TITLE

Tetraplegic persons, Intracortical Brain-Computer Interfaces and Agency: A Decolonial Perspective

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Chapter 1: Introduction

1. Background

Tetraplegia (also quadriplegia) is the impairment or loss of motor function in the cervical area of the spinal cord (Kandola, 2020). Individuals with tetraplegia experience paralysis of their arms, legs, trunk (abdomen), chest and in more serious cases the neck, shoulders and head. The severity of the paralysis may vary but such individuals have a higher risk of impaired vital body function (Herrmann *et al.*, 2011). Although, such individuals often have intact cognitive function, their ability to transmit brain signals to the musculoskeletal system is disrupted, resulting in severe limitations in their essential motor functions necessary for exercising agency (Buller, 2020, p. 155; Bergeron *et al.*, 2023, p. 225). Tetraplegia can be suffered by individuals with Amyotrophic Lateral Sclerosis (ALS) and locked-in syndrome, as well as individuals who have suffered spinal cord injury. The main treatment goal for Tetraplegic individuals is to achieve and maximize their mobility and independence to promote further their reintegration into society. To achieve this, the patient requires a multidisciplinary approach that not only enhances physical capabilities but promotes social reintegration and improved quality of life (Oke, Kubeyinje, and Agwubike, 2012, p. 31; Fridén and Gohritz, 2015, pp. 2490-2491).

Intracortical Brain-Computer Interface (Intracortical BCI) represents a groundbreaking advancement in the rehabilitative care of Tetraplegic individuals. Intracortical BCI is a type of Brain-Computer Interface (BCI) that enables a direct communication pathway between the brain and an external device, facilitating motor-disabled persons with tetraplegia with the ability to interact with the world in an unprecedented way, transcending the need for bodily movements (Buller, 2020, pp. 155-156; Rainey, Maslen, and Savulescu, 2020, pp. 46-47; Sun and Ye, 2023, p. 2). Typically, an intracortical BCI comprises three components: a sensor to

detect neural signals, a signal processor that converts neural activity into a command, and a device to effect action (Buller, 2021, p. 13: Buller, 2020, pp. 155-156). The signal processing system bypasses the impaired neuromotor pathways decoding neural activity within the motor cortex. This is then translated into voluntary motor commands that reflect that person's motor intentions. These commands are translated into actions via a computer-generated output device, such as steering a wheelchair or controlling a prosthetic arm or leg (Buller, 2021, pp. 3-4). Thus, by operating through thoughts, a tetraplegic person, previously considered as the archetype of inaction, can effect change or impact their environment without the muscular system of the body as an intermediary (Glannon, 2013, pp. 46-47; Buller, 2020, p. 155 and 157; Kögel and Wolbring, 2020, p. 227; Shih, Krusienski and Wolpaw, 2012, p. 268; Sun and Ye, 2023, p. 1).

Although preliminary studies show that Intracortical BCIs are cost-effective and promise more significant outcomes in the restoration of motor function when utilized in conjunction with conventional therapies (Cheng *et al.*, 2020, pp. 272 and 275; Bockbrader *et al.*, 2018, p. 5237; Jovanovic *et al.*, 2022, p. 283; Hochberg *et al.*, 2012, pp. 374-375; Peng, Y. *et al.*, 2022, pp. 2- 6 and 9), intracortical BCI is still a topic of ethical debate. One ethical contention is how such a device would impact the potential user's agency. Although both arguments in favour of and against deploying BCI in the care of motor-disabled Tetraplegic individuals ground their claims on the capacity of intracortical BCI to enhance or undermine agency, it is often unclear what 'agency' means within these claims. As the project demonstrates in a subsequent section, this is a critical gap. Equally missing in the ethical debate on whether or not to deploy intracortical BCI in the care of motor-disabled persons is the contribution of decolonial scholars. Decolonial scholarship is an approach to research and knowledge production that challenges the dominance of Western knowledge systems. These systems are empowered by the unmitigated effects of colonial historical and social contexts, which dismiss alternative perspectives. Decolonial Scholars seek to highlight the contrasts in the lived experiences of

individuals whose values or worldviews differ from Western ideals, ultimately dismantling intellectual imperialism that sustains the coloniality of knowledge (Fosu, 2025, pp. 70-72; Zembylas, 2018, pp. 2-3; Dunford, 2017, pp. 382-388).

A question that is often posed is: Why is this important? Eurocentric models of knowledge production are influenced by colonial contexts, thus, the continued use of such knowledge systems without question further marginalizes and silences vulnerable communities by undermining their perspectives and lived experiences. Decolonial Scholarship acknowledges that colonial power systems continue to perpetuate societal structures and power dynamics within research, knowledge production, and institutional power systems, undercutting efforts to democratise knowledge (Fosu, 2025, pp. 73-74, Mthombeni, 2024, pp. 1-3). Therefore, in response, Decolonial Scholarship strives to re-evaluate these universal assumptions by acknowledging and valuing non-Western ways of knowing. This process seeks not erase colonial histories nor undermine Eurocentric knowledge systems , but rather seeks to foster a pluriversal approach to knowledge – one that incorporates, prioritises and values multiple perspectives, creating an inclusive and pluriversal intellectual landscape (Mthombeni, 2024, pp. 3-4; Dunford, 2017, pp. 841-842; Zembylas, 2020, pp. 22-24; Ndlovu, 2018, p. 108-110). A further discussion on Decolonial scholarship and the components relevant to this report are further discussed under Chapter 3.

Evidently, the thoughts of decolonial scholars on this question are worth contributing to foster epistemic justice, which, ensures the recognition of one's right to be recognized and respected as a knower and contributor of valuable insights on an important issue (Fricker, 2007, pp. 1-2; Motshabi, 2021, pp. 1-3). The absence of decolonial contributions on this topic may enable those ethical perspectives featured to have a disproportionate influence in the discussions on intracortical BCI and the care of Tetraplegic individuals, which is a form of epistemic injustice. To contribute a decolonial voice, this project draws on two key features of agency in decolonial

scholarship – epistemic pluriversality and active subjectivity - to clarify, query, and expand the moral perspectives that foreground the conception of agency within ethical discussion regarding the deployment of Intracortical BCIs.

It is important to mention that this research report seeks to emphasize the value of Decolonial Scholarship as an evaluative lens for discussions around agency, particularly in the context Intracortical BCIs. Rather than constructing or producing a Decolonial Theory of Action, the report focuses on decolonial agency as a crucial facet of a broader paradigm.

While references to a 'Decolonial Theory of Action' may appear throughout the report it is important for the reader to understand that the intent is not to produce a discussion around a singular theory but to engage with a framework with various facets that can be applied in all aspects of life in which colonisation has tainted (Fosu, 2024, p. 3, Reinders and Madlingozi, 2019, pp. 27-32 and 110). All facets of the Decolonial Theory of Action are interconnected and must operate in tandem with one another. The Decolonial Theory of Action, specifically seeks to redefine how action, agency and autonomy operate within decolonial thought. Although, all facets collectively challenge colonial forces on our understanding of agency, and push our understanding past the logos of rational thought, 'Decolonial Agency' (which falls under the broader concept of Decolonial Theory of Action) promotes broadening our understanding by applying decolonial principles to agency, thus including an additional narrative as opposed to redefining agency within itself.

Given the inherent time constraints of this research report, decolonial agency is my chosen point of contention in the discussions around agency. The reason being that the concept of decolonial agency as an aspect of Decolonial Theory of Agency advocates for the emancipation of marginalized groups particularly, disabled persons, through epistemic pluriversality and active subjectivity (Silva, 2019, pp. 107-114). These norms provide a constructive and comprehensive framework on which to evaluate the permissibility of

intracortical BCI's through efforts of inclusive collaboration, and recognition and respect of alternative perspectives. Therefore, Decolonial agency is merely an aspect of a greater paradigm shift towards a redefined understanding of action free from colonial constraints – The Decolonial Theory of Action (Reinders and Madlingozi, 2019, p. 60) that I believe is worth interrogating.

1.1 Literature Overview and Critique

This section describes existing positions on (intracortical) BCIs, highlights the gaps in the literature, and explains how it would contribute towards filling these gaps. Notably, scholars have emphasized their concerns about the permissibility of brain-computer interface technology as a standard of care. The general question raised within such ethical discussions is whether there is an obligation to deploy intracortical BCIs to overcome tetraplegia in motor-disabled persons. Guglielmo Tamburrini argued that using BCIs empowers users by enabling them to express their intentions through BCI-mediated action (Tamburrini, 2014, p. 148; Glannon, 2013, pp. 46-47; Kögel and Wolbring, 2020, pp. 227-228). Andrew Ko and Nancy Jecker made a similar argument based on the Capability Approach, contending that there is a moral obligation to use BCIs, framing this technology as an essential tool for enhancing human dignity and restoring agency. (Jecker and Ko, 2022, pp. 6-7). In this way, BCI is seen as instrumental to human dignity as it promotes the user's ability to perform actions, thus effectively safeguarding their agency. The underlying basis of the Capability Approach is the focus on a set of capabilities that individuals possess, which allow them to live a dignified life. All humans must reach a minimum threshold for each central capability, i.e., health, bodily integrity, etc., to optimize their lives. Therefore, any disability that lowers an individual's threshold below the minimum level hinders their ability to live a full and dignified human life. Societies must take reasonable steps to safeguard these central capabilities that are essential for leading dignified lives. According to Andrew Ko and Nancy Jecker, BCIs afford motor-

disabled persons the opportunity to restore and enhance their central capabilities, enabling them to realize a dignified life. Therefore, deploying BCIs in the care of motor-disabled persons is not only ethically permissible but required if society wants to respect the dignity of its people. (Jecker and Ko, 2022, pp. 6, 12-13; Jecker and Ko, 2023, pp. 2-3).

Conversely, opponents of BCI permissibility claim that BCIs give rise to ethical issues that should not be ignored. They argue from a deontological standpoint, more specifically, neurorights . Key proponents of this approach include Christoph Bublitz and Robert Adorno, who contend that we ought to protect our mental life, which involves preserving our cognitive liberty, mental integrity, personal identity, and psychological continuity (Ienca, 2021, pp. 2-7; Australian Human Rights Commission, 2023, pp. 10-13; Sjors Ligthart *et al.*, 2023, pp. 462 and 464). On this basis, Marcello Ienca claims that neurotechnologies such as BCIs challenge the traditional boundaries of our minds and can interfere with or alter one's mental state. BCIs have the potential to alter a user's perception of themselves and their own identity, particularly where the BCI forms a part of their daily functioning, playing an integral role in restoring a user's agency as well as their relations with others, profoundly shaping their life (Sample *et al.*, 2019, p. 3; Botes, 2022, p. 1155-1156; Friedrich *et al.*, 2018, pp. 17-19). Removing certain Interface due to technical failure or due to the conclusion of a study could disrupt their psychological identity - this encompasses their habitual thoughts, preferences, and choices (Ienca and Andorno, 2017, pp. 20-23; Sjors Ligthart *et al.*, 2023, pp. 462-463), their newfound relations with others (Gilbert, Ienca, and Cook, 2023, p. 786; Ienca, 2021, p. 8; Sample *et al.*, 2019, p. 2), such interference with their mental state impacts their self-determination and ultimately affect their sense of agency/control and self (Davidoff, 2020, p. 12; Zeng, Sun and Lu, 2021, p. 210; Sjors Ligthart *et al.*, 2023, pp. 470-471).

Both arguments in favour of and against using BCIs for motor-disabled persons converge on the theme of agency. Proponents see BCIs as a means to enhance agency. At the same time,

opposers base their main arguments around the potential to undermine the user's agential capacities further resulting in further ethical concerns over responsibility and accountability (Glannon, 2013, p. 47; Tamburrini, 2014, pp. 150-151 and 155-156; Davidoff, 2020, p. 9; Zeng, Sun and Lu, 2021, p. 210; Jecker and Ko, 2022, pp. 2, 5-6; Jecker and Ko, 2023,p. 3; Sun and Ye, 2023, pp. 2 and 4; Ienca, 2021, pp. 7-8: Gilbert, Ienca, and Cook, 2023, p. 785 and 787). The effect of BCI on a user's agential capacities is at the forefront of the ethical debate of BCI use and deployment. This raises critical questions as to what exactly constitutes "agency" and whether achieving such a state is necessary for the emancipation and recognized personhood of motor-disabled persons.

There are at least two problems with current discussions for (or not) using BCIs in the care of motor-disabled persons. *One problem* is that current discussions focus broadly on BCIs rather than *intracortical BCIs*. Notably, both arguments justifying and contesting BCI deployment are stunted by the authors' shared inability to differentiate the ethical issues that uniquely apply to the various interface technologies (Sun and Ye, 2023, p. 2). Interface technologies are divided into those that 'read' the brain signals to record brain activity and decode its meaning. These are read-out BCIs and include intracortical BCIs, EEGs, etc. Read-out BCIs are generally used to control external devices such as robotic arms, wheelchairs, etc. (Sun and Ye, 2023, pp. 2-3). There are those that 'write' to the brain to manipulate activity in specific regions and affect their function. These are known as write-in BCIs and include DBS, which is an invasive brain stimulation method that entails the implantation of electrode arrays in some regions of the brain to stimulate the target sites, effectively treating symptoms of diseases such as psychopathy, Autism Spectrum Disorder, and Parkinson's disease, to name a few (Buller, 2020, p. 156).

