8

Synthesis and Conclusion

8.1 INTRODUCTION

Can neurotechnologies be used responsibly in the rehabilitation of convicted persons, respecting fundamental freedoms and rights? This is the question we have endeavoured to answer throughout this book. The human rights challenges generated by new and emerging neurotechnologies have been widely noted by scholars, ethics committees and human rights bodies.[1] This has prompted a debate on how and to what extent human rights protect – and should protect – against unsolicited interference with our brains and minds.[2] In a recent report on the impact, opportunities and challenges of neurotechnology in relation to human rights, the Human Rights Council Advisory Committee concluded that neurotechnologies can affect human rights in a "unique manner". Therefore, developing an actionable human rights approach is of the "utmost importance". Some of their concerns relate to the potential use of neurotechnology in the criminal justice system, holding that "most of the applications proposed are extremely problematic from a human rights perspective". For example, they consider that "forceful extraction of information from detainees or offenders through the use of neurotechnology is prohibited".[3]

In this book, we explored the permissibility of the use of neurotechnology for the rehabilitation of convicted persons in view of international and European human rights law. This entailed three central tasks: (A) clarifying the scope of the relevant human rights to identify potential *infringements* of these rights, (B) clarifying these

[1] For overview and discussion of emerging neurotechnologies in different fields, see Farahany 2023. For recent policy initiatives see, inter alia, United Nations Human Rights Council, Neurotechnology and Human Rights, A/HRC/51/L.3 (29 September 2022); UNESCO, First draft of the Recommendation on the Ethics of Neurotechnology (2024). See also Ienca, M., *Common human rights challenges raised by different applications of neurotechnologies in the biomedical field*, Council of Europe, October 2021; Bublitz & Ligthart 2024.

[2] Bublitz & Merkel 2014; Ienca & Andorno 2017; Ligthart et al. 2023a.

[3] Advisory Committee, UNHRC, Impact, opportunities and challenges of neurotechnology with regard to the promotion and protection of all human rights, A/HRC/AC/31/CRP.1 (8 August 2024), pars. 47–48.

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rights' permissible limitations to identify potential *violations*, and (C) exploring the scope of *positive obligations* of states that can be derived from these rights. Our analysis has provided us with the first contours of a normative, human rights-based framework for neurorehabilitation in criminal justice. We shall now synthesise our results in this final chapter.

From a human rights perspective, the permissibility of neurotechnological interventions will usually depend on all relevant circumstances of the individual case. Still, with this reservation in mind, based on our analysis we can make a tentative distinction between, roughly, three different types of neurotechnological interventions for the purpose of criminal rehabilitation: (1) plausibly permissible interventions, (2) plausibly impermissible interventions, and (3) interventions of which the permissibility is largely unclear. While acknowledging its oversimplicity and stressing, again, that from a human rights perspective the lawfulness of neurotechnological interventions will normally depend on the facts and circumstance of individual cases, we do think that attempts to clarify different categories of (im)permissible interventions has value. Such endeavours are particularly relevant in relation to ongoing developments in policymaking and the regulation of neurotechnologies through general guidelines, often informed by and grounded in human rights.[4]

Therefore, based on the analyses in the preceding chapters, we will try to tentatively identify at least *some* categories of neurotechnological applications of which their use in criminal justice appears prima facie permissible (8.2) and prima facie impermissible (8.4). We also consider neurotechnological applications whose permissibility is largely unclear (8.3). The three categories are meant to structure our thoughts about the human rights protection of the person in relation to neurotechnology. The candidate examples of the respective categories provided in the next sections are certainly not meant to be exhaustive nor definitive.

8.2 PLAUSIBLY PERMISSIBLE INTERVENTIONS

An instance of neurorehabilitation seems prima facie permissible when (i) valid consent to the intervention is obtained, (ii) the intervention is known to be safe,[5] and (iii) the intervention is expected to be effective in its professed goal (i.e., the goal of facilitating neurorehabilitation or of identifying neural markers that are relevant for assessing recidivism risk).[6]

[4] Such as the projects running at UNESCO and the Human Rights Council Advisory Committee.

[5] And has no degrading or otherwise dehumanising effects.

[6] Exceptions to (ii) and (iii) might arise if an intervention is in the research phase. In this kind of scenario, it seems likely that the permissibility of an intervention will strongly depend on the acquisition of valid consent, with particular attention being paid to disclosure of the risks and uncertainties involved – and, clearly, the permission of an ethics review board.

