 2000 at [91]; (2002) 35 E.H.R.R. 11; *Ireland v United Kingdom* (App. No.5310/71), judgment of 18 January 1978 at [163]; (2018) 67 E.H.R.R. SE1; see also: N. Mavronicola, *Torture, Inhumanity and Degradation under Article 3 of the ECHR: Absolute right and absolute wrongs* (London: Bloomsbury Publishing, 2021), pp.90–92.

⁴¹ *Soering v United Kingdom* (App. No.14038/88), judgment of 7 July 1989 at [100] (1989) 11 E.H.R.R. 43; *Svinarenko v Russia* [GC] (App. No.32541/08 and 43441/08), judgment of 17 July 2014 at [114]; *Jalloh v Germany* [GC] (App. No.54810/00), judgment of 11 July 2006 at [67]; (2007) 44 E.H.R.R. 32; *Ireland v United Kingdom* (App. No.5310/71), judgment of 18 January 1978 at [136].

⁴² *Selmouni v France* [GC] (App. No.25803/94), judgment of 26 July 1999 at [100]–[101]; (2000) 29 E.H.R.R. 403; *Hénaf v France* (App. No.65436/01), judgment of 27 November 2003 at [55]; (2005) 40 E.H.R.R. 44; *X v Austria* [GC] (App. No.19010/07), judgment of 19 February 2013 at [139]; (2013) 57 E.H.R.R. 14.

⁴³ *Akkoc v Turkey* (App. Nos 22947/93 and 22948/93), judgment of 10 October 2000 at [115]; (2002) 34 E.H.R.R. 51; *Salman v Turkey* [GC] (App. No.21986/93), judgment of 27 June 2000 at [114]; (2002) 34 E.H.R.R. 17; see also: Y. Arai-Yokoi, “Grading scale of degradation: Identifying the threshold of degrading treatment or punishment under Article 3 ECHR” (2003) 21(3) *Netherlands Quarterly of Human Rights* 385, pp.388–389.

⁴⁴ Council of Europe, *The Greek Case: 12 Yearbook of the European Convention on Human Rights*, (The Hague: Springer Netherlands, 1969), p.186; C.M. De Vos, “Mind the gap: Purpose, pain, and the difference between torture and inhuman treatment” (2007) 14(2) *Human Rights Brief* 2, p.4.

⁴⁵ *Kudla v Poland* [GC] (App. No.30210/96), judgment of 26 October 2000 at [92]; (2002) 35 E.H.R.R. 11; *Soering v United Kingdom* (A/161) (App. No.14038/88), judgment of 7 July 1989 at [100].

⁴⁶ Webster, *Dignity, Degrading Treatment and Torture in Human Rights Law: the Ends of Article 3 of the European Convention on Human Rights* (2018), p.64.

⁴⁷ *Kudla GC* (App. No.30210/96), judgment of 26 October 2000 at [92]; *Ireland v United Kingdom* (App. No.5310/71), judgment of 18 January 1978 at [167]; *Campbell and Cosans v United Kingdom* (App. Nos 7511/76 and 7743/76), judgment of 25 February 1982 at [28]; *Pretty v United Kingdom* (App. No.2346/02), judgment of 29 April 2002 at [25]; (2002) 35 E.H.R.R. 1.

resistance;⁴⁸ if treatment has an adverse effect on personality;⁴⁹ and if one is being driven to act against one's will or conscience.⁵⁰

Neuro-interventions in light of Article 3 ECHR

In order to determine whether art.3 ECHR provides protection for offenders against state-initiated neuro-interventions, it must be assessed whether neuro-interventions reach the minimum level of severity. If neuro-interventions reach this threshold, they are absolutely prohibited under art.3. If neuro-interventions do not reach this threshold, they fall outside the scope of art.3, but art.8, the right to respect for private life, may still be applicable. To determine whether neuro-interventions reach the minimum level of severity, one must look at the factors that the Court uses to determine the severity of a particular treatment, of which some may be of particular relevance in case of neuro-interventions. However, no case-law yet exists on the use of neuro-interventions in criminal justice. In order to overcome this lack of research material, this article reviews cases that deal with comparable treatments and draws an analogy.⁵¹

For this analysis, neuro-interventions will be compared with medical procedures in detention. Medical procedures in this regard refer to activities performed on an individual with the intention to improve their health or save their life. Medical procedures were chosen as an analogy because they most closely resemble neuro-interventions, compared to all other procedures discussed in the Court's case law. Neuro-interventions and medical treatments both have a medical character: they influence a person's body, are performed in a medical setting, and require medical supervision. Accordingly, both have the potential to violate physical integrity. Examples of medical procedures in detention settings that will be used in this analysis are the forced feeding of a prisoner on hunger strike or the forced administration of neuroleptics to a mentally ill detainee in a psychiatric hospital.

From case-law on medical procedures in detention settings, three specific factors emerge as being relevant to the Court's assessment of whether a treatment has attained a minimum level of severity: consent, medical necessity and the manner of execution. Each will be discussed in the following sections.

Consent

The Court's case law indicates that medical interventions require, in principle, the valid consent of the patient. Enabling a patient to accept or refuse medical treatment allows them to retain their physical integrity, which is an integral part of art.3.⁵² In 2011, the Court confirmed this line of jurisprudence (as it has done repeatedly since then)⁵³ in a case about the forced sterilisation of a Romani woman:

“in the sphere of medical assistance, even where the refusal to accept a particular treatment might lead to a fatal outcome, the imposition of medical treatment without the consent of a mentally competent adult patient would interfere with his or her right to physical integrity.”⁵⁴

⁴⁸ *Pretty* (App. No.2346/02), judgment of 29 April 2002 at [52]; *Svinarenko v Russia* [GC] (App. Nos 32541/08 and 43441/08), judgment of 17 July 2014 at [115]; *Gäfgen v Germany* [GC] (App. No.22978/05), judgment of 1 June 2010 at [89]; *Ireland v United Kingdom* (App. No.5310/71), judgment of 18 January 1978 at [167].

⁴⁹ *Iacov Stanciu v Romania* (App. No.35972/05), judgment of 24 July 2012 at [165]; *Raninen v Finland* (App. No.20972/92), judgment of 16 December 1997 at [55]; *Nazarenko v Ukraine* (App. No.39483/98), judgment of 29 April 2003 at [125]; *Rohde v Denmark* (App. No.69332/01), judgment of 21 July 2005 at [90].

⁵⁰ *Keenan v United Kingdom* (App. No.27229/95), judgment of 3 April 2001 at [110]; (2001) 33 E.H.R.R. 38.

⁵¹ S. Ligthart, “Gedwongen brain imaging in de strafrechtspleging en artikel 3 EVRM: van analogie naar deductie” (2018) *Methoden van onderzoek in het strafrecht, de criminologie en de victimologie* 51.

⁵² *Pretty* (App. No.2346/02), judgment of 29 April 2002 at [63]; *Glass* (App. No.61827/00), judgment of 9 March 2004 at [70]–[72]; *Jehovah's Witnesses of Moscow v Russia* (App. No.302/02), judgment of 10 June 2010 at [135]; see also: S. Michalowski, “Article 3—Right to the Integrity of the Person” in *The EU Charter of Fundamental Rights: A Commentary* (London: Bloomsbury Publishing, 2014), p.39.