Therefore, while both read-out and write-in devices are brain interfaces, the manner in which the systems operate is fundamentally different, requiring different ethical conversations. Write-

in BCIs are designed to effectively manipulate brain activity to alter patients' intentions or thoughts, replacing or affecting their decision-making capacities (Buller, 2020, p. 156; Sun and Ye, 2023, p. 2). Meanwhile, read-out BCIs intend to reflect the patient's intentions through commands expressed by external devices. (Buller, 2020, p. 156; Sun and Ye, 2023, p. 3; Glannon, 2014, p. 1). While write-in BCIs may reasonably generate ethical questions regarding the permissibility of altering an individual's intentions, this is often not a concern raised by read-out BCIs like intracortical BCIs. In this regard, write-in BCIs and read-out BCIs have different impacts on agential capacities. A failure to acknowledge the more nuanced distinction between the two technologies risks, i) obscuring the unique ethical discussions to be had on, as well as the ethical implications of, each BCI type for users, and ii) hindering the meaningful and specific conversation that could play a crucial role in shaping the future of each assistive technology and the nature of the moral obligation to deploy each technology to overcome motor disabilities in Tetraplegic individuals.

A *second problem* with the existing positions on BCI use broadly is that BCIs are only worth deploying (or not) if they not only correct the impairment or disability but correct it to a form of normalcy and convention. The correction stems from wanting to inaugurate normalcy and convention, as these are the only ways to view emancipation (Jóhannsdóttir, Egilson, and Haraldsdóttir, 2022, pp. 361-363). This shows that within ethical discussions around the permissibility of BCIs, there is a reliance on conventional standards of agency. By equating normalcy and convention with personhood, we risk defining the worth of assistive technology by how well it conforms individuals to societal expectations.

The prevailing standard for evaluating the permissibility of BCIs promotes rhetoric that if beneficiaries – within this context – like Tetraplegic individuals cannot perform optimally or have their agential capacities fully restored to optimal function, it is not worth deploying. This is deeply problematic. By implying that the worth of BCI hinges on its ability to mimic the

capacities of able-bodied individuals, it perpetuates existing biases and further stigmatizes those with disabilities. For instance, Tetraplegic individuals may be unfairly judged as lacking "a crucial aspect of being a human" further undermining their dignity and agency (Welzel and Inglehart, 2010, p. 44; Nierula *et al.*, 2019, pp. 2420, 2429-2343). Such a framework not only exemplifies able-bodied norms and marginalizes their experiences but also creates barriers to access to new technology that could enhance their quality of life.

Furthermore, this limited perspective can lead to the internalized belief amongst Tetraplegic individuals that they are less than *persons*. Emancipation should be viewed as an opportunity for motor-disabled persons to express action uniquely rather than be viewed as merely striving for conformity. Reframing the discourse around BCIs requires a shift towards valuing the enhancement of individual capabilities without tethering such enhancements to conventional ideals of normalcy. Consequently, it is worth interrogating and broadening the conception of agency, specifically within the context of *intracortical* BCI use beyond the conventional understanding, if we wish to foster more respectful care of Tetraplegic individuals. Precisely, while this endeavor agrees – unlike the opponents – that agency is a valuable concept for grounding the permissibility of intracortical BCIs for addressing issues around motor disability, it contends that this conception needs to be carefully broadened beyond its current use in this conversation, given the identified ethical issues that are associated with this current use.

To broaden the thinking about agency, this endeavor contributes insights informed by the under-explored conception of agency as understood by decolonial scholars. Two key emerging normative features of agency in decolonial scholarship have implications for the aim of this project. They include active subjectivity and epistemic pluriversality. Epistemic pluriversality "rejects the hegemonic dominance of one [perspective; it] instead prompts individuals to recognize and place value on multiple ways of knowing or thinking to foster inclusivity." This feature of agency emphasizes the importance of intentionally building a

democratic (rather than hegemonic) process for knowledge production, a multiplicity of centers (Reinders and Madlingozi, 2019, p. 11 and 61-65). Active subjectivity is the “active engagement of persons in challenging epistemic domination and asserting their subjectivity or perspectives." It allows oppressed and silent communities like Tetraplegic individuals to exercise a form of agency by critically engaging in the meaning-making process that is centered on their socialites, experiences, and perspectives (Lugones, 2005; Lugones, 2020, p. 34; Eggleston *et al.*, 2019, pp. 5-6 and 27-28; Hicham, Ghazouane and Farouk, 2021, pp. 57 -58). This conception could validate the unique lived experiences of tetraplegic individuals, affirming their worth and encouraging equitable access to assistive technologies that empower rather than stigmatize. This project does not make the claim that the decolonial perspective is the most ethically plausible perspective for this project’s aim. However, the decolonial perspective would still be worth contributing to enhance epistemic justice, even if it is a less ethically plausible perspective. Future studies can focus on contributing other ethical perspectives.

1.2. Research Question

The central research question this endeavor interrogates is, “Is the decolonial view of agency a valuable perspective for interrogating and broadening the conception of agency (within the context of intracortical BCI use) in ways that avoid reinforcing implicit stigmatization of tetraplegic individuals inherent in the dominant justification for deploying (or not) intracortical BCI in the standard care of Tetraplegic individuals?

1.3. Rationale for the Study

The project has academic and social values. Concerning its academic value, this project uses an under-explored decolonial understanding of agency to expand the current discussion about deploying BCIs past the dominant thinking of agency to a pluralistic understanding of agency that morally requires us to seek out alternative perspectives of agency that are intrinsically

valuable (Eggleston *et al.*, 2019, pp. 18-21 and 26-27). This should be of interest to academic scholars, who are keen to learn how decolonial perspectives may be used to address ethical issues that new and emerging technologies like intracortical BCI raise.

This project also has a social value. Notably, the public health importance of this project for tetraplegic and motor-disabled persons cannot be over-emphasized. By exposing how current arguments and counter-arguments can carry within them stigmatization or views that have negative implications for those these arguments are positioned as serving, the project fosters respect for tetraplegic and motor-disabled persons. It also forces critical conversation that needs to be had about respectful care of tetraplegic and motor-disabled persons. It does this by ensuring that the deployment of intracortical BCIs and other assistive technology is grounded in ethical principles that respect the integrity and reflect the needs of those it seeks to aid.

1.4 Thesis

I contend that the decolonial view of agency is a valuable perspective for interrogating and broadening the conception of agency (within the context of intracortical BCI use) in ways that avoid reinforcing implicit stigmatization of Tetraplegic individuals inherent in the dominant justification for deploying (or not) intracortical BCI in the standard care of Tetraplegic individuals.

1.5 Research Aim

The project's primary aim is to defend the thesis described in the previous section.

1.6 Research Objective

1. To outline the normative framework from which ‘agency’ is advocated and contend how this conception of agency incorporates harmful able-bodied norms that risk

entrenching the discrimination of disabled persons broadly and Tetraplegic individuals in particular, who are paradoxically positioned as being served by these arguments.

2. To defend the relevance and importance of moral norms arising from the core features of agency (epistemic pluriversality and active subjectivity) in decolonial literature for challenging and broadening the conception of agency.
3. To address potential objections against my thesis and justifications.

1.7 Research Design and Methods

This research report is a Type I project. Precisely, it is a primarily conceptual and normative bioethical project. As a result, the research method will mainly be desktop-based research, and relevant literature will be derived from databases such as Google Scholar, Elsevier, PubMed, and the Wits Library database. This may include, but is not limited to, journal articles, dissertations, books, and web-based articles.

1.8 Argumentative Strategy

To *realize objective 1*, I will critically interrogate how the term ‘agency’ has been used in relation to the deployment of BCIs broadly. This is important to pinpoint the moral approach that grounds this conception of agency. Here, the project will contend that the term agency, as it is currently used in the ethical discussion on whether or not to deploy intracortical BCIs in the care of tetraplegic carry inherent risks for Tetraplegic individuals themselves, who are, on account of these arguments, positioned as less than persons. So, these arguments likely stigmatize Tetraplegic individuals.

To *realize objective 2*, I will give a comprehensive overview of ‘agency ‘as understood within decolonial scholarship, outlining its core features (particularly active subjectivity and epistemic pluriversality) and justifying the moral norms to which these features give rise. After teasing out the moral norms that arise from these features of agency, I will demonstrate how these moral norms imply a prima facie moral obligation to deploy intracortical BCI in the care of

Tetraplegic individuals. Additionally, I will also explain how this conception of agency avoids the stigmatization of Tetraplegic individuals.

To *realize objective 3*, the paper will address objections to the thesis. A critic may argue that while advocating for disability diversity is made in good faith, such arguments oftentimes overlook the tension between embracing disability as a form of human diversity and recognizing the harm and suffering that certain disabilities cause. Expanding the understanding of agency to be more inclusive could undermine the idea of bodily normality. (Bognar, 2015, p. 46). Framing disability as a difference that ought to be celebrated as opposed to the harm suffered by individuals that needs to be corrected could neglect the suffering and functional limitations that may severely impact one's quality of life.

In response, I will contend that medical practitioners are ethically obligated to provide the best possible care for individuals, particularly when disability results in harm and suffering (Varkey, 2020, p.18; Bognar, 2015, pp. 46-47). The aim thereto is not to augment them to conform to a norm but to alleviate them of pain and suffering. There is a need to balance the celebration of diversity with the need to protect individuals from harm.

In addition, I will also clarify my key objective. Precisely, the key question is: How can we expand the conception of agency to include diverse bodily experiences without dismissing the suffering that some disability causes? The two features of the decolonial conception of agency (epistemic pluriversality and active subjectivity) prioritize diverse perspectives, ensuring that no single way of thinking takes priority over the other (Reinders and Madlingozi, 2019, p. 9-10). Decolonial agency advocates for productive dialogue between key stakeholders, namely, Tetraplegic individuals and medical practitioners. (Kaunda, 2015, pp. 75-76). The argument raised by the project does not seek to dismiss the need for medical intervention. Rather than enforcing a single unattainable standard of normalcy that may be inappropriate, the decolonial agency demands that we expand this conception to promote an inclusive medical standard

that acknowledges and is centered around individual needs. This user-centered approach enhances the quality of care by respecting the diversity of human bodies and experiences and allows Tetraplegic individuals' lived experiences and specific needs to drive the development and deployment of assistive technology that genuinely improves their quality of life (Wilkinson *et al.*, 2016, p. 67; Tao *et al.*, 2020, p. 1026) without further perpetuating stigma (Kübler *et al.*, 2014, p. 2; Fischer, Peine and Östlund, 2019, p. e513; Sujithra Raviselvam *et al.*, 2016, pp. 131-132).

1.9 Research Outcomes and Outputs

This project will contribute to the award of the M.Sc. degree in Bioethics and Health Law. Equally, I anticipate a publication output in an accredited journal, particularly AJOB Neurosciences. Finally, my project will make a positive contribution to the necessary conversation that needs to be had about broadening the underlying ideologies that inform the deployment and use of new and emerging technologies.

1.10 Limitations

This project has some limitations. Although I frequently mentioned in this proposal that it is important to invite the perspectives of Tetraplegic individuals in the deployment of intracortical BCI, my study only justifies this importance, and thus, it is not a qualitative study. Qualitative studies would be required to explore Tetraplegic individuals' opinions on what they would define as agency and whether, on that premise, they would argue that there is an obligation to implant or deploy intracortical BCI in their care. However, this is a conceptual project. Nonetheless, I do not consider this limitation intrinsically problematic since the decolonial view of agency that I draw on *centers* the importance of undertaking such qualitative projects.

1.11 Overview of Chapters

1.0 Introduction

2.0 Standard Theory of Action and BCI-mediated actions: Challenging the able-bodied lens

3.0 Decolonial Scholarship and Agency: Redefining Agency in the Context of Intracortical BCI use

4.0 Addressing Potential Objections

5.0 Conclusion

1.12 Ethical Approval

This research report is primarily conceptual and normative. Therefore, it does not involve research with humans and/or animals. Therefore, I will not apply for ethical approval from an Ethics Committee.

Chapter 2: Standard Theory of Action and BCI-Mediated Actions: Challenging the Able-bodied Lens

2. Introduction

As stated in the previous chapter, many scholars recognize the importance of integrating intracortical BCIs to enhance the agency of Tetraplegic individuals. However, the conception of agency that underlies many arguments is often non-specified. What does it mean to exercise agency? What normative framework underlies the conception of agency often purported? How do intracortical BCI-mediated actions constitute actions of an agent as underscored by the normative frameworks purported by proponents? Whether we *ought* to deploy intracortical BCIs on the condition that they enhance agency depends a lot on what it means to act or exercise agency. Failing to define agency may result in grave implications for intracortical BCI users.

This chapter is crucial since it explains how the conception of agency that underlies arguments, particularly in favor of deploying intracortical BCIs in the care of Tetraplegic individuals, can have adverse implications for those who are paradoxically positioned as being served by these arguments. To realize this task, this chapter considers questions like: What about changing our environment through movement is indicative of exercising agency? Is it appropriate to deem intracortical BCI-mediated actions as comparable or equivalent to "ordinary" action as underscored by the relevant normative framework? However, to have a thorough discussion about intracortical BCIs, it is vital that we reiterate, discuss, and categorize the different types of BCI so as to better understand the exact kind of BCI discussed along with its ethical implications. This chapter fulfills this task.