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This category of prima facie permissible neurorehabilitation includes situations in which making safe and effective neurorehabilitation available to a given person – and delivering it when consent to it is obtained – is not only permissible but plausibly *required* from a human rights perspective. We discussed this idea of a *right to* neurorehabilitation in Chapters 5, 6 and 7. In Chapter 5, we suggested that states might have a positive obligation under the right to respect for private life to make mental control-enhancing neurotechnologies available to convicted persons on certain occasions.[7] For instance, when these persons have mental states that significantly limit their ability to live the kind of life that they want. We suggested in Chapter 6 that states might have a positive obligation under the right to mental health to make neurorehabilitation available to some subpopulations of convicted persons: for instance, when it would be necessary for, or would make it substantially easier for these populations to achieve, a reasonable standard of mental health. And in Chapter 7, we suggested that states might have a positive obligation to make neurorehabilitation available, when neurorehabilitation is necessary (i) to counter the degenerative impact of imprisonment, (ii) to preserve genuine hope for release from prison or (iii) to preserve convicted persons' ability to socially contribute.

That neurorehabilitation might sometimes be required from a human rights perspective has yet received little support from the case law, though. The use of neurotechnologies in criminal justice is still largely in the research phase and no cases involving neurorehabilitation have been brought before human rights courts. It is also unlikely that rights-based claims to be provided with neurorehabilitation will be successfully invoked in the near future, given (among other things) the resource constraints with which states operate. Still, the suggestion that neurorehabilitation might sometimes be required (absent defeaters) from a human rights perspective receives support from the case law and literature pertaining to other kinds of interventions – for example, standard medical interventions and traditional rehabilitative interventions – and from some general observations of the courts.[8] We thus posit that the category of plausibly permissible neurotechnological intervention in criminal justice includes some interventions that states also have a defeasible duty to provide.

[7] We also noted that while Article 17 ICCPR refers only to persons' right to legal protection from 'arbitrary or unlawful *interference*' with their privacy (emphasis added), positive duties to facilitate people's mental self-determination or mental control may also arise under this right in certain circumstances.

[8] For instance, recall that the ECtHR in *Sengtes/The Netherlands* observed that Article 8 ECHR may impose positive obligations on states when a 'direct and immediate link' exists between the measures sought by an applicant and their private life, and when 'the State's failure to adopt [such] measures interferes with that individual's right to personal development', see ECtHR 8 July 2003, 27677/02 (*Sengtes/The Netherlands*), pp. 5–6.

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8.3 INTERVENTIONS OF WHICH THE PERMISSIBILITY IS UNCLEAR

As follows from the analyses in Chapters 2, 3 and 4, the question about the permissibility of *non-consensual* use of neurotechnology for rehabilitation is complex.

On first inspection, non-consensual neurorehabilitation might seem like a paradigmatically impermissible interference with the person's body and mind, and as such, something that is clearly impermissible. The Human Rights Council Advisory Committee seems to lean towards such a position. For example, they write that the prohibition of ill-treatment pursuant to Article 7 ICCPR "provides offenders with protection against brain-reading and brain-writing techniques, particularly 'neurocorrectives', which constitute an inherently degrading treatment *in all circumstances*".[9] Furthermore, they hold that "[t]he forceful extraction of information from detainees or offenders through the use of neurotechnologies is prohibited".[10] Similar claims have been made based on the right to freedom of thought.[11]

Our analysis provides reasons for more nuance, however. The human rights protection of personal interests over brains and minds, such as the interest in mental privacy, personal integrity and identity, has both a qualified and absolute dimension.[12] First and foremost, the protection of these interests is covered by qualified rights – in particular, the right to privacy and personal integrity. Furthermore, a limited number of (grave) interferences can engage additional protection within the absolute dimension – particularly from the prohibition of ill-treatment and the right to freedom of thought and, to some extent, by the arguably absolute protection of the core essence of privacy and integrity rights.

As far as non-invasive brain stimulation and neuroprediction is concerned, we found that their non-consensual use is unlikely to infringe either the prohibition of ill-treatment or the right to freedom of thought. Regarding the prohibition of ill-treatment, the bodily and mental effects of non-invasive brain stimulation may often be too subtle to qualify as the infliction of severe physical pain or mental suffering, failing to attain the prohibition's minimum level of severity threshold. Furthermore, when embedded in a larger and diverse rehabilitation programme, complemented by interventions that actively engage the person – as ends in themselves, not only as

[9] Advisory Committee, UNHRC, Impact, opportunities and challenges of neurotechnology with regard to the promotion and protection of all human rights, A/HRC/AC/31/CRP.1 (8 August 2024), par. 34 (emphasis added).