⁵³ *Csoma v Romania* (App. No.8759/05), judgment of 15 January 2013 at [42]; *Lopes de Sousa Fernandes v Portugal* [GC] (App. No.56080/13), judgment of 19 December 2017; see also: *YP v Russia* (App. No.43399/13), judgment of 20 September 2022.

⁵⁴ *VC v Slovakia* (App. No.18968/07), judgment of 8 November 2011 at [105].

For consent to be considered valid, three conditions must be fulfilled.

First, the detainee must have decision-making capacity.⁵⁵ This is the capacity to make a rational decision. For example, young age, unconsciousness and sometimes mental illness can impair decision-making capacity as these factors could cause a person to not fully comprehend the meaning of the information given to them.⁵⁶ When employing neuro-interventions in criminal justice, especially in the case of mentally ill detainees, it must thus be ensured that the detainee is mentally competent to consent.

Second, consent must be informed.⁵⁷ Detainees should be informed appropriately both in content and form, prior to the intervention. They should receive all the necessary information about their health status, the proposed intervention and any alternative treatments.⁵⁸ Moreover, all the potential health benefits and side effects of the treatment should be communicated, and not only those that are typical of the given type of intervention, but also those that may arise in connection with the individual characteristics of the detainee.⁵⁹

In the case of neuro-interventions, it is especially important to inform detainees about the unique characteristics and workings of these new technologies as these are likely to be unfamiliar to the detainee and may provide novel benefits and risks. Additionally, the choice to employ a neuro-intervention instead of an alternative (more well-known and less intrusive) rehabilitation method should be communicated. All the information has to be given to detainees in such a way that they are able to give informed consent.⁶⁰ For example, detainees should in principle be given time to think.⁶¹ Although not essential, the Court has recommended the use of a specific consent form to enhance legal certainty.⁶² It is wise to use such a form for neuro-interventions to ensure the detainee is given all the necessary information and to clarify what exactly the detainee has consented to.

A point of difficulty may be that neurotechnology is developing rapidly. It is hard to foresee all the future developments and possibilities, for example, long-term side-effects may be unknown. As a consequence, one may not be able to anticipate all the implications of giving consent.⁶³ The question arises whether authorities are able of providing detainees with really all the necessary information to obtain informed consent.

Third, consent should be free (or voluntary). Whether consent to neuro-interventions can be free, is a point of debate, especially in the context of detention. Individuals held in detention are in a vulnerable position by virtue of being within the control of the authorities.⁶⁴ Detainees are dependent on the authorities, for instance in terms of access to medical assistance, contact with the outside world, and other liberties.⁶⁵

⁵⁵ *Pretty* (App. No.2346/02), judgment of 29 April 2002 at [63]; *Herczegfalvy v Austria* (App. No.10533/83), judgment of 24 September 1992; (1993) 15 E.H.R.R. 437 at [82]–[86]; W. Buelens, C. Herijgers and S. Illegems, “The View of the European Court of Human Rights on Competent Patient’s Right of Informed Consent. Research in the Light of Articles 3 and 8 of the European Convention on Human Rights” (2016) 23(5) *European Journal of Health Law* 481, p.484.

⁵⁶ P.S. Appelbaum, “Assessment of patients’ competence to consent to treatment” (2007) 357(18) *New England Journal of Medicine* 1834; C. Barstow, B. Shahan and M. Roberts, “Evaluating medical decision-making capacity in practice” (2018) 98(1) *American Family Physician* 40.

⁵⁷ Article 5 of the Convention for the Protection of Human Rights and Dignity of the Human Being with regard to the Application of Biology and Medicine: “An intervention in the health field may only be carried out after the person concerned has given free and informed consent to it”.

⁵⁸ *VC v Slovakia* (App. No.18968/07), judgment of 8 November 2011 at [112].

⁵⁹ European Committee for the Prevention of Torture, *Report to the Czech Government on the visit to the Czech Republic carried out by the European Committee for the Prevention of Torture and Inhuman or Degrading Treatment or Punishment* (2009), para.25; L. Waddington and B. McSherry, “Exceptions and exclusions: the right to informed consent for medical treatment of people with psychosocial disabilities in Europe” (2016) 23(3) *European Journal of Health Law* 279, p.282.

⁶⁰ *Csoma v Romania* (App. No.8759/05), judgment of 15 January 2013 at [42]; *Trocellier v France* [GC] (App. No.75725/01), judgment of 5 October 2006 at [4]; *Codarcea v Romania* (App. No.31675/04), judgment of 2 June 2009 at [105].

⁶¹ *VC v Slovakia* (App. No.18968/07), judgment of 8 November 2011 at [112]–[113].

⁶² *Dvoráček v Czech Republic* (App. No.12927/13), judgment of 6 November 2014 at [104].

⁶³ Meynen, “Ethical Issues to Consider Before Introducing Neurotechnological Thought Apprehension in Psychiatry” 10(1) *AJOB Neuroscience* 9.

⁶⁴ *Denis Vasilyev v Russia* (App. No.32704/04), judgment of 17 December 2009; see also: Y. Al Tamimi, “The Protection of Vulnerable Groups and Individuals by the European Court of Human Rights” (2016) 5 *European Journal of Human Rights* 561, 570; A. Limanté, “Vulnerable Groups in the Case Law of the European Court of Human Rights”, in *Legal Protection of Vulnerable Groups in Lithuania, Latvia, Estonia and Poland: Trends and Perspectives* (Cham: Springer Nature Switzerland, 2022), pp.29 and 42.

⁶⁵ *Wenerski v Poland* (App. No.44369/02), judgment of 20 January 2009; *Popov v Russia* (App. No.26853/04), judgment of 13 July 2006; see also: Al Tamimi, “The Protection of Vulnerable Groups and Individuals by the European Court of Human Rights” (2016) 5 *European Journal of Human Rights* 570.

As a result, detainees are more vulnerable to being subjected to ill-treatment. In fact, the context in which most violations of art.3 ECHR occur is with respect to the treatment of detainees.⁶⁶ The authorities are therefore under a duty to protect (the rights of) detainees, and the Court applies a strict scrutiny to its assessment of treatment of detainees.⁶⁷

Because detainees are vulnerable, it can be questioned whether their consent can be truly free. They are under the control of the state, which has the power to improve their situation (e.g. allow parole) if they accept a certain treatment or intervention, or worsen their situation if they refuse. As detainees are susceptible to pressure,⁶⁸ they may be unable to refuse, possibly rendering their consent involuntarily given.⁶⁹ The fact that acquiring free consent in detention settings to state-controlled interventions may be problematic, also appears from the interpretations of free consent by the European Committee for the Prevention of Torture and Inhuman or Degrading Treatment or Punishment (CPT), on whose work the ECtHR often relies in this context, and by the European Court itself, as will be discussed below.