2.1 Clarifying BCI Types

BCI is an umbrella term utilized to represent several techniques in which the neural activity of the motor cortex is measured and decoded, allowing for direct communication between the brain and an external device (Vlek *et al.*, 2014, p. 193). The growth of research and applications of interface technologies has spurred extensive discussion about their ethical implications. However, very few publications distinguish between the various types of interfaces that fall under the umbrella term BCIs. The failure to properly distinguish between write-in BCIs and read-out BCIs could cause ethical discussions around these technologies to be misdirected (Sun and Ye, 2023, pp. 2 and 6). BCIs can be differentiated based on i) non/invasiveness and ii) activity. We discuss these different types in the subsequent sections.

2.1.1 Invasiveness

There are two main types of BCIs: noninvasive and invasive. A non-invasive BCI involves the implantation of sensors on or very close to the head. This form of BCI allows the sensors to measure brain signals from multiple points of the brain, thus identifying a wide range of brain activity. EEG is by far the most common method for measuring electrical brain activity non-invasively (Steyrl, Kobler, and Müller-Putz, 2016, p. 394; Waldert, 2016, pp. 1-2). Invasive methods involve deeper implantation inside the user's skull, allowing different interfaces such as intracranial EEG (ECoG and stereo-EEG) or intracortical and intraparenchymal micro-arrays to be installed into the limbic system to sense and decode electrical activities of the brain cells within the motor cortex (Steyrl, Kobler and Müller-Putz, 2016, pp. 393 and 394; Zaer *et al.*, 2021, p. 2) Depending on whether the system used is an active BCI the user is required to imagine performing a certain action and that motor imagery elicits changes in the neural activity within the brain and these neural signals are subsequently translated to control movements of a robotic arm (Steyrl, Kobler and Müller-Putz, 2016, pp. 193 and 194). Intracortical electrodes, for example, detect what is seen as “spikes” from single neurons

surrounding the electrode (Dong *et al.*, 2023, pp. 1-2). The pike is the electrical signal that best reflects the neural activity of the brain.

Invasive BCIs, such as Intracortical BCIs, provide the best performance (Shishkin, 2022, pp. 1-3), as they record and decode neural activity in a much more precise manner as they get much closer to the neurons they record (Bergeron *et al.*, 2023, pp. 224-225). In contrast to other BCIs, invasive BCIs offer users accurate control, combined with restoration of somatosensation (Waldert, 2016, pp. 2-3). In this regard, Intracortical BCIs provide the greatest and most precise reading of neural activity within the motor cortex, resulting in a more accurate outcome, i.e., movement of the robotic arm that reflects the user's intention (Vlek *et al.*, 2014, p. 195; Shih, Krusienski and Wolpaw, 2012, p. 270).

2.1.2 Activity

BCIs may also be characterized as either passive or active paradigms. Put simply, this means that BCIs allow for both monitoring and control. In active BCIs, the user is able to send motor commands through voluntary, intentional modulation of their brain waves to control an external device without depending on external events. Whereas passive BCIs are used for monitoring and acquiring information on the user's psychophysical state, meaning that the user does not interact with the device directly or voluntarily (Angrisani *et al.*, 2021, p. 1). Intercortical BCIs are considered active BCIs. This means that to effectively utilize the BCI, the user must intentionally perform a mental task, be it through motor imagery, mental counting, mental imagery or music imagery, in order to perform an action. This is because, although tetraplegics suffer damage to their spinal cord, they still retain active motor cortex neurons even when individuals use motor imagery to imagine or observe movements (Davidoff, 2020, p. 2; Glannon, 2013, p. 51). When individuals with tetraplegia imagine or attempt to execute movements through motor imagery, motor cortex neurons show context-dependent activity patterns within the motor cortex. The BCI will detect and decode the neural signals from the

performed mental task and process it into a command. In the context of Intracortical BCIs, the most commonly deployed mental strategy is motor imagery.

To perform an action utilizing BCIs, the user must imagine themselves moving a part of their body. For example, intentionally performing motor imagery of the right hand activates primary somatosensory as well as the corresponding areas within the motor cortex that correspond with the right hand. Meaning that there are different activation patterns when imagining left-hand movement. The Intracortical BCI picks up these different activation patterns, decodes and translates them into motor command signals to control an external device. For example, intracortical BCI users are able to send motor commands to a robotic to reach over and grab a glass by imagining reaching arm movement (Steinert *et al.*, 2018, p. 466). Although current ethical discussions on *intracortical* BCIs are nearly missing, in the next sections, I will explore and problematize current justifications for integrating BCIs in the care of Tetraplegic individuals.

2.2 Agency and the Causal Theory of Action

There are copious philosophical theories concerning how an agent can exercise agency. Although it is sometimes unclear how proponents and critics of BCIs use in the care of tetraplegics conceptualize agency, other times the conception of agency they draw on appears to be foregrounded by the theories of action. The main purpose of the philosophical theories of action is to describe instances in which an executed movement would be accurately deemed culpable and intentional, thus drawing a clear distinction between activity and passivity or mere happenings (Buller, 2021, pp. 156-157; Hornsby, J, 2004, p. 1-3). One prominent theory of action is the Causal Theory of Action (CTA) (Aguilar and Buckareff, 2010, p.1). This section and subsequent ones demonstrate that based on this theory, first, the BCI-mediated actions of a tetraplegic BCI user would hardly constitute the actions of an agent, as

understood under CTA, implying that the Tetraplegic individuals can scarcely be said to exercise agency on this ground. Second, due to this discrepancy, it may be argued that the CTA conception of agency is ableist and will ironically prevent Tetraplegic individuals from accessing this neurotechnology.

Within the context of neurotechnology and informed by the CTA, proponents of BCIs broadly sometimes justify the deployment of BCIs for Tetraplegic individuals to the extent that such deployment promotes “optimal agency” and “restoration” of agential capacities (Sample *et al.*, 2023, pp. 522-523; Friedrich *et al.*, 2018, pp. 19 and 21-24; Sankaran *et al.*, 2023, p. 1; Kögel and Wolbring, 2020, pp. 227-228). Optimal agency and restoration of agential capacities in these arguments refer to a state in which an individual is no longer suppressed by or encumbered by any limitation or reliant on others. Accordingly, it may be reasoned that we *ought* to deploy iBCIs in the care of Tetraplegic individuals on the standard and condition that it optimally enhances their ability to perform self-initiated, purposive, and intentional actions.

The CTA has been the prevailing framework in the philosophy of action and agency (Schlosser, 2011, pp. 1-2). It is sometimes referred to as the ‘standard story’ of human action (Buller, 2021, pp. 12 - 13; Aguilar, 2020, p. 3; Hornsby, 2004, p. 1; Steinert *et al.*, 2018, pp. 459 and 466; Aguilar and Buckareff, 2010, pp. 1-9). The standard story is aptly described by this slogan: 'Beliefs and desires cause actions, i.e., bodily movements.’ The CTA offers a necessary condition for action. It states that for an action to be appropriately deemed an action of an agent, it must have been caused by an agent’s mental state. These mental states have specific content (action plan) that represents some desire, belief, or intention, which can be simple or detailed (i.e., I desire water) (Buller, 2020, pp. 156 -157). This theory is, therefore, mainly concerned with mental states and implies that there is a causal link between conscious mental states and corresponding actions (Bonicalzi, 2019, p. 121; Steinert *et al.*, 2018, pp. 466- 467; Davis, 2010, pp. 32-33). In general terms, intentional actions are comprised of

intrinsically complex compounds, which include swift bodily movements and conscious, intentional states, meaning that your desire to drink water can be translated to the specific motor action of reaching your arm to grab a cup (Aguilar, 2020, pp. 4-5; Bonicalzi, 2019, p.p. 122-123). This separates actions from mere happenings as a mental state must precede actions, be it desire or intention. On this basis, an involuntary and/or automatic movement, such as a spasm, would not be deemed an action, according to the CTA. (Davis, 2010, pp. 32-34; Bonicalzi, 2019, p. 121-123 and 135).

The emergence of intracortical BCIs challenges the prevailing notions of human action and agency, raising pivotal questions such as if, under the CTA, BCI-mediated actions constitute "ordinary" actions. Authors such as Christoph Bublitz, Ralf Jox, Orsolya Friedrich, and Tom Buller argue that BCI-mediated actions do not constitute paradigmatic or ordinary actions of an agent from the point of view of CTA. To understand their reasoning, consider this scenario that is described below:

> *Sarah is a person with tetraplegia who lost all motor function 10 years ago due to a spinal cord injury. Sarah sought motor rehabilitation and underwent surgery to implant an intracortical BCI device into her brain that detects her movement intentions, enabling her to control the movement of her right arm with the aid of a robotic prosthetic arm. As a result of the surgery, Sarah is now able to reach out her robotic arm to pick up her cup to take a drink and/or feed herself.*

Sarah's movements could be deemed to satisfy the essential requirement for an action under the causal theory. In other words, Sarah is assumed to have acted or executed physical action based on the view that the movement of her robotic arm is caused by her desire for more coffee (Buller, 2020, pp. 156-159). However, Causal Theorists of Action like Steffen Steinert, Christoph Bublitz, Ralf Jox, and Orsolya Friedrich (Steinert *et al.*, 2018, p. 457-458), as well as Tom Buller (Buller, 2021, p. 13; Buller, 2020, p. 156) question whether it is appropriate to

claim that a person's intention to effect movement is the direct cause of bodily movement in BCI-mediated action. According to them, BCI-mediated actions are not like "ordinary" actions as they do not follow the same causal process as "ordinary" movements. To understand how, notice that in BCI-mediated actions, the Intracortical BCI systems – within this context – act as an intermediary. This raises the concern of whether the user initiates the causal process. It seems not because Tetraplegic individuals cannot send motor commands to their body parts to execute bodily movements (Buller, 2020, p. 157; Grahn *et al.*, 2014, pp. 1-2). The intracortical BCIs bridge this gap. Meanwhile, philosophers of action who argue from the causal account of action attribute intentional actions to a causal chain that connects our intention to move, i.e., our mental state, to the physical execution of the movement. These scholars contend that for a movement to be appropriately deemed an action, it must be caused in the right way, that is, as a *direct causal consequence* of the agent's mental state that constitutes the agent's reason for acting. This is known as a nondeviant process (Bonicalzi, 2019, pp. 121-123; Steinert *et al.*, 2018, p. 466). The nondeviant process entails the idea that *the agent's mental state directly causes the execution of an action*.

However, within the context of Intracortical BCIs, BCI-mediated actions involve a deviation in the causal process. This is because the user is entirely dependent on the interventions of the tech, an external element, to execute the action. In this instance, it is the presence or the absence of the Intracortical BCI that makes a difference in whether a tetraplegic like Sarah can affect movement (Buller, 2020, pp. 156-159). Without the external device, that is, the Intracortical BCI, Sarah is completely unable to effect movement (Buller, 2021, p. 19).

Furthermore, another concern expressed by scholars like Tom Buller is the usability and control of the relevant device. With current Intracortical BCIs, a user's control over the device in executing any movement is still often effortful, cumbersome, and susceptible to errors. This is due to the fact that the user's control is constrained by the nature and function of the device,

i.e., its capacities/sensitivity and reliability (Steinert *et al.*, 2018, pp. 468-472). Sensitivity is defined as the device's capacity to execute a bodily movement that accurately reflects the agent's mental state (intention to move). Current BCIs have a limited range of motion and freedom. For example, if the device only permits the user to execute the movement in only four directions (up, down, left, right), it could be argued that compared to paradigmatic movements, it significantly contracts the user's intentions to the action output, i.e., the specific actions that can be effected (Buller, 2021, pp. 19 -20: Buller, 2020, p. 160). If Sarah were to use an intracortical BCI-controlled wheelchair to make a complete turn, it would require her to give constant commands, for instance, "left, left, left," in order to effect the intended action of making a turn. Unlike "ordinary" actions, which affect movement in a fine-grained way, intracortical BCI-mediated actions are still cumbersome as the user has limited options when executing or controlling specific actions (Steinert *et al.*, 2018, pp. 472; Rainey, Maslen, and Savulescu, 2020, pp. 48-49). Additionally, sensitivity is expressed when the mental state of the agent changes, and the bodily movement acts accordingly. With conventional actions, one is able to execute an action, i.e., throwing a ball, but is also able to subsequently alter their intention and thus modify their action. Current BCIs are incapable of what is termed veto control – this refers to stopping outputs from happening - which results in involuntary externalization of movements that the user may not desire (Rainey, Maslen, and Savulescu, 2020, pp. 46-49; Steinert *et al.*, 2018, p. 471).