[10] Advisory Committee, UNHRC, Impact, opportunities and challenges of neurotechnology with regard to the promotion and protection of all human rights, A/HRC/AC/31/CRP.1 (8 August 2024), par. 34 (emphasis added), par. 48.

[11] Bublitz 2014; Bublitz 2018. Cf. UN Special Rapporteur on the Freedom of religion or belief, 5 October 2021, A/76/380.

[12] Cf. Bublitz 2024, speaking of the 'multi-layered protection of the person' in established human rights law.

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means – the risk of disrespecting human dignity by objectification will reasonably be reduced.

Regarding the right to freedom of thought, we argued that at least part of the mental phenomena relevant to the neurotechnological assessment and/or reduction of a person's recidivism risk – such as certain tendencies, behavioural control, empathic abilities and emotional responses – do not qualify as "thoughts" in the meaning of this right. Hence, when such mental phenomena are the targets of non-consensual neurorehabilitation, the right to freedom of thought is unlikely to be infringed.

Still, in most cases, non-consensual neurorehabilitation will infringe one or more qualified rights and are therefore prima facie prohibited. In particular, they may infringe the right to (mental) privacy, bodily and mental integrity, and, in some cases, the right to personal identity. These are all inherent in the umbrella rights to privacy and to private life pursuant to Article 17 ICCPR and 8 ECHR. Whether an infringement of these qualified rights will constitute a rights *violation* – rendering a neurotechnological interference impermissible – depends on an ultimate *balancing* of competing interests, which, in turn, depends on the facts and circumstances of the individual case.

This is no neutral balancing act. Specific restrictions and requirements apply. To be justified, an infringement of the qualified rights to mental privacy and personal integrity should have a non-arbitrary basis in the law and must be proportionate to a legitimate aim, such as crime prevention. Consequently, the permissibility of neurotechnological interventions that infringe these qualified human rights is largely unclear, as it strongly depends on the circumstances of the individual case. Still, some general aspects of the balancing act can be considered.

First, as discussed, the more *severe* a rights infringement, the more substantial the reasons must be for its justification. Applying this rule to preventive measures in the context of criminal justice often implies that severe rights infringements can only be justified to prevent serious crimes. Assuming that both neuroprediction and neurointerventions aim to contribute to preventing future crime, this means that, to be justified, the interference with a convicted person's privacy, personal integrity and/or identity should be proportionate to the severity of the harm the authorities aim to protect against.

For example, we argued that the *bodily* interference of non-invasive brain stimulation will often be minor. Such minor bodily interference could reasonably be considered proportionate to the prevention of a variety of non-trivial criminal offences. Meanwhile, we also argued that the *mental* effects of these interventions may be significant, which could lead to a severe infringement of the right to mental integrity. If such infringements can be justified at all, their justification would require weighty reasons, such as the prevention of severe crimes like murder, rape or abuse.

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However, since the right to mental integrity is currently underdeveloped, it is unclear how exactly the severity of infringements of this right should be assessed. We suggested the potential relevance of the directness of a mental interference and the level of mental harm that it causes. If the primary aim of a right to mental integrity is to protect *autonomy* over mental states and processes, then it is plausible that the less mental *control* an intervention leaves to the affected person, the more severe the infringement of the right to mental integrity can be considered to be. If we assume that, generally, direct interventions leave less control over mental states than indirect interventions, this would imply that, in general, stronger reasons are needed to justify infringements through direct interventions compared to indirect interventions. And when an infringement of the right to mental integrity entails additional mental harm, such as anxiety, stress or discomfort as a side effect of medication or brain stimulation, this likely adds to the severity of the rights infringement, therefore requiring more substantial reasons for justification.

The tools we considered in the context of neurorehabilitation – such as tDCS, TMS and psychopharmaceutical interventions – are of a direct nature as they target brain processes. The mental changes they induce leave little (if any) room for mental control to the person. Therefore, on the proposed account, these interventions could be considered to interfere with the person's mental autonomy to a significant degree, requiring weighty and very important reasons to be justified, such as reducing recidivism risks related to manslaughter or sexual abuse. Clearly, the need for such substantial reasons may further increase when the intervention entails harmful psychological side effects. Hence, whether such interferences can be permissible in some cases is an open question and the answer to it may strongly depend on the circumstances of each individual case.