The CPT is a Council of Europe committee which visits places of detention to assess how persons deprived of their liberty are treated. The Court regularly uses CPT reports in its judgments about alleged violations of the prohibition of ill-treatment of detainees. For example, the CPT has written various reports on the forced chemical castration of sex offenders in the Czech Republic and Germany.⁷⁰ In these reports, the CPT concluded that:

“medical interventions, and in particular medical interventions which have irreversible effects on persons deprived of their liberty, should as a rule only be carried out with their free and informed consent. Given the particularly vulnerable position of persons deprived of their liberty in this regard, it should be ensured that the patient’s consent is not directly or indirectly given under duress and that the patient receives all the necessary information when making his decision. Furthermore, the Committee considers that the concept of free and informed consent is hardly reconcilable with a situation in which the options open to an individual are extremely limited: surgical castration or possible indefinite confinement in a psychiatric hospital.”⁷¹

From this follows that the CPT’s main concern regarding the voluntariness of consent given in detention is the fact that a situation can easily arise in which detainees, given their vulnerable position, acquiesce rather than consent.⁷² The CPT questions the voluntariness of consent if a detainee has only a limited set of options to choose from, especially if these options are undesirable.⁷³ Being given a choice between two undesirable options may feel similar to having no options at all. This is particularly true if one of the options includes long-term deprivation of liberty. Consent may then be instigated by fear of indefinite

⁶⁶ A. Reidy, *Human Rights Handbooks No. 6: The prohibition of torture. A guide to the implementation of Article 3 of the European Convention on Human Rights* (Council of Europe, 2003), pp.1 and 22.

⁶⁷ *Iwanczuk v Poland* (App. No.25196/94), judgment of 15 November 2001; Limantè, “Vulnerable Groups in the Case Law of the European Court of Human Rights” in *Legal Protection of Vulnerable Groups in Lithuania, Latvia, Estonia and Poland: Trends and Perspectives* (2022), pp.42–43.

⁶⁸ *Belevitskiy v Russia* (App. No.72967/01), judgment of 1 March 2007.

⁶⁹ Buelens, Herijgers and Illegems, “The View of the European Court of Human Rights on Competent Patient’s Right of Informed Consent. Research in the Light of Articles 3 and 8 of the European Convention on Human Rights” (2016) 23(5) *European Journal of Health Law* 485; M. Donnelly, *Healthcare Decision-Making and the Law. Autonomy, Capacity and the Limits of Liberalism* (Cambridge: Cambridge University Press, 2014), pp.59–60; M. Valapour, K.M. Paulson and A. Hilde, “Strengthening protections for human subjects: proposed restrictions on the publication of transplant research involving prisoners” (2013) 19(4) *Liver Transplantation* 362, 364.

⁷⁰ CPT, *Report to the Czech Government on the visit to the Czech Republic carried out by the European Committee for the Prevention of Torture and Inhuman or Degrading Treatment or Punishment* (2009); CPT, *Report to the German Government on the visit to Germany carried out by the European Committee for the Prevention of Torture and Inhuman or Degrading Treatment or Punishment* (2012).

⁷¹ CPT, *Report to the Czech Government on the visit to the Czech Republic carried out by the European Committee for the Prevention of Torture and Inhuman or Degrading Treatment or Punishment* (2007), para.109.

⁷² CPT, *Report to the Czech Government on the visit to the Czech Republic carried out by the European Committee for the Prevention of Torture and Inhuman or Degrading Treatment or Punishment* (2007), para.109; see also M.J. Farah, “Emerging ethical issues in neuroscience” (2002) 5 *Nature Neuroscience* 1123; K. Vanderzyl, “Castration as an Alternative to Incarceration: An Impotent Approach to the Punishment of Sex Offenders” (1994) 15 *Northern Illinois University Law Review* 107, 140.

⁷³ J. McMillan, “The kindest cut? Surgical castration, sex offenders and coercive offers” (2014) 40(9) *Journal Of Medical Ethics* 583, 585.

detention and the belief that the medical intervention in question may be the only way in which the detainee could ever be released.⁷⁴

The European Court has also addressed the question to which extent consent to medical interventions can be considered free. It has considered that a certain type of persuasion or coercion may always occur in case of medical interventions.⁷⁵ For example, a doctor's advice will most likely have an influence on a patient's decision to consent to or refuse a medical intervention.⁷⁶ According to the Court, whether or not persuasion or coercion invalidates consent depends on the facts of each case.⁷⁷ The context in which the medical intervention occurs is especially relevant. Consent may be involuntarily given whenever a patient is in a subordinate position so that a persuader has authority over the patient. This is for example the case in the military,⁷⁸ but also in detention settings.⁷⁹ Whether consent given by detainees was truly free must thus be thoroughly examined.

The Court has assessed the voluntariness of consent given in detention in different cases. For example in *Juhnke v Turkey*, a case about a forced genealogical examination in a Turkish prison, the Court determined that misleading (e.g., making a detainee believe the medical procedure is compulsory) renders consent involuntary.⁸⁰ Moreover, in cases about the forced collection of urine, blood and other genetic material, the Court determined that consent is involuntary if a proposal is accompanied by the threat that a refusal to cooperate would result in negative consequences such as disciplinary measures in detention or criminal liability.⁸¹ These cases illustrate that attaching a negative consequence to a refusal to undergo medical treatment can negate consent.

Another case of interest is *Dvořáček v Czech Republic* from 2014.⁸² This is the only case so far in which the Court had to decide on circumstances very similar to those in which neuro-interventions may be applied. The applicant in this case had been prosecuted on several occasions because of sexual offences against minors, owing to his hebephilia (a type of paedophilia aimed at children in early adolescence).⁸³ The Czech District Court ordered the applicant to undergo protective sexological treatment in a psychiatric hospital to alleviate the manifestations of his sexual disorder.⁸⁴ The applicant was given the choice between anti-androgen treatment (a form of chemical castration whereby a patient receives medication to lower testosterone levels and suppress sexual urges, much like a neuro-intervention) or psychotherapy. The anti-androgen treatment would decrease the applicant's risk of recidivism and allow for release within a relatively short period of time, whereas psychotherapy would reduce recidivism risk only after a longer period of time, thus leading to a longer deprivation of liberty. The applicant claimed he had been under psychological pressure to consent to the anti-androgen treatment.

In this case, the Court first affirmed that consent is a crucial factor to determine whether a medical intervention violates art.3:

⁷⁴ CPT, *Report to the Czech Government on the visit to the Czech Republic carried out by the European Committee for the Prevention of Torture and Inhuman or Degrading Treatment or Punishment* (2009); W. Green, "Depo-Provera, Castration, and the Probation of Rape Offenders: Statutory and Constitutional Issues" (1986) 12 *University of Dayton Law Review* 1; F. Focquaert, K. Van Assche and S. Sterckx, "Offering neurointerventions to offenders with cognitive-emotional impairments: Ethical and criminal justice aspects" in *Neurointerventions and the law: Regulating Human mental capacity* (Oxford: Oxford University Press, 2020), p.128.

⁷⁵ Buelens, Herijgers and Illegems, "The View of the European Court of Human Rights on Competent Patient's Right of Informed Consent. Research in the Light of Articles 3 and 8 of the European Convention on Human Rights" (2016) 23(5) *European Journal of Health Law* 484.