On the other hand, a device is deemed reliable if it performs as expected with a high degree of probability (Buller, 2020, pp. 158-159). For a movement to be deemed an intentional action, it is not sufficient for the intention to effect action and the affected bodily movements to co-occur occasionally (Buller, 2020, p. 162). The intracortical BCI-mediated effect must reliably match the user's movement intentions or movement goals. Current BCI devices, including intracortical devices, are only capable of detecting and decoding a user's motor or movement intentions (i.e., arm position and velocity) rather than actualizing the content of the user's

mental states (Buller, 2021, p. 20: Buller, 2020, pp. 158 -159). To put it simply, intracortical BCI devices cannot accurately discriminate between motor commands and the users' intentions or desires. The BCI can detect the command to execute a reaching movement to a target, but it cannot interpret that the user intends to pick up a cup to satisfy the user's desire to drink some coffee.

If we revisit the scenario with what we have discussed about the causal process, it becomes apparent that if Sarah lacks the intention to pick her cup up but can effectively achieve that goal by reaching out her arm by means of imagining picking up her book, for example, she has effected the action but has failed to execute an intentional action. If any mental state can cause a bodily movement, be it imagining or intention, this suggests that it is not the intention that is doing the causal work, and the device lacks reliability (Buller, 2021, pp. 20 and 23).

Having set out elements of the CTA in contemplation of BCI-mediated action, we can revisit the argument raised by proponents. As stated previously, proponents argue for the deployment of BCIs on the standard that it promotes a desired functionality, which is "optimal agency," i.e., BCI-mediated actions ought to resemble "ordinary" behavior. This means that users should be able to control movement using the same mental processes used in "ordinary" actions. However, it is evident that according to the causal accounts of agency, some BCI-mediated movements are too coarse-grained and fail to emulate the fine-grained movements of pragmatic or "ordinary" actions. Henceforth, it may be concluded that BCI-mediated behavior has core features that distinguish it from ordinary behavior. This conclusion raises key questions as to whether, according to causal theory, an intracortical BCI user – for example – is actually *doing* something and is, therefore, exercising agency.

Arguably, causal accounts of agency, as well as other normative theories that attempt to explain action, particularly within the context of motor-disabled persons, often overlook the person's capacities in the moment of executing a movement. Therefore, even if the agent's

movements are caused by antecedent states such as the intention to drink coffee, it seems that an occasional error or even the functional limitation of current Intracortical BCIs disqualify such agents from having executed an action simply because they lack control over the movement. Thus, basing the deployment on the idea that intracortical BCI users like Tetraplegic individuals ought to act with optimal agency, at best, creates a narrow depiction of agency and fails to consider the dynamics of human functionality and the expansion of action under the use of neurotechnology in the rehabilitation of motor-disabled persons. Moreover, a failure to meet the standard of action or "optimal agency" risks subjecting motor-disabled individuals to normative prescriptions and assumptions about their capacity for action as being invalid. This would, by default, invalidate their lived experiences as motor-disabled individuals (Reynolds, 2016, p. 38).

2.3 Ableism and Implication

Agency, as understood under the CTA, is shortsighted as it prioritizes a form of agency that is often associated with non-disabled persons. Nicole Brown and Jennifer Leigh identified ableism as a knowledge system that is essentially excluding. Precisely, it is "a network of beliefs, processes, and practices that produces a particular kind of body (the corporeal standard, i.e., able-bodied) that is projected as the perfect or right way of being" (Campbell, 2020, p. 5). Ableism functions to 'inaugurate the norm.' It is not just a matter of ignorance but acts to project perfection onto nonnormative bodies, altering the manner in which we think about bodies. (Campbell, 2013, p. 206; Jóhannsdóttir, Egilson and Haraldsdóttir, 2022, pp. 361-362).

The internalization of ableism is evident in the use of terminology such as "optimal agency" as understood by the CTA. The problem with this conception of agency is that it implies that there is only one way of executing an action or exercising agency, and there is a wrong way. It

appears that the BCI-mediated actions executed by motor-disabled users would fall within the latter. This expression purports motor-disabled BCI users are inactive agents. If one were to agree with proponents' reasoning for deploying Intracortical BCIs on the grounds that it promotes a desired functionality that mirrors “ordinary” actions, the consequences thereto would be dire. We would be purporting an unattainable standard whilst perpetuating an idea that intracortical BCIs are only worth deploying *if and only if* they *correct* the impairment or disability to a form of normalcy.

Thus, utilizing a “causal or intentional agency” as the standard of deploying intracortical BCIs not only promotes able-bodied norms but also has adverse implications for Tetraplegic individuals whose interests the arguments are presented as serving. Hinging the deployment of intracortical BCI on an unrealistic standard creates a barrier to accessing assistive technology by stating that if users do not meet the normative standard, it is not worth deploying. If it were deployed on such a standard, it would create high feedback expectations from Tetraplegic individuals to display optimal functioning. These expectations set the terms of users' participation within society and may restrict or exclude individuals who fail to meet that standard, resulting in further ostracization (Sample *et al.*, 2023, p. 523). This can unintentionally shape the internal experiences of those using it (Wilson, 2024, p. 7). Users, particularly Tetraplegic individuals, who fail to meet the standard may experience feelings of shame, resulting in the abandonment of the technology.

In view of the preceding points, it is worth querying how devices that are created and standardized or deployed by normate values may impact users and whether we can change that (Phillips and Zhao, 1993, p. 272; Nijboer, 2015, pp. 36-37). This is all the more important given the well-justified tendency to think of motor-disabled individuals as less articulate or less reliable even though they still retain their cognitive function (Silva, 2019, p. 123; Glannon, 2013, p. 46). As a result, they are assumed to lack the required cognitive sophistication

needed to engage in intellectual discussions – that is, they are less likely to be consulted, particularly in the (development and) deployment of assistive devices that are targeted at them (Silva, 2019, p. 123). This way of thinking of motor-disabled persons as merely end users incapable of deep thought about their own bodies further plays into ableist ideologies (that disabled persons cannot contribute anything of inherent value) and, in many ways, is paternalistic. These paternalistic actions could perpetuate negative stereotypes of the disabled and hinder any meaningful conversation to be had on how – within this context – neurotechnology can influence our thinking about agency.

To avoid these paternalistic and abled-bodied norms, it is worth engaging Tetraplegic individuals if we wish to make any meaningful and inclusive contribution towards the ethical discourse around intracortical BCI deployment. According to Arseli Dokumaci's habitus of ableism, it is simply insufficient to adjust our attitudes towards disabled individuals (Wilkinson, 2024, p. 5). Instead, we should encourage the involvement of motor-disabled individuals in the (development and) deployment of intracortical BCIs. Mark Johnson also adds that unless we can associate and empathize with others to broaden our own conception of agency through their experiences, then we cannot be morally sensitive (Johnson, 1993; Vargas, 2024, pp. 48-50).

2.4 Concluding Remarks

This chapter justifies how the conception of agency that underlies arguments, particularly in favor of deploying intracortical BCIs in the care of Tetraplegic individuals, can have adverse implications for those who are paradoxically positioned as being served by these arguments. Notably, current arguments that particularly favour the deployment of this new technology will likely position motor-disabled individuals as less than persons. As the chapter explains, there are other broader societal implications, like the ostracization of motor-disabled individuals, that can arise from this view. This chapter concludes by acknowledging that it is worth broadening

our conception of agency beyond the dominant thinking about agency that underlies the proponents' justification for the permissibility of deploying this technology. A clearer conceptual framework of what it means to act could furnish a more productive and inclusive evaluative structure in which proponents such as theoreticians, researchers, and manufacturers alike can operate. The next chapter will articulate a new conception that avoids this implication.

Chapter 3: Decolonial Scholarship and Agency: Redefining Agency in the Context of Intracortical BCI Use

3. Introduction

This chapter introduces and explains the conception of agency grounded in decolonial ethics, emphasizing its core features, such as epistemic pluriversality and active subjectivity, as well as the moral norms to which they give rise. This chapter also seeks to explain exactly how these core features can further the conceptualization of agency to aid arguments made around the permissibility of BCI deployment. This chapter is integral in describing how the conception of agency grounded in decolonial ethics avoids the grave implications associated with the conventional conception of agency in the ethical discourse on the care of Tetraplegic individuals. To realize the objective of this chapter, first, I describe decolonial ethics. Subsequently, the chapter highlights key features of the decolonial conception of agency before justifying how it avoids the negative implications associated with the conception of agency identified in the previous chapter.

3.1 Decolonial Ethics

An ethic is decolonial if it aims to end the domination, silencing, and destruction of groups and the environment everywhere. Notably, it is common to describe decolonial ethics as the ethics of de-silencing that addresses the material aspects of coloniality, like the destruction of the environment and lives, as well as the immaterial ones, like epistemological dominance (Atuire and Rutazibwa, 2021). Since the preceding are global issues, decolonial ethicists are

spread across the globe. Some of these decolonial scholars include Bonaventura de Sousa Santos, Nelson Maldonado-Torres, Maria Lugones, Frantz Fanon, Olufemi Taiwo, Caesar Atuire, and Olivia Rutazibwa, to name a few. One advantage of decolonial ethics is that it seeks to challenge and redefine the universalization of a particular epistemological perspective, particularly where such an epistemologically dominant perspective continues to uninhibitedly shape societal norms and practices in problematic ways (Dunford, 2017, pp. 385-390). This point is relevant to this project's aim.

The use of epistemologically dominant perspectives is evident in the philosophical discussions regarding the standards of care of tetraplegics. As justified in the previous chapter, these inquiries often employ a conception of agency informed by the CTA as the motivating or decisive factor in improving the standard of care, leaving unexplored other perspectives (Zembylas, 2020, p. 19). However, a CTA-informed conception of agency prioritizes actions that are associated with able-bodied norms and, in the process, risks stigmatizing Tetraplegic individuals. This section describes an alternative conception of agency grounded in decolonial ethics, outlining how the decolonial ethics-informed conception of agency avoids the many problems associated with the CTA-informed conception of agency. Notably, the section justifies why redefining agency from a decolonial point of view offers a better perspective (that does not promote ableism) for integrating intracortical BCIs as a standard of care for Tetraplegic individuals.

3.2 Redefining Agency through a Decolonial Lens

Understanding and exploring different concepts of agency is vital for researchers in artificial intelligence who wish to build and deploy computer interfaces for motor-disabled persons (in)capable of purposeful autonomous action (Millican and Wooldridge, 2014, p. 548). This is because the conceptualization of the problem that intracortical BCIs are designed to solve, as

well as the justifications that are provided for their deployment, can have positive or negative implications for those who are positioned to benefit from the technology. To deploy effective technology that respects and meets the needs of its users, the points in the preceding sentence are worth taking seriously. Within this context, the belief is that the agency of tetraplegic individuals is significantly undermined by their condition and ought to be corrected, that is, *restored*. Tetraplegic individuals' Suppose the deployment of intracortical BCIs hinges on its ability to restore agency. In that case, there would be severe limitations in deploying intracortical BCIs in the care of Tetraplegic individuals since its deployment will not likely restore their agency as conceptualized by CTA. Hence, a nuanced understanding of agency – beyond the dominant CTA account – is essential to assess its permissibility (Young, 2020, pp. 1-3) accurately. For this task, the project draws on the decolonial lens.

There are two prominent features of agency that emanate in the description of the same by decolonial scholars and ethicists. They include active subjectivity and epistemic pluriversality. Although there are other features of agency, these two are relevant to the aim of this project. The project describes these features in the subsequent sections. Here, it is worth stating that the concept of agency in decolonial ethics is intrinsically linked with that of power, entailing not only the ability to choose but to choose otherwise. It involves a subject actively defying the conditions made by (oppressive) structures, acting against them or challenging their boundaries and implementing an alternative to the norm (Hicham, Ghazouane, and Farouk, 2021, pp. 45-47; Kaunda, 2015, pp. 77-78). This means the decolonial agency's core features compel agents to expand their understanding and application of agency past the logos of intentionality, hierarchies of reason, and/or linear causality (Eggleston *et al.*, 2019, pp. 68-69).

3.3 Agency, Epistemic Pluriversality and Decolonial Ethics

Epistemic pluriversality is one core feature of agency that emerges from published studies on the same by decolonial scholars and ethicists. Authors attribute different descriptions of epistemic pluriversality. First, some decolonial scholars consider epistemic pluriversality as a critique and response to universalism. Thus, it is anti-universalism. Reinders and colleagues describe universalism as a process in which a single hegemonic paradigm is promoted and generalized as the universal experience of the world and the only ethically valuable truth (Reinders and Madlingozi, 2019, p. 61-62 and 117; Hicham, Ghazouane and Farouk, 2021, pp. 36-37, 60). Universalism facilitates the dominance of one overarching knowledge system, value, interest, or paradigm by undermining other systems' capacity to make meaningful contributions to prevailing discourses (Silva, 2019, pp. 114 and 122-123). To perpetuate its hegemonic dominance, any commonality other knowledge systems, values, and perspectives have with the dominant thinking is encouraged. On the other hand, other inconvenient differences are rejected as worthless (Silva, 2019, p. 114).