Another consideration that could be relevant to the permissibility of neurorehabilitative tools that infringe qualified human rights is whether they interfere with the "core" or "essence" of those rights. The essence of rights doctrine has been employed for the interpretation and adjudication of human rights under both the ICCPR and the ECHR.[13] Respect for the essence of international human rights arguably follows from Article 5(1) ICCPR.[14] Furthermore, according to the Siracusa Principles on the Limitation and Derogation of Provisions in the International Covenant on Civil and Political Rights, permissible limitations of Covenant rights "shall not be interpreted so as to jeopardize the essence of the right concerned".[15] Likewise, considering Article 2(1) ICCPR, the Human Rights Committee states that, when restricting Covenant rights, "[s]tates must demonstrate their necessity and only take such measures as are proportionate to the pursuance of legitimate aims in order to ensure continuous and effective protection of Covenant rights. In no case may the

[13] Leijten 2017; Thielbörger 2019; Van Drooghenbroeck & Rizcallah 2019.
[14] Thielbörger 2019.
[15] E/CN.4/1985/4, Annex (1985) at A.2.

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restrictions be applied or invoked in a manner that would *impair the essence* of a Covenant right".[16]

In the same vein, the ECtHR has stressed, on various occasions, that restrictions on human rights may not impair the "very essence" of those rights.[17] As Gerards observes, in some cases, it seems that the essence of the right constitutes an "inviolable and absolute core" that cannot be balanced away, operating as a real limit of limits.[18]

Meanwhile, in other cases, the ECtHR appears to favour a rather relative approach to the essence of rights, holding that, in principle, the margin of appreciation of states will be narrowed if the essence of a Convention right is affected. In Chapter 3 we saw that such core rights reasoning generally implies that the closer a certain aspect of a right relates to the central values underlying the ECHR – democracy and the rule of law, pluralism, human dignity and personal autonomy – the more important it can be considered to be. Meanwhile, the more a certain aspect is in the periphery of the right, the less weighty it can be taken to be. Because restrictions of core rights might threaten the realisation of the ECHR's central objectives, the ECtHR considers it justified to apply strict scrutiny.[19] For example, under the right to respect for private life pursuant to Article 8 ECHR, the ECtHR holds that when "a particularly important facet of an *individual's existence* or *identity* is at stake, the margin of appreciation allowed to the State will be restricted".[20]

Hence, when the non-consensual stimulation of a convicted person's brain interferes with behavioural traits or mental states that must be considered an essential aspect of the person's identity,[21] the state's margin of appreciation is plausibly narrow. In such cases, the national authorities have limited discretion in balancing the convicted person's private interests against the public interest of crime prevention.

Note, however, that in human rights law, the essence of rights doctrine has not yet come to full development. Its application by different courts and treaty bodies is often considered vague, unreliable and inconsistent.[22] Therefore, the implications of this doctrine for neurorehabilitation under both the ECHR and ICCPR are yet unclear.

[16] CCPR General Comment No. 31, par. at 6 (emphasis added).

[17] ECtHR 22 December 2020, 14305/17 (*Selahattin Demirtaş/Turkey (no. 2)*), par. 387; ECtHR 11 July 2002 (Christine Goodwin/UK), par. 99. See also Gerards 2023, pp. 365–366.

[18] Gerards 2023, pp. 366–367.

[19] Gerards 2023, pp. 272–273.

[20] ECtHR (GC) 10 April 2007, 6339/05 (*Evans/UK*), par. 77 (emphasis added); ECtHR (GC) 4 December 2007, 44362/04 (*Dickson/UK*), par. 78.

[21] For example, due to severe side effects of brain stimulation.

[22] See, for example, Van der Schyff 2008; Leijten 2017; Van Drooghenbroeck & Rizcallah 2019; Tridimas & Gentile 2020; Thielbörger 2019.

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8.4 PLAUSIBLY IMPERMISSIBLE INTERVENTIONS

Based on our analysis, we can identify two general circumstances where non-consensual neurorehabilitation is impermissible under established human rights law – that is, when the interference (i) infringes and therefore violates an absolute human right or (ii) infringes a qualified right in a way that cannot reasonably be justified, therefore constituting a rights violation.

Non-consensual or mandatory employment of neurotechnology will be impermissible if it infringes the prohibition of ill-treatment or the right to freedom of thought – two rights that are generally considered to be absolute.[23] Although we concluded that the relevance of these rights and freedoms appear limited regarding the case of neurorehabilitation in criminal justice, they do set some clear and absolute boundaries. First, the involuntary employment of neurotechnology is impermissible if the effects (or side effects) are severe, for example, because it is very painful, dehumanizing, has dreadful impact on the person's health or severely affects the person's agency or autonomy, which all plausibly qualify as inhuman or at least degrading treatment, prohibited by Article 7 ICCPR and 3 ECHR.