⁷⁶ E. Jackson, *Medical Law: Text, Cases and Materials* (Oxford: Oxford University Press, 2006), p.282; Donnelly, *Healthcare Decision-Making and the Law. Autonomy, Capacity and the Limits of Liberalism* (2014), pp.72–74.

⁷⁷ Buelens, Herijgers and Illegems, "The View of the European Court of Human Rights on Competent Patient's Right of Informed Consent. Research in the Light of Articles 3 and 8 of the European Convention on Human Rights" (2016) 23(5) *European Journal of Health Law* 485.

⁷⁸ *Larissis v Greece* (App. No.23372/94), judgment of 24 February 1998 at [51].

⁷⁹ *Juhnke v Turkey* (App. No.52515/9), judgment of 13 May 2008 at [76]–[77]; (2009) 49 E.H.R.R. 24.

⁸⁰ *Juhnke* (App. No.52515/9) (2009) 49 E.H.R.R. 24 at [76]–[77].

⁸¹ *Peters the Netherlands* (App. No.21132/93), report of 6 April 1994; *Dragan Petrovic v Serbia* (App. No.75229/10), judgment of 14 April 2020 at [79].

⁸² *Dvořáček v Czech Republic* (App. No.12927/13), judgment of 6 November 2014.

⁸³ *Dvořáček* (App. No.12927/13), judgment of 6 November 2014 at [7].

⁸⁴ *Dvořáček* (App. No.12927/13), judgment of 6 November 2014 at [8].

“In the present case, the main question ... is whether or not the applicant consented to the medicinal treatment with anti-androgens. If indeed there was informed consent, as alleged by the Government, no issue arises under Article 3 of the Convention.”⁸⁵

In its assessment of the case, the Court acknowledged that the applicant was faced with a difficult choice between taking anti-androgen drugs with the prospect of earlier release from hospital, and being treated by psychotherapy with the prospect of longer confinement. The fact that his options were limited and both his options had negative aspects made his choice a difficult one to make.⁸⁶ This difficult choice constituted a certain amount of pressure, which could lead to feelings of distress and frustration.⁸⁷ Nevertheless, the Court rejected the applicant’s claim that the medical intervention lacked consent because the anti-androgen treatment was justified on medical grounds and because it had not been established that the applicant had been pressured into undergoing the treatment.⁸⁸

The Court thus takes a different approach to consent than the CPT. Whereas the CPT finds that any form of duress or pressure in a criminal context is irreconcilable with free consent, the Court finds the fact that a detainee is presented with a difficult choice between two alternatives from which pressure emanates—because one option (chemical castration) is preferable (because of early release) to the other (psychotherapy, which could mean long-term detention)—insufficient to render consent involuntary.⁸⁹

To conclude, proposing neuro-interventions to detainees calls for increased vigilance because of their vulnerable position. It must be carefully considered whether consent is freely given to ensure compliance with art.3 ECHR. A neuro-intervention may not be proposed in combination with the threat of added negative consequences, such as disciplinary measures, if the detainee refuses. Even though no threats or deception are used, the proposal of a neuro-intervention can still place pressure on the detainee. Nevertheless, from *Dvořáček* follows that neuro-interventions most likely can be proposed as an additional treatment option that provides certain benefits, without invalidating consent. For example, neuro-interventions could in the future be proposed in exchange for early release or parole, or as an alternative to other therapies. However, caution is warranted. Because *Dvořáček* is one standalone case, it is too early to draw a definite general conclusion.

Medical Necessity

The second factor, according to the Court, to determine if a medical intervention falls within the scope of art.3 is the medical (or therapeutic)⁹⁰ necessity of an intervention. If a medical necessity exists, the treatment will most likely fail to reach the minimum level of severity, even when the person involved did not consent to the treatment.⁹¹ Until now, there has not been a single case in which the Court established the existence of a medical necessity, and simultaneously found a violation of art.3. Contrarily, the lack of a medical necessity increases the likelihood of the threshold being reached. The leading case is *Herczegfalvy v*

⁸⁵ *Dvořáček* (App. No.12927/13), judgment of 6 November 2014 at [96]. Translated by the author. Original French text: “En l’espèce, la question principale sur laquelle la Cour est tenue de se prononcer est de savoir si le requérant a consenti ou non au traitement médicamenteux par anti-androgènes. Si en effet il y a eu consentement éclairé, comme l’allègue le Gouvernement, aucune question ne se pose sous l’angle de l’article 3 de la Convention”.

⁸⁶ *Dvořáček* (App. No.12927/13), judgment of 6 November 2014 at [102]; European Court of Human Rights, *Press release Dvořáček v. Czech Republic* 328 (2014), available at: <https://hudoc.echr.coe.int/eng-press> [Accessed 18 August 2023].

⁸⁷ *Dvořáček* (App. No.12927/13), judgment of 6 November 2014 at [104]–[105].

⁸⁸ *Dvořáček* (App. No.12927/13), judgment of 6 November 2014 at [100]–[105].

⁸⁹ See also: J. Ryberg, *Neurointerventions, Crime and Punishment: Ethical Considerations* (Oxford: Oxford University Press, 2020), pp.27–28.

⁹⁰ The Court uses both terms, although they are synonyms.

⁹¹ Some legal scholars argue that the medical necessity factor impacts the absolute nature of art.3. There are counterarguments, in particular centred around the fact that medically necessary treatment engages the (qualified) positive obligation to protect a patient. It is beyond the scope of this article to discuss this debate. Relevant readings on this topic include: H. Battjes, “In Search of a Fair Balance: The Absolute Character of the Prohibition of Refoulement under Article 3 ECHR Reassessed” (2009) 22(3) *Leiden Journal of International Law*; S. Smet, “The ‘Absolute’ Prohibition of Torture and Inhuman or Degrading Treatment in Article 3 ECHR: Truly a Question of Scope Only?”, in *Shaping rights in the ECHR: the role of the European Court of Human Rights in determining the scope of Human Rights* (Cambridge: Cambridge University Press, 2013), p.273.