Universalism also undermines the free exercise of a dominated group's agency by preventing them from drawing on their own knowledge systems to make sense of the world. This harm is sometimes described as "the imperialism of the mind" (Kaunda, 2015, pp. 79-80). The problem with this form of intellectual imperialism, or the failure to authentically engage, is that even statements made in good faith may perpetuate the hegemonic dominance of one perspective, thereby deauthorizing alternative perspectives. This occurs because the claims made by the 'privileged individual' have a significant impact on discourse, potentially distorting the truth (Alcoff, 1991, p. 10). In other words, the minds of those oppressed by the dominant system are conditioned and forced to be conceptually dependent on their oppressors to make choices on their behalf (Kaunda, 2015, pp. 80-82). Within this context, oppressed minds are unable to exercise agency over their own lives because their understanding of themselves and others

like them is externally imposed and created by oppressive power structures and knowledge systems. (Silva, 2019, pp. 112-113).

As a critique and response to universalism, epistemic pluriversality encourages agents to resist and reject domination, as well as delink themselves from the idea that rationality is defined by adherence to dominant thinking, particularly where such dominant thinking finds its basis in outdated frameworks. One exercises one's agency not only by drawing on other knowledge systems to make sense of the world but also by opening one's mind to alternative perspectives, particularly those that oppose dominant ideals. (Zembylas, 2020, pp. 3-9).

Second, epistemic pluriversality is also conceptualized by some authors as a value that promotes harmony and coexistence of plural knowledge systems and values. The harmony and coexistence of plural values emerge as the outcome of dialogue across multiple cultures and visions about the world (Mignolo, 2011, pp. 73-74; Zembylas, 2020, pp. 8-9). By opening up dialogue to incorporate alternative viewpoints, we not only challenge the discriminatory and paternalistic practices attached to dominant systems that maintain inequitable power relations (Mushonga, 2017, p. 193; Ndlovu, 2018, pp. 95-101 and 105-106), we also enable agency. This is because true agency is exercised when subjects are empowered to contribute their varied perspectives and lived experiences, and such contributions are equally valued and acknowledged within the discourse (Zembylas, 2020. p. 18; Kaunda, 2015, pp. 83-85)

Consequently, it (epistemic pluriversality) values a world in which other worlds are possible and multiple worldviews, practices, and livelihoods coexist, and each has global significance and is given equal recognition and respect on global issues, as well as primary recognition on issues that affect each group (Zembylas, 2020, pp. 22-24). Notably, the epistemic pluriversal way of speaking centers on the recognition of different perspectives and values. This allows for the coexistence of different ways of thinking, thus promoting a harmonized way of life where no knowledge system takes priority over the other (Reinders and Madlingozi, 2019, pp. 24,

30- 31). One ought to take these fragmented knowledge systems and build a cohesive knowledge system (Kaunda, 2015, p. 78). This involves liberating and redesigning the existing but dysfunctional dominant paradigm through pluralistic dialogues that align with the notion of pluriversality in order to rearticulate meanings and values (Ndlovu, 2018, pp. 108-110).

Third, epistemic pluriversality also entails a rejection of Eurocentrism. At least, this is another prominent way decolonial scholars and ethicists conceptualize this term (Reinders and Madlingozi, 2019, pp. 6 and 46-48). Eurocentrism emphasizes the notion of a singular worldview that promotes a Western way of thinking, living, and knowledge production (Reinders and Madlingozi, 2019, pp. 7-8). In this regard, Eurocentrism fosters a myth of Western superiority (and African inferiority). This seems to be Achille Mbembe's (Mbembe, 2015) point when he contended during a public lecture that:

> Eurocentric canon attributes truth to the Western way of knowledge production and disregards other epistemic traditions. This hegemonic notion of knowledge production has generated discursive scientific practices and has set up interpretive frames that make it difficult to think outside of these frames. But this is not all, this hegemonic tradition has not only become hegemonic by disregarding other perspectives but actively repressing other perspectives that are articulated, thought, and envisioned outside of their hegemonic paradigm, ensuring that no other centers of narratives can exist (Mbembe, 2016, p. 31).

Notably, Eurocentrism speaks to Western advancement and superiority – the idea that Western knowledge is considered universally salient and facilitated by the rejection of difference (Zembylas, 2020, pp. 6-8; Silva, 2019, pp. 111-114). The dominance of dominant thinking is facilitated by hierarchical relations, i.e., naming other forms of knowledge systems that are often associated with marginalized groups as primitive and irrational versus Western systems, which were identified as civilized and rational. By extension, Eurocentric knowledge

production or system acts upon the belief that it is an intervention saving agents from forms of knowledge systems that are ‘irrational’ and ‘barbaric’ (Kaunda, 2015, pp. 81-82; Zembylas, 2020, pp. 6-9). Victims are entrapped, and their agencies compromised not simply because they deliberately seek to spew the same Eurocentric rhetoric but because they know no other way of life – leaving them unaware of any need for change.

The rejection of Eurocentrism and epistemic entrapment calls for the decolonization of knowledge through the de-silencing of other alternative knowledge systems (Reinders and Madlingozi, 2019, pp. 73 and 90). De-silencing is instrumental in replacing and ultimately rejecting the coloniality of knowledge systems and power. While this conception of epistemic pluriversality is similar to that of epistemic pluriversality as being anti-universalism, it further emphasizes the necessity of rejecting Eurocentrism by echoing marginalized voices. Put plainly, this paradigm shift demands not only the integration of diverse viewpoints but also explicitly ensuring – for example – that African epistemology, specifically, is given equal recognition alongside prevailing paradigms in discourses of global significance (Reinders and Madlingozi, 2019, pp. 60-61 and 65-66). In this regard, the rejection of Eurocentrism identifies that more work must be done to restore African epistemologies to an equal standing. For this reason, de-silencing is thus a process through which the oppressed and often outcast from engaging in ethical discussion on account of their relationship to colonization become co-contributors to much more than ethical discussions and intellectual life. It is done further on terms that are more their own (Silva, 2019, p. 111; Kaunda, 2015, pp. 75-77).

3.3.1 Epistemic Pluriversality and the Moral Norm it Generates

It is worth emphasizing here that the moral imperative arising from these features of epistemic pluriversality does not require one to replace the dominant conventional way of thinking with another *dominant* way of thinking, nor is it to relegate it to a second-class status. It is erroneous

to perceive that this feature of agency requires a paradigm shift from Western ways of thinking, the dethroning of the dominant paradigm and replacing it with another one, such as Afrocentrism. Instead, epistemic pluriversality entails a moral imperative to continuously question the status quo and change it to reflect a pluriversal way of thinking and living (Reinders and Madlingozi, 2019, pp.7 and 30-35; Pierre, 2021, pp. 16-17). This thought embodies a transformative recognition of “another way of thinking, another way of developing life than the one developed” (Eggleston *et al.*, 2019, pp. 7 and 20-21).

The moral norm that arises from these conceptions of epistemic pluriversality demands that we acknowledge that philosophical thought is not confined to the status quo but has room for other ways of thinking and being that may be informed by other cultures and subjectivities (Silva, 2019, p. 108 and 133-134). This shift in decolonizing one's mind is crucial to not only understanding one's position within the power structure and the implications thereto. Still, it is also a vital step towards reshaping and reconfiguring the current paradigm (Pierre, 2021, pp. 1-3 and 21-23).

The implication of the above for agency in decolonial ethics is that agency entails the liberation of the mind, that is, the freedom to draw on one’s own values and knowledge systems to make sense of the world. It also entails the freedom to actively challenge intellectual imperialism through a comprehensive rethinking of how knowledge is produced (whose voices ought to be echoed but are silenced?), interrogating questions about the true beneficiaries of current knowledge production arrangements and liberating the minds of those subjected to the assumptions that arise from these dominant perspectives (Reinders and Madlingozi, 2019, pp. 33-36; Silva, 2019, p. 127). Finally, it entails dialogue and democratic deliberations that empower and respect individuals in conversations. A failure to include these perspectives undermines an authentic expression of agency (Mushonga, 2017, p. 39; Silva, 2019, pp. ..116-117).

3.4 Active Subjectivity in Decolonial Ethics

A second feature of agency in the works of decolonial ethicists and scholars is active subjectivity. This view has been defended by Maria Lugone (Lugones, 2010, p. 746; Lugones, 2020, pp. 28-29 and 36; Mondragón, 2022, pp. 12-14). In Lugone's view, active subjectivity is a concept that encapsulates the creation of choice made by the resister against multiple oppressive structures in search of multiple subjectivity or pluriversality in an environment that suppresses this. Put plainly, active subjectivity brings life to one's agency or choice of action. It involves a process of conscious decisions made with the intention to strive towards a conducive environment for social advancement, moving away from the old oppressive environment (Lugones, 2010, pp. 753-754; Lugones, 2020, pp. 28-29; Kaunda, 2015, pp. 78). This requires oppressed communities to become conscious, thoughtfully initiating actions by critically reflecting on the power dynamics at play and, after that, actively engaging in the meaning-making process. Within this context, this interaction or meaning-making process would begin from the perspective of the oppressed's needs and interests in a manner that is sufficiently inclusive to encompass the values and perspectives of the oppressed group (Hosking., 2008, p. 3). In relation to this project, motor-disabled individuals, more particularly Tetraplegic individuals, are considered and treated as if they are less than persons due to their deficits and, therefore, form an oppressed group whose desires and interests are taken over by able-bodied persons. To affect the desired outcome of a meta-narrative and pluriversal world, oppressed agents must cognize the intent behind this mean-making process and actively bring their intention to fruition (Chang *et al.*, 2018, pp. 2-3 and 14-15).

A second conception of active subjectivity in the works of decolonial scholars and ethicists is that it is a site of tension, negotiation, and transformation. Notably, the process of actively engaging in the meaning-making process requires individuals to intentionally and consciously

express their perspectives and lived experiences. This conscious and intentional act may bring about resistance, a pull and push between – for example – the oppressor and the oppressed. Therefore, resistance is not only about rejecting hegemonic thinking but also actively engaging in this tug and pull with the oppressor to transform the dominant power structures and knowledge systems that deny their existence.

3.4.1 Active Subjectivity and the Moral Norm it Generates

In light of the preceding paragraphs, active subjectivity gives rise to a moral norm that prescribes a commitment towards decolonial praxis. Decolonial praxis petitions marginalized subjects to advocate beyond theory and put effort into social action aimed towards pluriversal discourse (Hayes, Luckett and Misiaszek, 2021, pp. 897-899). Unlike epistemic pluriversality, whereby we are compelled to deconstruct the dominant narratives, active subjectivity demands the marginalized group to take an empowered stance by asserting their agency to challenge these dominant narratives and actively contributing towards a meta-narrative (Mondragón, 2022, p. 14; Pierre, 2021, p. 63; Vázquez, 2020, pp. 88 and 89; Chang *et al.*, 2018, pp. 6 and 20-21).

3.5 How the decolonial agency is a better conception

Critiquing long-held assumptions and convictions is a crucial step needed to dismantle the power structures at play within a Eurocentric paradigm, stripping the truth from Eurocentrism and seeing the paradigm for what it is. Within the context of this project, authentic engagement must begin with engaging and revealing how conventional conceptions of agency are problematic and what is required to change them. In the context of intracortical BCIs, it may be argued that the Causal Theory of Agency is often imposed and masqueraded as being universal and globally applicable (Schlosser, 2011, pp. 4-5; Schlosser, 2019; Dunford, 2017, pp;. 382-383; Hornsby, 2004, pp. 1-2). The characterization of agency under this framework

is limited and arguably superficial in its understanding. This is because paradigmatic normative ethical theories, such as the Causal Theory of Agency, have historically emphasized their principles while deemphasizing their exemplars, i.e., those to whom it intends to be applied. Put plainly, the use of such a conventional understanding of agency is to assume that agency can be understood and expressed in one universalized way and be informed by one perspective (Reynolds, 2016, pp. 38 -39).

The concept of the Causal Theory of Agency reinforces the idea that agency is intertwined with notions of 'normalcy', ultimately suggesting that normalcy is the ideal to which all motor-disabled persons should aspire. Continuously referring to such conceptions within philosophical discussions about agency legitimizes the suppression of other ways of thinking about agency. This creates an assumption of a 'right' way of being, thus reinforcing the oppression of the marginalized, which in this instance would be persons who do not realize action in the same fashion, i.e., motor disabled persons in particular tetraplegic individuals (Alcoff, 1991, pp. 10-14). These assumptions act as a boundary that delineates between the kinds of people capable of partaking in such theoretical inquiries regarding agency and those who cannot – Tetraplegic individuals generally fall within the latter category. Equally, such assumptions infantilize and undermine Tetraplegic individuals, further altering their perception of their disability or identity as "crippled" or "unfortunate" and incapable of being active participants in society (Palikarova, 2016, pp. 53-56).

Disabled individuals, particularly tetraplegic individuals, already face societal expectations to overcome their disability to gain the same respect accorded to non-disabled people (Jóhannsdóttir, Egilson and Haraldsdóttir, 2022, p. 362). This expectation and standard or boundary is harmful as it dismisses specific views on agency, in place for the privileged oppressor's viewpoint. This is because they (able-bodied persons) are taught to "know better" and understand agency or emancipation more thoroughly than Tetraplegic individuals (Silva,

2019, pp. 113-114). By viewing themselves as the pinnacle of agency and liberation, they reinforce a dominant, singular way of thinking around agency, further perpetuating stereotypes and limiting disabled individuals' agency. This imposes a feeling of inauthenticity and alienation, stripping tetraplegics individuals' ability to think for themselves as they are forced to take up the perspectives of the privileged oppressor. They are also stripped of their ability to self-individuate from stereotypical notions of being “disabled” which is often associated with being unintelligible or incapable of making valuable contributions (Kaunda, 2015, pp. 83; Silva, 2019, pp. 114-115 and 126-127).