Furthermore, non-consensual neurorehabilitation is impermissible when it changes or reveals the person's religious beliefs, conscientious convictions or their unexpressed thoughts. Although the precise interpretation of "thought" in human rights law is yet unsettled, some mental features clearly qualify, such as political and philosophical beliefs. Other candidates that might qualify include a person's deepest wishes and sexual desires. Non-consensual interference with such mental properties will infringe the right to freedom of thought and is therefore prohibited.

Finally, supposing the use of neurorehabilitation is safe and effective, has a non-arbitrary legal basis and pursues a legitimate interest,[24] its non-consensual use will be impermissible if it constitutes an *unnecessary* or *disproportionate* infringement of one of the considered qualified rights. Although considerations of necessity and proportionality usually require a balancing of interests in view of all relevant circumstances of the individual case, some clear instances of impermissible interference can be identified.

For example, when the targeted person is willing to submit to traditional forms of rehabilitation and these interventions promise to be equally effective, the non-consensual administration of neuropharmaceuticals or mandatory employment of brain stimulation is unnecessary and would, therefore, constitute an impermissible infringement of the relevant right, like the right to personal integrity. Furthermore, compulsory neurointerventions will likely be disproportionate when applied to persons who are not a severe threat to public safety. Likewise, interferences with

[23] Here we assume that these rights are absolute, while acknowledging that this has been contested. See, for example, Greer 2015; Ligthart 2025c.

[24] Such as preventing crime and disorder.

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the person's mental privacy during neuroprediction can be excessive and unnecessary, for example, when targeting non-crime-relevant mental properties.

8.5 CLOSING REMARKS

Neurotechnological developments have led to a lively debate among scholars and policymakers regarding the protection of our minds. The freedom of our minds and the rights that protect them are of the utmost importance to humans and humanity.

One possible area of future application is of particular concern. This area is criminal justice and it is one of concern because it is a domain where non-consensual use of neurotechnology might be considered, where some limitations of rights and freedoms are legally permissible and where the stakes are typically high, both for convicted persons, victims and society at large.

Our analysis has focused on the application of neurotechnologies in this domain. More specifically, we considered neurorehabilitation in relation to human rights that protect the person – their body and mind. We set out to identify whether – and if so, how – neurorehabilitation might be used responsibly from a human rights perspective. As the key components of this analysis – the neurotechnologies and the legal frameworks – are evolving, our conclusions are only provisional.

Still, we conclude that current human rights protection of our bodies and minds is robust. At the same time, with the exception of certain areas, it is not absolute, meaning it will often require a balancing of competing interests. For instance, as we argued that neurointerventions for rehabilitative purposes may usually not target "thoughts" in a strict sense, but rather inclinations and preferences, it appears that absolute protection by the right to freedom of thought, although not impossible, is less likely. That means that the ultimate decision about the admissibility of such interventions would strongly rely on the applicable qualified rights, like the right to privacy and personal integrity. This means that the admissibility of these interventions will ultimately depend on the type of balancing discussed above. This may be reason to seek further protection, for instance in the form of reshaped human rights or by other means.

Emerging neurotechnologies do not only pose threats and create risks and, therefore, require legal protection. They also open up opportunities for people's health, rehabilitation and the enhancement of mental capabilities. Accordingly, we explored the existence and possible implications of *rights to* the application of neurotechnologies, at least to some forms of use.

Based on our analysis in Chapters 5, 6, and 7, we suggested that there may be situations where making safe and effective neurorehabilitation available to a given person – and delivering it when voluntary and competent consent to it is obtained – is not only plausibly permissible but perhaps even *required* from a human rights perspective. Meanwhile, that neurorehabilitation may be required from a human rights perspective receives little support from the case law so far. We suggested that

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states might have a positive obligation to offer neurorehabilitation when it is necessary (i) to counter the degenerative impact of imprisonment, (ii) to preserve genuine hope for release from prison or (iii) to preserve convicted persons' ability to socially contribute. Meanwhile, practical considerations may be relevant here: the likelihood of successful rights-based claims to neurorehabilitation is also influenced by resource constraints within which states operate.

Still, we feel it is highly important that positive rights receive attention in future debates about responsible use of neurotechnologies in criminal justice, together with the negative rights that protect us from unsolicited interference by others with our brains and minds.

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