Austria from 1992, in which the Court stated that: “as a general rule, a measure which is a therapeutic necessity cannot be regarded as inhuman or degrading”.⁹²

Although the Court has never defined the term medical necessity, from its case law three requirements to establish a medical necessity can be derived. The first requirement relates to the *situations* in which a medical necessity can exist. Medical necessity arises in situations where the life of a detainee is in serious danger. This is the case if a detainee will almost certainly die without treatment. For example, in *Özgül v Turkey*, the applicant was a detainee on a prolonged hunger strike. When his state of health started to deteriorate due to malnourishment, his strike became life-threatening and the authorities decided to force-feed him. The forced treatment was thus necessary to preserve the life of the applicant, and was therefore medically necessary.⁹³ The Court confirmed that force-feeding can be medically necessary in *Nevmerzhitsky v Ukraine*:

“A measure which is of therapeutic necessity ... cannot in principle be regarded as inhuman or degrading. The same can be said about force-feeding that is aimed at saving the life of a particular detainee who consciously refuses to take food.”⁹⁴

The Court has found that medical necessity is not limited to life-saving treatment. A medical necessity can also arise in situations where the *health* of the detainee is in serious danger. The Court has stated that medical necessity can cover treatment that is imposed as part of a therapeutic regime. This is the case if: (1) the detainee is diagnosed with a specific clinical condition; (2) the detainee’s health suffers detriment from this clinical condition insofar that it may be inhuman or degrading; and (3) treatment is necessary to alleviate the symptoms of the condition.⁹⁵ For example, in *Buckley v United Kingdom*, Mr. Blackwood was forcefully administered an injection of anti-psychotic medication in a psychiatric hospital when he was agitated, uncooperative and refused to take any form of medication. Within minutes after the injection, Mr. Blackwood collapsed and later that day he passed away. The European Commission of Human Rights (the Commission) decided that “none of the circumstances as presented to the Commission discloses that the treatment of Orville Blackwood was anything other than part of a therapeutic regime”.⁹⁶ As a result, a medical necessity could be established and the Commission found no reason to depart from the general rule that a measure which is a therapeutic necessity cannot be regarded as inhuman or degrading.⁹⁷

A medically necessary treatment is thus a treatment that can preserve the life and/or health of a detainee when they are in serious danger. Neuro-interventions will most likely be employed if a detainee has a high risk of reoffending. This means that neuro-interventions will most likely not be used to preserve a detainee’s life in life-threatening situations.⁹⁸ Whether neuro-interventions are used to preserve the health of a detainee is debatable. Neuro-interventions will presumably be used to change brain activity that is not necessarily related to a clinical condition, but that is rather related to undesirable behavioural traits such as aggression and impulsivity. Although a detainee may suffer detriment from this brain activity (for example because it hinders daily life), it need not be the case that he suffers from a clinical condition that puts his health in serious danger. Therefore, neuro-interventions in these situations are not—at least not primarily—applied to preserve the health of the detainee in the presence of a serious or even life-threatening

⁹² *Herczegfalvy v Austria* (App. No.10533/83) (1993) 15 E.H.R.R. 437 [82].

⁹³ *Özgül v Turkey* (App. No.7715/02), decision of 6 March 2007.

⁹⁴ *Nevmerzhitsky v Ukraine* (App. No.54825/00), judgment of 5 April 2005 at [94]; (2006) 43 E.H.R.R. 32; see also: *Ciorap v Moldova* (App. No.12066/02), judgment of 19 June 2007 at [77].

⁹⁵ *Gennadiy Naumenko v Ukraine* (App. No.42023/98), judgment of 10 February 2004; *Wilkinson v United Kingdom* (App. No.14659/02), judgment of 28 February 2006; *Buckley v United Kingdom* (App. No.28323/95), report of February 1997; (1997) 23 E.H.R.R. CD129.

⁹⁶ *Buckley* (App. No.28323/95) (1997) 23 E.H.R.R. CD129.

⁹⁷ *Buckley* (App. No.28323/95) (1997) 23 E.H.R.R. CD129.

⁹⁸ There can be exceptions, for example a detainee who constantly engages in life-threatening self-mutilation may be eligible for a neuro-intervention. However, in that case the intervention is not employed to reduce the detainee’s recidivism risk. These situations are therefore beyond the scope of this article.

danger, but rather will be aimed at making him fitter to lead a crime-free life. As a consequence, a medical necessity will most likely not exist.

However, it is conceivable that some brain activity that causes a person's high reoffending risk is related to a clinical condition, such as intermittent explosive disorder.⁹⁹ It can be argued that when neuro-interventions alter brain activity in these cases, they alleviate symptoms of a clinical condition that is detrimental to the detainee. Especially when a clinical condition leads to situations that are dangerous for the detainee's health or life (for example, a psychosis may cause a person to cause harm to themselves or others), neuro-interventions might fulfil this requirement of medical necessity.

The second requirement for a treatment to be qualified as medically necessary, is that the treatment must have a therapeutic aim. The treatment must be aimed at improving the detainee's well-being to protect his life and/or health. For example, in *Özgül v Turkey*, a therapeutic aim could be established. The doctors had respected the applicant's wishes to not be treated while he was on a hunger strike as long as his state of health was satisfactory. Only when his health deteriorated so much that it was in danger, the doctors decided to force-feed him. The Court concluded that the doctors acted with the aim of preventing irreversible damage to the body and thus acted in the best interests of the applicant.¹⁰⁰

If treatment has a non-therapeutic aim—for instance to punish, humiliate, or discourage—a medical necessity cannot be established. For instance in *Ciorap v Moldova*, the applicant went on a hunger strike in detention as a means of protest, which the prison authorities considered to be a violation of the rules and an act of disobedience towards the prison administration. As a result, the applicant was put in solitary confinement and force-fed. As there was no medical need to force-feed, the Court found that the force-feeding had been aimed at discouraging the applicant from continuing his protest. Consequently, no medical necessity could be established.¹⁰¹

It is possible that neuro-interventions will be applied with a therapeutic aim, but this need not be the case. One can argue that neuro-interventions improve a detainee's health by targeting biological features, much like other forms of medical treatment. As neuro-interventions are applied to improve the well-being of the detainee, in the sense that they enable him to participate again in society, it can be argued they have a therapeutic aim.¹⁰² While it is true that neuro-interventions are intended to also have beneficial effects for detainees, their ultimate goal is to benefit society. The main aim of neuro-interventions is to make society a safer place by preventing recidivism through the successful rehabilitation of offenders. It is uncertain how the Court would approach treatment with the aim of rehabilitation compared to medically necessary treatment and treatment with the aims of punishment, humiliation, and discouragement.

For example, in the *Dvořáček* case, the Court accepted that the detainee had a clinical condition (hebephilia) that needed to be remedied using medication. This treatment could be beneficial to the detainee (possibility of early release and remission of the condition), but it mostly served to protect society against crime by reducing the detainee's high recidivism risk. The treatment thus had, at least in part, a rehabilitative aim. In the case itself, the Court said that the contested treatment was “*justifié par les raisons médicales*”, so justified on medical grounds. In the English press release, the term “*medical necessity*” was used instead of a seemingly more apt equivalent to the French phrasing like *medically justified*. It is, thus, unclear whether the Court really established the existence of medical necessity in the *Dvořáček* case, and whether neuro-interventions can have a medical necessity when their application may be medically justified, but is more so aimed at rehabilitation.

⁹⁹ Intermittent explosive disorder is a psychiatric disorder characterised by sudden episodes of impulsive, disproportionate aggressive behaviour: E.F. Coccaro et al, “Amygdala and orbitofrontal reactivity to social threat in individuals with impulsive aggression” (2007) 62(2) *Biological Psychiatry* 168; Sergiou et al, “Transcranial direct current stimulation targeting the ventromedial prefrontal cortex reduces reactive aggression and modulates electrophysiological responses in a forensic population” (2022) 7(1) *Biological Psychiatry: Cognitive Neuroscience and Neuroimaging*.

¹⁰⁰ *Özgül* (App. No.7715/02), decision of 6 March 2007.

¹⁰¹ *Ciorap* (App. No.12066/02), judgment of 19 June 2007 at [79].