The ascriptions of causal agency and its continued use as a referral point within philosophical inquiry only further perpetuate its dominance in the discourse (Chang *et al.*, 2018, pp. 6-8; Silva, 2019, pp. 108 and 126). Maldonado-Torres spoke on how normative assumptions arising from universalism survive: “It is maintained alive in books, in the criteria for academic performance, in cultural patterns, in common sense, in the self-image of peoples, in aspirations of self, and so many other aspects of our modern experience.” (Maldonado-Torres, 2007, p.243). In the face of oppression and able-bodied normativity, it becomes imperative not simply to diversify the conception of agency but to decolonize it. Therefore, when seeking pluriversality, the process of decolonization is imperative as it makes possible the idea of a shift in power structures and attitude of the oppressor as well as the oppressed and demands that both take responsibility and actively partake in dismantling the colonized subjectivities of knowledge around agency with a willingness to take many perspectives, in particular, those whose existence and agency is assumed insignificant (Maldonado-Torres, 2007, pp. 257-262). Without interrogating universalism and the consequences of Eurocentrism in disciplinary discourse, alternate perspectives would be blindly rejected as worthless, thereby reinforcing the dominance of conventional thinking as the universal truth (Silva, 2019, pp. 113-115). As a result, those who are subject to this dominant thinking may condone or endorse such ‘universal’ truth to their own detriment.

What the decolonial conception of agency as active subjectivity reveals is that there is a need (as a collective) to unthink dominant ideas of agency so that tetraplegic individuals can empower themselves to address the issues they face and articulate their own version of history (Chang *et al.*, 2018, pp. 2-4; Reinders and Madlingozi, 2019, pp. 69-73). Furthermore, the decolonial conception of agency as epistemic pluriversality reveals that, instead of promoting this limited view, we must reject its universality and seek to embrace a pluriversality of processes of abled-ness that recognize the existence of disability as an operational difference and not a fault (Jóhannsdóttir, Egilson and Haraldsdóttir, 2022, pp. 370-373; Vorster and Quinn, 2017, pp. 32-36). Recognizing this may also then lead to recognizing that the use of assistive technology like intracortical BCIs in the care of Tetraplegic individuals may bring about a different expression of agency that is of equal value to 'conventional' forms of action. This realization of epistemic pluriversality gives rise to a second moral norm, which demands that we pursue alternative frameworks of thought around agency. This is a crucial component of decolonial ethics (Eggleston *et al.*, 2019, p. 36; Reinders and Madlingozi, 2019, pp. 65-69). In place of universalism, decolonial agency offers the idea of a pluriversal universe. A pluriversal world ensures a vision where other perspectives, values, and theories are accorded equal recognition or respect and are deemed equally and ethically valuable (Dunford, 2017, p. 381). Presenting alternate frameworks of thought offers individuals an option that stands alongside other options (Reinders and Madlingozi, 2019, pp. 71-72).

The preceding point highlights the power of choice as essential in enabling marginalized individuals like tetraplegics to diversify away from universal frameworks like the Causal Theory of Agency towards a pluriversal world reformulated in accordance with their own distinctive interpretations and perspectives. This empowerment embodies the moral norm of thinking "otherwise:' (Mignolo, 2011, p. 10). While epistemic pluriversality offers a counternarrative to universalism of Causal agency by highlighting the need for diverse interpretations of agency (Perry, 2020), the second feature of decolonial agency (active subjectivity) focuses on initiating

the discourse from which these alternative perspectives arise. The implication here is that tetraplegic individuals should be active agents in discussions about deploying intracortical BCIs in their care and avoid being docile, complacent victims (Mondragón, 2022, pp. 2-3 and 12-16). Being an active agent implies that a person has the ability to not only freely choose or have the options presented before them, but it also involves making active contributions or directional efforts towards positive change in the relevant context (Hayes, Luckett and Misiaszek, 2021, p.p. 887-889). Concretely, Tetraplegic individuals would be involved from the conceptualization of the problems that assistive technologies like intracortical BCIs are designed to solve to its deployment. This is a healing and justice-seeking process involving a direct interaction between the tech corporations who manufacture these technologies and motor-disabled persons who are potential end-users of these technologies. Such interactions are essential for rejecting the causal theory of action and establishing a new conception of agency grounded in social dynamics and structures informed by disabled persons' own lived experiences and perspectives (Vázquez, 20210, pp. 89 and 90). Notably, to genuinely dismantle universalism around agency and foster dialogue in which alternative conceptions of agency are contributed to a meta-narrative, it is crucial for marginalized groups to initiate action in resisting power structures (Kaunda, 2015, p. 85). Establishing a pluriversal framework that respects the different understandings and experiences of agency is critical in ensuring that the interests, values, and beliefs of Tetraplegic individuals are considered within ethical discussions around the deployment of intracortical BCI as a standard of care.

3.6 Why the Decolonial View of Agency Ought to Matter

Assistive technologies like intracortical BCIs can empower people with disabilities by providing them with the developmental, social, and psychological benefits of independent mobility (Floreani *et al.*, 2021). In addition to physicality, there is also evidence of improved quality of

life, social inclusion as well as reduced costs of care, which are foundational in producing life-changing benefits (Santos and Silveira, 2021; Tao *et al.*, 2020, pp. 1025-1026). Although intracortical BCIs have mainly been confined to the research domain (Oh, Shin, and Kim, 2024, pp. 24-33), the current pace of neurotechnological advancement and its potential benefits leaves no doubt that intracortical BCIs will be implemented into clinical care, becoming an available option of care for motor-disabled persons (Vansteensel *et al.*, 2023, p. 1324).

However, despite the rise in assistive technological advancements and options, there remains a challenge to ensure potential beneficiaries adopt this available option and are able to navigate its use (Tao *et al.*, 2020, p. 1028). Even when potential beneficiaries adopt assistive technology, the proportion of technology abandonment is still very high. Various factors contribute to the persistence of the aforementioned challenges, but one main factor stands out, which is the limited knowledge about the needs of potential beneficiaries. Put simply, a number of end users fail to ascribe value to assistive technology such as intracortical BCIs due to its inability to meet their functional needs and requirements (Wilkinson, 2016, pp. 68-69; Tao *et al.*, 2020; Kinney, Goodwin and Gitlow, 2016, pp. 107-109).

There is a gap within ethical discussions around intracortical BCIs. This is the lack of a robust debate or engagement with the concept of agency and how potential beneficiaries – within this context, Tetraplegic individuals – view agency, as well as how this conception can inform the design, development, and deployment of novel (assistive) technology.

The recommended solution to this blindsight comprises of a pluriversal approach aimed at addressing the gap by decolonizing the established oppressive structures around agency and opening up meaningful dialogue on what the positive outcome (agency) would look like for Tetraplegic individuals that adopt intracortical BCIs. The use of Causal Agency as a benchmark for an operation BCI, as previously mentioned, reinforces the idea that agency is

interlinked with notions of ‘normalcy’ and normalcy is the ideal that all motor-disabled persons must strive for. This is seen through the opponents' and proponents' arguments that rely solely on already established frameworks of agency (i.e., Standard Theory of Action) as well as relying on the perspectives of researchers and other rehabilitative experts who merely assume the potential users’ needs without necessarily proving them through meaningful engagement.

Rather than viewing assistive technology as a tool of empowerment, current arguments, particularly in favour of its deployment, perceive it as a part of a process in which the wrong way of living or the disability is corrected, and the remedy is the enablement of disabled individuals. This sets an unrealistic standard of a ‘typical and fully human ideal’ to the extent that where the ideal remains elusive, the assistive technology is deemed not worth deploying, developing, or adopting (Campbell, 2020, p. 208; Hosking, 2008, pp. 11 and 17). These expectations increase the chances of dissatisfaction and technological abandonment due to the gap in understanding users’ needs, requirements, and lived experience.

The decolonial conception of agency gives rise to epistemic pluriversality, which prioritizes the voices of the marginalized (which in this instance would be Tetraplegic individuals) where it is relevant and especially where it is necessary. It empowers tetraplegic users to take up active roles in involving themselves directly in the decision-making process within the development and deployment of intracortical BCIs (Hicham, Ghazouane and Farouk, 2021, pp. 47-51; Kaunda, 2015, pp. 86-89).

To realize decolonial agency, Tetraplegic individuals, as potential beneficiaries or end users, can contribute insights that are worth considering by the designers of intracortical BCIs about their idea of what the positive outcomes of using intracortical BCIs ought to be (Reinders and Madlingozi, 2019, pp. 65-72; Silva, 2019, p. 130-135). As opposed to being aligned with normalcy or causal agency, the norms that arise from decolonial agency emphasize that end users' requirements may extend beyond conventional norms or outcomes of executing

paradigmatic movements. The exercise of agency under decolonial ethics involves an interactive relationship or mean-making process between the researcher and the concerned group (Vázquez, 2020, pp. 93-98; Silva, 2019, p. 133-134).

Although other experts may analyze the accuracy and reliability of the BCI in determining its impact on the quality of life of the end users, it is worth stating that end users are able to understand their context and articulate their needs and priorities directly (Reinders and Madlingozi, 2019, pp. 6, 29-31; Kaunda, 2015, pp. 78; Ortiz-Escobar *et al.*, 2023, pp. 1-2). They are able to provide the qualitative context necessary to further and meaningfully engage with such ethical discussions. End users' involvement is crucial to help key actors like engineers and health professionals design, develop and deploy assistive technologies that will more accurately reflect decolonial notions of agency (Ortiz-Escobar *et al.*, 2023, pp. 14-16; Kübler *et al.*, 2014, pp. 1-4 and 6-7; Fischer, Peine and Östlund, 2019, pp. e517-e518; Vansteensel *et al.*, 2023, p. 1328).

Involving Tetraplegic individuals in the (design, development, and) deployment of BCI technology empowers them to contribute alternative perspectives that are equally valued and integrated, thus fostering a collaborative and inclusive environment. Following this end-user-centred approach allows Tetraplegic individuals' needs and desires to drive the discussions around the deployment of intracortical BCIs, including their design and development (Wilkinson, 2016, p. 72; Tao *et al.*, 2020, p. 1035) as well as contemplate new possibilities for improvements in alignment with the diverse agency (Fischer, Peine and Östlund, 2019, pp. e513- e514; Sujithra Raviselvam *et al.*, 2016, p. 132).

Drawing from the moral norms that arise from features of epistemic pluriversality and active subjectivity, a moral obligation arises, which compels us to actively deconstruct agency and reimagine it through the use of novel technology (intracortical BCIs) as the standard of care for Tetraplegic individuals (Fischer, Peine and Östlund, 2019, p. e521; Santos and Silveira,

2021). This obligation is reinforced by decolonial ethics, which not only defends the pluriversal approach to understanding agency within these ethical discussions but also strengthens the underlying logic by emphasizing the integration of the perspectives of a tetraplegic person.

Unlike the conventional conception of agency inherent to the causal theory of agency, which often overlooks the value of tetraplegic individual's voices, the norms identified demand that tetraplegic individuals be actively sought out to contribute missing perspectives and knowledge systems in ethical discussions regarding the deployment of intracortical BCIs (Eggleston *et al.*, 2019, pp. 7-8 and 21). Ultimately, avoiding the shortcomings of current arguments in favour of or against the deployment of intracortical BCI in the care of Tetraplegic individuals. Tetraplegic individuals' agential capabilities are duly recognized within the meaning-making process as crucial and deemed to be of equal value as the perspectives of any other medical professional or ethicist, ensuring a comprehensive and equitable discourse.

A means of seeking out these perspectives is to engage Tetraplegic individuals in qualitative research. Qualitative research can access the perspectives and experiences of oppressed groups lacking the power to make their voices heard through traditional academic discourse. (Santhosh, Rojas, and Lyons, 2021, pp. 172 and 181; Montgomery *et al.*, 2022, pp. 2-3). Researchers must be aware of the power dynamic at play within such a study itself. To mitigate any unfavorable power differentials that may exist between researchers and participants, researchers can employ participatory research approaches that allow participants to contribute and sometimes lead aspects of research projects (Vorster and Quinn, 2017, pp. 34-35 and 40).

3.7 Conclusion

Epistemic pluriversality and active subjectivity are prominent features of agency in decolonial scholarship. These features demand that the perspectives and viewpoints of marginalized groups be included within dominant discussions, for example, around assistive technology. In

order to have inclusive and meaningful discussions around intracortical BCIs that actually make a difference for Tetraplegic individuals, researchers must prioritize decolonizing and diversifying the conception of agency by echoing the voices of tetraplegic individuals and acknowledge their agential capacity during the design, development, and deployment of these assistive technologies. This chapter makes this particular case. However, the chapter also admits that the project does not concretely echo the voices of tetraplegic individuals. Qualitative research studies are required to do this. Such studies should directly engage Tetraplegic individuals themselves to understand their values, needs, and diverse lived experiences. Although this project is not a qualitative study, it reinforces current attempts to motivate the use of intracortical BCIs in the care of Tetraplegic individuals by contributing a view of agency that does not have negative implications for disabled persons. In the next chapter, I will consider critical objections to my claim.

Chapter 4: Addressing Possible Objections

4. Introduction

It is worth reiterating that the goal of this project is not to provide exhaustive defense – that draws on the conception of agency – of the permissibility of deploying intracortical BCIs in the care of Tetraplegic individuals. This argument exists already. Instead, the project explains the negative implications of, and particularly broadens, the conception of agency that underlies these permissibility arguments while contributing a novel (decolonial) conception of agency that avoids these problems.

To realize this objective, in the second chapter, I explained the Causal Theory of Action and the conception of agency that arises from this theory, outlining how this conception is problematic or has varying troubling implications for Tetraplegic individuals who are, in fact, positioned as beneficiaries of these arguments. In the previous chapter, I explained how the decolonial conception of agency avoids the negative implications of agency for Tetraplegic individuals. Particularly, I justify the claim that the conventional conception of agency informed by the theory of action promotes an exclusionary framework that idealizes able-bodied norms, creating unattainable standards and healthcare outcomes for disabled persons in the use of intracortical BCIs. In the same chapter, I challenged this standard while contributing a novel conception of agency that is grounded in decolonial perspectives. The decolonial agency aims to create a more inclusive framework in which the interests and lived experiences of motor-disabled persons inform our understanding of agency as a healthcare outcome in rehabilitative care.

However, this approach is not excluded from critique. This chapter seeks to address the most concerning objections to this project, namely, the concern over promoting harm and suffering

as a difference rather than a disease, concerns over the erosion of diagnostic and treatment practices, as well as the potential objection that my argument will create a new hegemonic structure.

4.1 Balancing human diversity with medical intervention

A critic may contend that current arguments, including the one this project provides, all have the same weakness: they overlook the difference between embracing disability as a form of human diversity and recognizing the harm and suffering that certain disabilities cause. Expanding the understanding of agency to be more inclusive may potentially overlook and further undermine the need for medical intervention (Bognar, 2015, p. 48). Framing disability as a difference that ought to be celebrated as opposed to the harm suffered by individuals that need to be corrected could neglect the suffering and functional limitations that may severely impact one's quality of life. The goal of medicine is the latter, to mitigate or eliminate harm. This is confirmed by the Hippocratic oath. The oath states, "The regime I shall adopt shall be for the benefit of the patients, according to my ability or judgment, and not for their hurt or any wrong" (Shmerling, 2020). Put plainly, the patient's best health interest is at the heart of medicine. Medical practitioners are thus ethically obligated to provide the best possible care for individuals and reduce or eliminate harm to them (Varkey, 2020, pp. 17-18; Bognar, 2015, p. 48). Thus, the sentiment behind arguments that state "intracortical BCIs ought to be or not to be deployed on the basis that it promotes agency" is irrelevant.

In response, it is worth stating that these two are not mutually exclusive. To explain this link, the project will – in the remainder of this section – outline the importance of disability diversity within the standard of care for disabled persons such as tetraplegic individuals. Subsequently, we will illustrate how the acknowledgment of disability is congruent with ensuring proper care and reduction of harm suffered.

When considering the proper treatment plan for disabled individuals, it is problematic to assume or speak of “motor disabled “persons as a single category when they are a diverse group (Kurawa, 2010, pp. 1805-1807). Various studies have shown that despite the increase in assistive technology advancements, there are still major challenges with promoting users to adopt the assistive technology and the high rates of technology abandonment. The main contributing factor to this issue is limited knowledge of end-users and their needs. This is because key actors in the development and deployment of assistive technology, such as ethicists, engineers, medical professionals, manufacturers, etc., fail to consider and understand that tetraplegic individuals suffer from physical conditions that present constraints and motor limitations differently. This variation in their disability is pronounced in their interactions with interactive systems (Johansson *et al.*, 2023, pp. 426-427). This highlights the need to understand exactly how certain disabilities interact with assistive technology and what the best outcome is for the individual patient/user that would be of value to them.

Decolonial ethics, particularly the notion of agency, provides a comprehensive framework with moral norms that seek to empower end users with the space and environment in which they are able to ascribe meaningful value to intracortical BCIs. The core features of decolonial agency prioritize diverse perspectives, ensuring that no single way of thinking takes priority over the other (Reinders and Madlingozi, 2019, p. 9). Active subjectivity, which is a central part of the decolonial agency, advocates for productive dialogue between key stakeholders, namely, Tetraplegic individuals, ethicists, and medical practitioners. (Kaunda, 2015, pp. 75-76). It does not just call for conversations to be had but for key stakeholders to create an environment that is conducive to a meaning-making process. This process begins from the perspective of the most vulnerable, Tetraplegic individuals. This ensures that those who are often overlooked are placed at the center of the dialogue as a means to create an inclusive environment group (Hosking, 2008, pp. 6-8).

Therefore, the argument raised in this paper does not seek to dismiss the need for medical intervention nor undermine the central importance of healthcare, which is to alleviate harm and suffering in whatever form that harm may come in. The argument in this paper, in fact, promotes the advancement of medical intervention through individualized care. This is done by employing dialogue with patients on their care. The decolonial agency mandates us to prioritize collaboration with the common goal of finding the best health outcome for Tetraplegic individuals, which encompasses their lived experiences and interests. Thus, rather than enforcing a single unattainable standard of normalcy that may be inappropriate, the decolonial agency demands that we expand this conception to promote an inclusive medical standard that tailors care to address specific individual needs. This user-centered approach enhances technology accessibility and, ultimately, the quality of care by respecting the diversity of human bodies and experiences. It allows Tetraplegic individuals' lived experiences and specific needs to drive the discussions around their care, more specifically, the development and deployment of assistive technology that genuinely improves their quality of life through empowerment (Tao *et al.*, 2020, pp. 1026 and 1032-1033) without further perpetuating stigma (Johansson *et al.*, 2023, p. 426; Fischer, Peine and Östlund, 2019, p. e513).

4.2 Undermining Normal bodied and the standard of normality in diagnostic and treatment processes

Another critic may argue that challenging the conception of agency could have a serious impact on notions of ‘normality’ in medical and diagnostic contexts. Reconceptualizing agency – in the way this project has done – has the potential to replace, supersede, or reduce the importance of typical or normative functions and thereby run the risk of destabilizing the basis of all comparisons in health and functionality. Notably, where no particular sort of body is seen as ‘normal’, then no *body* would be seen as ‘deficient’ (Bognar, 2015, p. 46). This implies that

the line between ‘normal’ and ‘deficient’, ‘healthy and ‘diseased’ would become arbitrary or blurred within the healthcare context. Put plainly, if there is substantial diversity in the sorts of things that come to be seen as ‘normal bodily functions or characteristics’, the idea that there is one normal sort of ‘body’ might be undermined (Catita, Águas and Morgado, 2020, p. 3). Health outcomes should be informed by evidence-based medicine that is consolidated to clinical practice guidelines and not arbitrary choices (Tenny and Varacallo, 2022). Thus, a key concern is whether a diverse conception of agency proposed by the decolonial scholarship could exist without destabilizing all benchmarks of treatment and diagnostic care, ultimately impacting the well-being of others. In clinical practice, ‘normality’ forms the basis of current medical standard practice. It shapes how we perceive health and disease (Catita, Águas, and Morgado, 2020, p. 1). This standard also informs legal frameworks, i.e., healthcare justice views disease as a limitation to equal opportunity; thus, healthcare justice mandates efforts to be made in promoting health equities amongst the disabled (CDC, 2021). This argument raises essential points, mainly that health outcomes cannot be based on arbitrary or personal preferences. A critic may contend that that is precisely what this endeavor does.

In response, it is worth acknowledging that an established ideology within the healthcare setting is that the norm of the able body is deemed central to the diagnosis and treatment of patients (Berghs *et al.*, 2016, p. 27; Catita, Águas and Morgado, 2020, pp. 1-2), and is considered to be made in the best interest of the patient (Atkins and Das, 2022, pp. 762-763). Essentially, what this criticism assumes is that any deviation from the normative or standard body is undesirable, given the implication for actual clinical practice. Furthermore, it alludes to the idea that because such “abnormality” is deemed undesirable, medical intervention is required to correct the abnormality. However, equating normative bodies to being healthy is problematic. This is because arguments premised on the ‘normality’ without contextual consideration – like the causal theory of action – promote an outdated and oppressive established framework or model within medicine that views only one body as healthy. This

approach prioritizes normative/normality as the goal for every treatment offered, and this may result in the prioritization of physical uniformity over the actual interests of the patient. Such oversight often comes at the expense of disabled patients, who are then – as previously stated – considered less than *normal* (Hosking, 2008, p. 8).

The point is that the critic's view will have a negative impact on how society views disease or particular groups, especially disabled persons (Catita, Águas, and Morgado, 2020, pp. 3-5). Prioritizing normality within standard care practices promotes the objectification of individuals with disabilities by reducing them merely to their impairment and ultimately viewing them as less than persons. The objectification of disabled patients' bodies that fall outside of the norm inherently and subconsciously endorses the idea that there is a presumed standard of the human body that is synonymous with health (Berghs *et al.*, 2016, pp. 26 -32; Atkins and Das, 2022, pp. 763-764). Therefore, the problem with maintaining and relying on a fixed standard of normality as the basis of all comparisons within the clinical practice for all individuals is that it oversimplifies the conception of what it means to be healthy in various contexts by not accounting for human nature and its inherent ability to adapt to changes in its physiology and its external environment (Catita, Águas and Morgado, 2020, p. 1 and 4). This could lead to treatments that may not align with a specific individual's evolving needs.

Moreover, the concept of 'normality' constitutes or conforms to a type of conventional standards, which have implications for the doctor-patient relationship and policy considerations (Rost, Favaretto and De Clercq, 2022, pp. 1 and 9-12; Catita, Águas and Morgado, 2020, p. 1). Where the capabilities of the able-body are defined as the norm, intracortical BCI potential beneficiaries (i.e., motor disabled persons) could fall victim to a hidden system of compulsory conformation whilst simultaneously perpetuating oppressive power structures of privilege. The use of conventional terms and established frameworks that center around normative bodies marginalizes, stigmatizes, and discriminates against those

who are “othered”, which only amplifies existing inequalities (Rost, Favaretto and De Clercq, 2022, pp. 2-3 and 10-11).

One must embrace a flexible and context-sensitive approach that does not lead to negative implications for patients, particularly motor-disabled persons. Decolonial agency highlights the need to embrace and prioritize the diversity of human experiences and how those individuals understand agency within their own contextual realities. This allows for an end-user-centered approach in medicine where individual-specific treatments and rehabilitative care may be offered to honor these variations and diversity in interests and needs.

Under a decolonial agency, each individual has an essential and morally legitimate role within ethical discussions around their healthcare. Active subjectivity specifically encourages motor-disabled persons to have access to a cooperative environment in which they can participate freely (Ralston and Ho, 2007, pp. 620-622). This flexible approach brought on by decolonial agency acknowledges that it is essential that ‘the contextual circumstances inform normality’ and health outcomes. People with disabilities such as facial or limb deformity or sensory impairment can and do live full lives even if those lived experiences, to an able-bodied lens, may appear constrained or even incomplete. Normality in this context would be adapted to the certain contexts in which specific individuals find themselves. Therefore, health outcomes should be grounded in their interests, goals, and lived experiences. Taking into account the subjective experience of the individual with the impairment and the social context in which the individual inhabits. The difference is that rather than focusing on how the individual may be augmented from abnormal to normal. This action of care seeks to create realistic and ideal health outcomes or goals that are centered around biostatistical data alongside patients’ individual interests and needs that align with the core features of the decolonial agency (Catita, Águas and Morgado, 2020, pp. 5-6).

4.3 Creating a New Normative Hegemony with Decolonial Agency

A critic could also argue that by challenging the conception of agency and ‘normality’, we run the risk of creating a new standard or ideal. The pursuit of a “new normal” can inadvertently reinforce rigid standards that enable forms of hegemony whereby conformity to the modified body becomes as restrictive as adhering to the old norms (Bognar, 2015, p. 48; Kamlongera and Katenga-Kaunda, 2023, pp. 318-319). This may have grave consequences for disabled and non-disabled persons alike. This new hegemony could marginalize those who align more with conventional ideals of normality and lead to further exclusion than true inclusivity. Promoting disability diversity through the reconceptualization of agency within the rehabilitative field may (re)create a hegemony or dogma in which the disabled body is now the norm.

The concern raised by the critic is, in and of itself, a concern of perpetuating the same power structures in which diverse bodies are the center of medical standards of care as opposed to ‘normal’ bodies. As discussed above, normality is not objective, and utilizing that approach only further perpetuates the health inequalities it deems to address (Rost, Favaretto, and De Clercq, 2022, pp. 1-2 and 12). The current hegemonic narrative centers on able bodies as the ideal. Consequently, those who are othered by this narrative are victimized by a system of compulsory augmentation and are unable to exercise agency over their own lives nor their health outcomes because their understanding of themselves (specifically their impairments) and others like them are externally imposed and created by standards of normality in clinical practice informed by able-bodied norms (Kaunda, 2015, pp. 79-80).