¹⁰² L. Forsberg, “Anti-libidinal Interventions and Human Rights” (2021) 21(2) *Human Rights Law Review* 384, 395.

To conclude that a medical necessity exists, the third requirement is sufficient evidence: the Court must satisfy itself that the medical necessity has been convincingly shown to exist.¹⁰³ The existence of a medical necessity must be based on established principles of medicine, such as psychiatric principles generally accepted at the time.¹⁰⁴ The Court attaches great weight to medical evidence that can justify the existence of a medical necessity and treatment.¹⁰⁵ For instance in *Nevmerzhtsky v Ukraine*, the decision to force-feed the applicant made by the head of the detention centre, was based on a written report by a medical commission, according to the authorities.¹⁰⁶ Since the Government failed to provide the Court with the decision and the written report, the Court decided that medical necessity was not convincingly shown to exist.¹⁰⁷

It follows that there must be sufficient evidence of a medical necessity before employing a neuro-intervention. A medical investigation should precede the neuro-intervention, carried out by independent medical professionals, to assess the health situation of the detainee. A medical necessity can only be established if this investigation concludes that a specific neuro-intervention is necessary to alleviate the symptoms of a specific condition that causes serious danger to the health or life of this specific detainee. Such an investigation can ensure that the national authorities cannot arbitrarily and without sufficient cause assume the existence of a medical necessity can be used by the national authorities as evidence before the Court to substantiate the existence of a medical necessity.

To conclude, the existence of a medical necessity will typically result in a treatment falling below the minimum level of severity stipulated in art.3. It is unclear whether neuro-interventions can have a medical necessity. However, it seems unlikely in most cases because neuro-interventions mostly do not treat clinical conditions and their main purpose is reducing recidivism to protect society. This finding suggests that the Court might (and perhaps should) choose another factor for assessing the level of severity of neuro-interventions. Although it is beyond the scope of this article to fully discuss potential new factors, *rehabilitation* is provided as a starting point for further scholarly examination.

Rehabilitation could be incorporated into a factor employed by the Court to assess neuro-interventions. Since the *Vinter* case, the Court has emphasised rehabilitation as a ground on which imprisonment can legitimately be based.¹⁰⁸ It has highlighted that all detainees should be offered the possibility of rehabilitation, to respect their human dignity and to alleviate the risk they pose to the public (in line with states' positive obligations under arts 2 and 3 ECHR to protect people against death and ill-treatment by the hands of others).¹⁰⁹ Moreover, the Court already allows, under certain circumstances, some forced medical procedures that do not have a medical necessity in a criminal justice context, namely those with the purpose of obtaining evidence (such as forced DNA tests).¹¹⁰ Such procedures do not necessarily benefit the suspect, but they do benefit society as they contribute to the detection and deterrence of crime. Likewise, rehabilitation, although it also benefits the detainee, ultimately benefits society at large because it contributes to the reduction of crime and may therefore prevent death or ill-treatment.

¹⁰³ *Herczegfalvy v Austria* (A/242-B) (App. No.10533/83) (1993) 15 E.H.R.R. 437 at [82]–[83]; *Nevmerzhtsky* (App. No.54825/00), judgment of 5 April 2005 at [94].

¹⁰⁴ *Herczegfalvy* (App. No.10533/83) (1993) 15 E.H.R.R. 437; *Nevmerzhtsky* (App. No.54825/00), judgment of 5 April 2005; *Dvoráček* (App. No.12927/13), judgment of 6 November 2014 at [90]; *Gennadiy Naumenko* (App. No.42023/98), judgment of 10 February 2004 at [112]; *Ciorap* (App. No.12066/02), judgment of 19 June 2007 at [77].

¹⁰⁵ Buelens, Herijgers and Illegems, "The View of the European Court of Human Rights on Competent Patient's Right of Informed Consent. Research in the Light of Articles 3 and 8 of the European Convention on Human Rights" (2016) 23(5) *European Journal of Health Law* 497; *Gennadiy Naumenko* (App. No.42023/98), judgment of 10 February 2004; *Buckley v United Kingdom* (App. No.28323/95), report of February 1997.

¹⁰⁶ *Nevmerzhtsky* (App. No.54825/00), judgment of 5 April 2005 at [62].

¹⁰⁷ *Nevmerzhtsky* (App. No.54825/00), judgment of 5 April 2005 at [62].

¹⁰⁸ *Vinter v United Kingdom* [GC] (App. Nos 66069/09, 130/10 and 3896/10), judgment of 9 July 2013; (2016) 63 E.H.R.R. 1; N. Mavronicola, "Crime, Punishment and Article 3 ECHR: Puzzles and Prospects of Applying an Absolute Right in a Penal Context" (2015) 15 *Human Rights Law Review* 721, 737–738.

¹⁰⁹ Mavronicola, "Crime, Punishment and Article 3 ECHR: Puzzles and Prospects of Applying an Absolute Right in a Penal Context" (2015) 15 *Human Rights Law Review* 739.

¹¹⁰ Lighthart, *Coercive Brain-Reading in Criminal Justice: An Analysis of European Human Rights Law*, (2022); *Salikhov v Russia* (App. No.23880/05), judgment of 3 May 2012.

Given the Court's emphasis rehabilitation and the similarities between the purposes of gaining evidence and rehabilitation, rehabilitation could be incorporated into an assessment factor by the Court to decide whether a neuro-intervention falls within the scope of art.3. This does not imply that every detainee could be forced to undergo a neuro-intervention in the name of rehabilitation. There should be a certain level of necessity or urgency (as is the case with medical necessity), for instance because a detainee poses imminent danger to himself or other people. Given the limited scope of this article, further in-depth scholarly research is warranted to fully explore the normative justifications and conditions for imposing neuro-interventions on a person on the basis of rehabilitation.

Manner of Execution

The third factor used by the Court to determine whether a medical procedure in detention reaches the threshold of art.3 ECHR, is *the manner of execution*. The manner in which a medical treatment is carried out may not go beyond the minimum level of severity.¹¹¹ To guarantee this, procedural safeguards must be in place. The procedure must be ordered and administered by medical doctors; performed in accordance with medical standards; and there must have been constant medical supervision.¹¹²

A treatment is more likely to reach the minimum level of severity if it the manner in which it is carried out is unnecessarily painful or humiliating or if it caused an aggravation of the state of health.¹¹³ Pain can be a logical consequence of medical interventions, for example surgery may cause pain due to tissue damage. However, the pain should not be *unnecessary*, meaning that it could have been prevented by a different manner of execution. When employing neuro-interventions, pain must thus be prevented as much as possible. Transcranial direct current stimulation (tDCS) and transcranial magnetic stimulation (TMS) in principle do not involve any pain or negative consequences for one's health. There is however a slight possibility that uncomfortable or painful side effects occur such as a tingling, itching or burning sensation on the scalp.¹¹⁴ Such side effects should be eliminated as much as possible, for example by repositioning the device on the scalp or by adjusting the stimulation settings.¹¹⁵

Neuro-interventions can also involve more painful or serious side effects. For example, in case of tDCS and TMS more severe adverse health effects such as seizures and hearing impairments could occur, although very uncommon.¹¹⁶ In addition, deep brain stimulation (DBS), is a painful procedure because it requires making an incision in the scalp and drilling a small opening in the skull in order to be able to implant an electrode in the brain. Therefore, anaesthesia should always be used to make sure the procedure is painless. Although it is considered to be a safe procedure, there is a slight chance that (severe) side effects such as gait disturbances, infections, memory deficits and depression may ensue.¹¹⁷ So neuro-interventions should be employed cautiously. For example, adverse effects can usually be managed by making a compromise between maximal stimulation benefit and the occurrence of side effects.¹¹⁸

¹¹¹ *Nevmerzhtsky* (App. No.54825/00), judgment of 5 April 2005.