The critic raises the argument that creating a hegemonic narrative centered on the disabled body is inherently exclusionary to non-disabled persons and marginalizes those who are othered and, therefore, should not be promoted. In order for this argument to be sound, the argument would be preceded by the following premise: hegemony is always impermissible.

Therefore, the argument would be as follows: hegemony is impermissible due to the negative implications for those who are othered. Therefore, departing from 'normality' and adopting and *prioritizing* a decolonial agency could further perpetuate hegemonic power structures, and that is something that we ought not to do.

For the critic to raise such an argument, he/she would have to concede with the premise that *any* hegemonic power structures – whether it is centered from the sole perspective of the able-body or the disabled body - are harmful and could potentially stigmatize those that are othered. The decolonial agency promotes hegemonic power structures. Yet this is untrue. Decolonial agency's core feature, epistemic pluriversality, advocates against hegemonic narratives. It acknowledges that having a singular model of what is deemed to be a healthy or 'correct' body is what leads to more social and personal harm to the disabled as an already oppressed group, as well as non-disabled persons. Instead, epistemic pluriversality promotes the idea of initiating action in engaging or resisting power and implementing alternatives to the norm, which avoids perpetuating the same colonial power structures (Mignolo, 2011, p. 28; Zembylas, 2020, pp. 12-14). To anyone in a position of privilege, equality can feel like oppression. This is because equality requires the oppressor and those who perpetuate its ideology to make room for other ways of thinking. Particularly, epistemic pluriversality compels us to deconstruct dominant narratives to expand our limited worldview (Mondragón, 2022, pp. 10-16; Pierre, 2021, p. 25; Vázquez, 2020, pp. 92-94; Chang *et al.*, 2018, pp. 3-4). By adopting decolonial agency, we reject the harmful implications embedded in the conventional understanding of agency. Instead, it recognizes that motor-disabled persons' lived experiences are unique, and it is this variation, lived experiences, that should shape the way in which we understand agency and, therefore, health outcomes in rehabilitative care.

4.4 'Decolonial Agency' is a Methodological Argument as Opposed to Prescriptive

A critic may argue that although the concept of decolonial agency presents itself as the prescriptive response to circumvent the negative implications associated with conventional and ableist understandings of agency, it may, in fact, merely present itself as merely a methodological argument as opposed to a prescriptive one. In other words, this paper merely critiques the conventional understanding of agency, ultimately failing to adequately engage with decolonial agency to ascribe a prescriptive rule. The norms that are derived from the decolonial agency, namely epistemic pluriversality and active subjectivity, only provide a flexible guideline as to how one could possibly achieve decolonial agency, thus failing to ascribe exactly what decolonial agency is and what moral rule can be derived from it. Notably, what is the decolonial theory of action?

Before addressing the critique, it is important that I clarify the purpose of this report. It does not seek to provide an exhaustive discussion on the decolonial theory of action, as that would require greater efforts in research and resources, such as time, to which I am unfortunately limited. Such exhaustive discussion would also require an in-depth description of the view of moral status that can be grounded in the decolonial theory of action, why certain people are owed different duties, and the way certain contexts inform how the decolonial prescriptions are implemented concretely. The implication here is that the decolonial theory of agency, which I described and applied in this project, is only one aspect of the decolonial theory of action. Instead, this project seeks to highlight and directly address the ableist and negative implications of the conventional understanding of agency by broadening the conception of agency by means of decolonial agency rather than offering a detailed account of the Decolonial Theory of Action.

Nonetheless, there are aspects of the discussion in this project that have implications for the decolonial theory of action. Precisely, in light of what I have said about epistemic pluriversality

and active subjectivity, the decolonial theory of action can be articulated as a paradigm that seeks to dismantle colonial power structures by creating the power of choice (Reinders and Madlingozi, 2019, p. 13, Kaunda, 2015, pp. 76-78). This normative paradigm involves the disruption of colonial knowledge systems or logic, rejecting Western supremacy as well as restoration and elevation of alternative forms of knowing through social action – making visible the knowledge systems and practices that belong to and are understood by others (Reinders and Madlingozi, 2019, pp. 108-110). It is an ongoing commitment to creating spaces for marginalized communities to assert their agency.

Also, in addressing the critique, it is equally important to note that the decolonial theory of action is not a singular event nor a singular approach. Rather, it is a paradigm that can be applied in all facets of life in which colonization has tainted (Fosu, 2024, p. 3; Reinders and Madlingozi, 2019, pp. 27-32 and 110); all aspects of the decolonizing framework are interconnected and must operate in tandem with one another. Therefore, the decolonial agency, as argued throughout this project, is merely an aspect of a greater paradigm shift – the decolonial theory of action (Reinders and Madlingozi, 2019, p. 60). The concept of decolonial agency, as an aspect of the decolonial theory of agency, advocates for the emancipation of marginalized groups, particularly disabled persons, through epistemic pluriversality and active subjectivity (Silva, 2019, pp. 107-114). These norms provide a constructive and comprehensive framework on which to evaluate the permissibility of intracortical BCIs through efforts of inclusive collaboration and recognition and respect of alternative perspectives.

Although the limitations and focus of this report have been highlighted, the critique remains to be adequately answered: what prescriptive or normative rules are ascribed from the understanding of agency and its norms? What exactly *ought* we to do? It is important that I define what exactly prescriptive rules are. Thereafter, I will lay two claims in response to the

critique; firstly, I argue that the norms that arise from decolonial agency do ascribe actionable commands, and secondly, that even if the argument lain in this report were to be more descriptive than prescriptive, I argue that ethical principles can be grounded in empirical observations about human nature.

Prescriptive rules guide moral actions and decisions – creating actionable commands (Bahník, Efendic, and Vranka, 2021, p. 110), distinguishing themselves from a descriptive argument, which merely describes how things are as opposed to how they *ought* to be. For instance, under Kantian ethics, a prescriptive rule is that people *ought* to treat others as ends in themselves and not merely as means to an end (Wolemonwu, 2020, p 221). Although this paper does not make objective claims regarding specific moral rules, such as what one *ought* to do or *ought* not to do. The project, however, goes beyond a purely descriptive argument by rejecting oppressive structures and advocating for power through choice and change. The norms derived from the decolonial agency, namely, epistemic pluriversality and active subjectivity, go further than merely critiquing the state of oppression under the causal theory of action as a standard framework from which ethicists evaluate the value of intracortical BCIs in the care of tetraplegic persons. It actively provides actionable commands for how tetraplegic persons and other stakeholders *ought* to act for justifiable reasons (Scharding and Warren, 2024, p. 339). For instance, since universalism silences marginalized perspectives, one ought to actively seek alternative perspectives. Hence, epistemic pluriversality calls for us to make the rational choice in resisting power and implementing alternatives to the norm (Kaunda, 2015, pp. 78-84). This norm carries a prescriptive force towards dismantling the façade and harmful impact of a universal truth. Although this statement: “universalism is centered on one truth which can have silencing effects on the perspectives of others, further ostracising those in need”, does not expressly provide a moral rule, the statement carries a prescriptive value and implication that one *ought* to seek other perspectives.

Similarly, since the oppression and silencing of tetraplegic persons denies them the practice or assertion of their own agency, one ought to create meaning-making processes and spaces in which such marginalized group (tetraplegic persons) can assert their agency. Comparable to epistemic pluriversality, active subjectivity has a prescriptive implication that calls for stakeholders to reinforce the negated subjectivity of tetraplegic persons by creating space for and engaging in meaning-making processes that are centered around their lived experiences (Vázquez, 20210, p. 93; Silva, 2019, p. 133-134). Therefore, involving tetraplegic persons in the active resistance against universalism and ableist ethical frameworks. Both these actionable commands are moral imperatives that are drawn from and derived from the observed harms suffered by tetraplegic persons and our moral responsibility to offer justice and inclusion.

However, this critic could further contend that making a prescriptive conclusion from a descriptive argument, such as the oppressive and ableist nature of the Causal Theory of Action, blurs the is-ought distinction. This is because the harm, i.e., 'able-ist or discriminatory behaviors,' is characterized as bad or cruel, carrying prescriptive significance and implying that one ought not to engage in such behaviors (Scharding and Warren, 2024, p. 340). However, this merely presents a state of affairs and carries with it no prescriptive influence as to what *ought* to be done.

This argument finds its basis in David Humes' assertion that "an *ought* cannot be derived from an *is*", which highlights a distinction between descriptive statements of (what is) and prescriptive statements (what *ought* to be) (Scharding and Warren, 2024, pp. 339). However, it is possible for moral values to be grounded in the factual state of affairs (Scharding and Warren, 2024, pp. 340). For instance, if a particular action promotes further well-being or emancipates oppressed individuals from oppressive structures (an "is"), then it ought to be pursued (the *ought*). Utilitarianism exemplified the view that ethical principles can be grounded

in empirical observations about human nature or, in other words, what *is*. Under Utilitarianism, moral obligations derive from facts about human well-being—happiness and suffering. In this theory, we accept happiness as a moral good and thus derive “ought statements.” Similarly, Kantian ethics derives the moral obligation to respect one another from observational facts about rational human nature.

If one were to consider moral realism, it posits that there are objective moral truths that exist independently of human beliefs. These truths can be discovered through reason and observation of the world. Under the decolonial understanding of agency, the observable oppression of tetraplegic persons in their ability to make independent choices, particularly in their contribution towards the deployment and development of intracortical BCI, is an objective wrong that *ought* to be corrected. Therefore, to challenge these oppressive structures, one *ough*t to act in accordance with the actionable commands implied within the norms that arise from the decolonial agency.

Denying the realities of oppression (state of affairs) further perpetuates the oppression already suffered by tetraplegic persons– depriving the oppressed of their lived experience”. Therefore, rejecting oppression and actively acknowledging other ways of being is a moral responsibility that should be done (Kamlongera and Katenga-Kaunda, 2023, pp. 313-314). Taking actionable steps to address these injustices is not only ethical but necessary.

4.5 Conclusion

This chapter has considered different potential criticisms that may be advanced against this project’s core claim. These potential objections not only highlight significant concerns over the conceptualization of agency but also over ensuring that the implementation of a diverse agency under decolonial ethics will circumvent the negative implications while also avoiding

the recreation of a new hegemony. The objections also highlight the need for a flexible and inclusive approach to clinical standards – more specifically, within the context of ethical discussions around the deployment of intracortical BCIs. The first objection highlights the need for nuanced conversations around the agency that equally celebrates disability as a form of human diversity. The decolonial agency requires us to find a balance in which diverse bodies and forms of agency and action are valuable without disregarding the limitations that are attached to such impairments. Similarly, the second objection raises the argument that arguing for a diverse agency could have negative implications for actual clinical practice, where normality has a key role to play. The last objection reveals the potential for a decolonial agency as a framework to create a new hegemonic structure, conscientizing us to the need to address hegemonic narratives in a way that does not promote the same colonial power structures. As we justify, this criticism, in fact, underscores the importance of epistemic pluriversality and active subjectivity in that it does not have an end goal that can be visualized. Instead, it is a continuous process of meaning-making that uncovers various paradigms, values, and perspectives, all feeding into each other and informing the other. Thus, it forms an ongoing and provisional product of dialogue and collaboration between differences. In the next chapter, I will conclude the report and make recommendations for future studies.

Chapter 5: Conclusion

The chapter provides a conclusion for the project by reinstating what it considers a key gap in current discussions concerning whether to deploy intracortical BCIs in the care of tetraplegic individuals, explaining how the project contributes towards filling this gap, and making a recommendation for future studies.

One key gap in current discussions regarding whether or not there is an obligation to deploy intracortical BCI in the care of Tetraplegic individuals is a conception of agency that positions motor-disabled individuals as less than persons. Put plainly, both proponents and critics in ethical discussions regarding whether or not we ought to deploy intracortical BCIs in the care of tetraplegic individuals have largely failed to engage with a key concept of their argument. This is agency. Failing to engage with this underlying concept that structures their different positions leaves the concept (agency) open to rely on a conventional understanding. Thus, when proponents utilize concepts such as “optimal agency” and “restore capacities for action,” it may be inferred that they promote a conventional understanding of action or exercise of agency.

The conventional understanding of agency aligns with able-bodied norms, and it promotes non-disabled persons as the ideal norms of conventions of existing as a person. As I have justified, this has negative implications for Tetraplegic individuals as potential users of intracortical BCIs. Notably, within the context of BCI deployment, users, such as Tetraplegic individuals, may be unfairly judged as lacking “a crucial aspect of being a human” even when utilizing revolutionary technology built to improve their quality of life.

This endeavor has contributed to a conception of agency grounded in decolonial scholarship and ethics, which avoids this negative implication for tetraplegic individuals. To have inclusive

and meaningful discussions around intracortical BCIs that make a difference, researchers must prioritize decolonizing and diversifying the conception of agency through the voices of tetraplegic individuals. Qualitative studies would be required to realize this goal. I recommend that these studies should draw on participatory research approaches that mitigate any power dynamics that may exist between researchers and participants. Such participatory research approaches are necessary to ensure the active participation of research participants from the conceptualization of these research studies to their implementations. Such participatory research approaches will also meet all Tetraplegic individuals' specific needs to drive these studies.

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