¹¹² *Jalloh* [GC] (App. No.54810/00), judgment of 11 July 2006 at [73]; Buelens, Herijgers and Illegems, "The View of the European Court of Human Rights on Competent Patient's Right of Informed Consent. Research in the Light of Articles 3 and 8 of the European Convention on Human Rights" (2016) 23(5) *European Journal of Health Law* 489–499.

¹¹³ *Ciorap* (App. No.12066/02), judgment of 19 June 2007 at [88]; *Bogumil v Portugal* (App. No.35228/03), judgment of 7 October 2008 at [70].

¹¹⁴ C. Dondé, N.H. Neufeld and P.A. Geoffroy, "The impact of transcranial direct current stimulation (tDCS) on bipolar depression, mania, and euthymia: a systematic review of preliminary data" (2018) 89(4) *Psychiatric Quarterly* 855, 863; R. Taylor, V. Galvez and C. Loo, "Transcranial magnetic stimulation (TMS) safety: a practical guide for psychiatrists" (2018) 26(2) *Australasian Psychiatry* 189, 190.

¹¹⁵ R.E. Gross et al., "Electrophysiological mapping for the implantation of deep brain stimulators for Parkinson's disease and tremor" (2006) 21(14) *Movement Disorders* 259, 263; M. Van Westen et al., "Optimizing deep brain stimulation parameters in obsessive-compulsive disorder" (2021) 24(2) *Neuromodulation: Technology at the Neural Interface* 307, 313.

¹¹⁶ Taylor, Galvez and Loo, "Transcranial magnetic stimulation (TMS) safety: a practical guide for psychiatrists" (2018) 26(2) *Australasian Psychiatry* 189–190; Y. Rassovsky et al., "Single transcranial direct current stimulation in schizophrenia: Randomized, cross-over study of neurocognition, social cognition, ERPs, and side effects" (2018) 13(5) *PLoS One*.

¹¹⁷ M. Christen et al., "Dealing with side effects of deep brain stimulation: Lessons learned from stimulating the STN" (2012) 3(1) *AJOB Neuroscience* 37, 39; M.S. Okun, "Deep-brain stimulation for Parkinson's disease" (2012) 367(16) *New England Journal Of Medicine* 1529.

¹¹⁸ Lozano et al., "Deep brain stimulation: current challenges and future directions" (2019) 15(3) *Nature Review Neurology* 154.

Means of restraint should also not cause unnecessary pain or an aggravation in the detainee's state of health. Neuro-interventions could, in theory, be employed using restraints in cases where the detainee refuses to cooperate with the treatment. For instance, the detainee could be secured by means of mechanical restraint: securing the detainee to a bed using straps and a vacuum mouthpiece.¹¹⁹ It is conceivable that the Court would consider mechanical restraint to be unnecessarily painful and humiliating because the inability to move oneself may cause physical discomfort, because the ability to communicate and respiration are hampered by the mouthpiece, and because being restrained can cause a feeling of fear, anguish and inferiority.¹²⁰ The employment of neuro-interventions using mechanical restraint may thus reach the minimum level of severity.

Another option is chemical restraint: employing the neuro-intervention while the detainee is in a state of general anaesthesia.¹²¹ While anaesthesia is overall very safe, there are a number of potential side effects such as breathing problems, nausea and muscle aches. It is unclear whether the Court would consider these side effects to be unnecessarily painful, especially because side-effects may outweigh the pain the detainee would experience without anaesthesia. Moreover, it is unclear whether, and under what circumstances, the Court would consider it humiliating to bring someone in a state of unconsciousness to perform a neuro-intervention without their consent.¹²²

The third criterion to determine whether the manner of execution of a treatment exceeded the minimum level of severity is the *intrusiveness* of the treatment. If a medical procedure is more intrusive than necessary, it is more likely to fall within the scope of art.3. The domestic authorities must demonstrate that they took into consideration alternative methods for treatment, and ought to favour the least intrusive (but still effective) medical procedure to treat the detainee.¹²³

The Court emphasised the relevance of intrusiveness in *Ciorap v Moldova*. The applicant, who was on a hunger strike in detention, had asked the authorities for an intra-venous drip for nourishment. The authorities did not reply to this request and, instead, the applicant was force-fed in the following manner. He was handcuffed, the prison staff forced him to open his mouth by pulling his hair, gripping his neck and stepping on his feet, his mouth was then fixed in an open position by means of a metal mouth-widener, his tongue was pulled out of his mouth with a pair of metal tongs, and a tube was inserted as far as his stomach.¹²⁴ The Court considered that there was a less intrusive alternative to force-feeding that was not even considered by the national authorities despite the applicant's express request, which resulted in a breach of art.3.¹²⁵

From this follows that neuro-interventions can only be applied if there are no less intrusive treatment options available that are still as effective. To decide whether less intrusive methods exist, the level of intrusiveness of neuro-interventions must be determined, which depends on two factors: the level of physical intrusion and the level of mental intrusion.

A physically intrusive treatment is a procedure where the body is accessed via cutting or puncturing the skin, especially by inserting instruments into the body, and where the physical anatomy of the body is changed.¹²⁶ The level of physical intrusion of neuro-interventions depends on the precise type of neuromodulation that is being used. DBS is generally referred to as a very invasive procedure because it requires puncturing the scalp, skull and brain. tDCS and TMS, on the other hand, are generally referred

¹¹⁹ Lighthart, *Coercive Brain-Reading in Criminal Justice: An Analysis of European Human Rights Law* (2022), p.69.

¹²⁰ See e.g.: *Jalloh* [GC] (App. No.54810/00), judgment of 11 July 2006; *Ciorap* (App. No.12066/02), judgment of 19 June 2007.

¹²¹ Lighthart, *Coercive Brain-Reading in Criminal Justice: An Analysis of European Human Rights Law*, p.70.

¹²² It seems that even in these circumstances, a medical necessity weighs heavily: in *YP*, the Court considered that the sterilisation of a woman without her knowledge caused her to feel humiliated, but not in breach of Article 3 because the procedure was medically necessary. *YP* (App. No.43399/13), judgment of 20 September 2022.

¹²³ *Ciorap* (App. No.12066/02), judgment of 19 June 2007; *Nevmershitsky* (App. No.54825/00), judgment of 5 April 2005.

¹²⁴ *Ciorap* (App. No.12066/02), judgment of 19 June 2007 at [19].

¹²⁵ *Ciorap* (App. No.12066/02), judgment of 19 June 2007 at [87]–[89].

¹²⁶ See e.g. S. Cousins, N.S. Blencowe and J.M. Blazeby, "What is an invasive procedure? A definition to inform study design, evidence synthesis and research tracking" (2019) 9(7) *BMJ Open*.

to as non-invasive treatments because they do not require an instrument to enter the body: an electric current is generated in the brain from outside the scalp.¹²⁷ At a glance, tDCS and TMS thus seem to involve minor to no physical intrusions. However, all neuro-interventions influence the body, even if they don't technically enter the body. Neurostimulation alters brain activity by increasing the firing rate of neurons, which is a physical change in the brain. Therefore, all neuro-interventions can be considered somewhat physically intrusive.

Treatment can also be mentally intrusive. A mentally intrusive treatment is a procedure where access to the mind is gained or where mental states such as emotions and thoughts are changed. Neurotechnology makes it possible to make inferences about a person's mind, as it enables us to see certain brain characteristics (for example, heightened activity in the amygdala) that are known to correlate with certain mental states (for example, aggression). Moreover, by changing brain activity, neuro-interventions can also alter detainees' mental states and thereby their behaviour.¹²⁸ A unique feature of neuro-interventions is that they can intrude into the mind *directly*, through altering brain activity and thereby bypassing emotions, thoughts and control, and *indirectly*, through feelings of for instance humiliation or shame.¹²⁹ As neuro-interventions are able to identify and affect mental states (including those unrelated to criminal behaviour), they can be considered to be mentally intrusive.¹³⁰

In sum, neuro-interventions are, to different degrees, physically intrusive, but they are also—and probably mainly—directly mentally intrusive. This is what makes them unique: most medical procedures are mostly physically intrusive, and only mentally intrusive insofar that the physical intrusion can (indirectly) cause humiliation.¹³¹ As the Court has yet to reflect upon directly versus indirectly intrusive interventions, it may prove difficult to compare neuro-interventions to each other and to other intervention methods, and to determine which is the least intrusive option. In other words: it is unclear at this point in time which intrusions would weigh more heavily in the Court's intrusiveness assessment. This is a topic of further research.

Conclusion

This article aimed to determine whether art.3 ECHR offers protection for detainees against neuro-interventions, and if so, to what extent. The article analysed whether neuro-interventions could attain the minimum level of severity threshold to fall within the scope of art.3. This article drew an analogy between neurostimulation on the one hand and medical interventions on the other, from which three factors were identified that the Court uses to determine the level of severity of medical treatment in detention. Each of these factors could be applied to the use of neuro-interventions, however, none of the factors yielded complete clarity.

The first factor is the consent of the detainee: if a treatment is employed with valid consent, it is unlikely to reach a minimum level of severity. It is, however, unclear how to propose a neuro-intervention in such a way that valid consent can be given. Firstly, the Court requires consent to be informed. As neuro-interventions develop rapidly, it is impossible to foresee all future possibilities, especially potential side-effects, and therefore to give detainees all the necessary information. Secondly, the Court requires consent to be voluntary. Although the Court has condemned the use of threats and deception, the *Dvořáček* case seems to suggest that a difficult choice between an intervention and a long(er) time in prison does

¹²⁷ Ryberg, *Neurointerventions, Crime, and Punishment: Ethical Considerations* (2020); N.A. Vincent, T. Nadelhoffer & A. McCay, *Neurointerventions and the Law: Regulating Human Mental Capacity* (Oxford: Oxford University Press, 2020).

¹²⁸ "Directly" refers to the fact that neuro-interventions do not intrude into the mind through emotions or thoughts. Instead, they directly change the mind through altering brain activity.

¹²⁹ See C. Bublitz, "Why Means Matter: Legally Relevant Differences Between Direct and Indirect Interventions into Other Minds", in *Neurointerventions and the Law: Regulating Human Mental Capacity* (Oxford: Oxford University Press, 2020), p.49.

¹³⁰ D. Birks and A. Buyx, "Punishing Intentions and Neuro-Interventions" (2018) 9(3) *AJOB Neuroscience* 133, 134.

¹³¹ See e.g. *Ciorap* (App. No.12066/02), judgment of 19 June 2007.

not render consent involuntary per se. Thus, neuro-interventions might be proposed in combination with positive consequences (such as parole or early release). But since *Dvořáček* is a stand-alone case, and was decided eight years ago, no general conclusions about how to propose neuro-interventions can be drawn yet. Clarification on valid consent is required.

The second factor is the medical necessity of a treatment. If an intervention is therapeutically necessary, it will most likely not attain a minimum level of severity, even when administered without consent. Neuro-interventions may or may not be therapeutic in nature. For instance, some neuro-interventions may reduce the risk of recidivism by diminishing certain symptoms of a mental illness, like aggression. But others need not target symptoms of an illness; they can also diminish risk of recidivism through other routes—as certainly not all (violent) crimes are the result of illnesses. Still, it is unclear whether neuro-interventions would be used in situations in which a medical necessity can arise (this seems unlikely). Second, it is unclear whether neuro-interventions will have a medical aim. One may argue that neurostimulation does have a medical aim because it influences biological features of the detainee, much like other medical treatments. However, others may argue that neurostimulation is primarily used to benefit society by reducing detainees' recidivism risk. It is uncertain which of the two interpretations the Court will adopt. From the *Dvořáček* case, it seems as if the Court may lean more towards the first interpretation, however, this has not (yet) been confirmed by the Court in further case law. And of course, the Court has also not yet had to apply its already existing assessment factor (medical necessity) to the new situation of neurostimulation.

A possible solution could be that the Court would develop a new assessment factor. Since interventions aiming at rehabilitation are a category of their own, the Court could, and perhaps should, develop a separate assessment to determine their level of severity. For instance, the Court could incorporate “rehabilitation” into a factor to determine the level of severity of neuro-interventions.

The third and final factor to determine the level of severity of a neuro-intervention is the manner in which the treatment is executed. This factor requires neuro-interventions to not cause unnecessary pain or permanent damage to the detainee's health. Moreover, it requires that national authorities only employ a neuro-intervention if it is the least intrusive (but still effective) treatment option available. It is not entirely clear how neuro-interventions will compare to other interventions because they are invasive in a different way. Neurostimulation is physically invasive because it changes the brain, but is more so *mentally* invasive because it directly changes the mind. Therefore, more clarity is needed on how to balance mental and physical intrusiveness in order to assess the severity of neuro-interventions. This is a topic for further research.

In conclusion, art.3 ECHR provides protection for detainees from neuro-interventions to a considerable extent. If neuro-interventions do not meet a number of criteria (valid consent, medical necessity and manner of execution), they cross the minimum level of severity threshold. As a consequence, their use will be prohibited by art.3. However, there is still substantial uncertainty as to how those criteria apply to neuro-interventions and how the Court will assess the application of neuro-interventions. *Dvořáček* suggests that, depending on the circumstances of each case, neuro-interventions may be admissible. However, more clarity is needed to determine and ensure the level of protection detainees have against neuro-interventions.