Reading the mind of a suspect

Is it feasible and socially desirable to access the 'thoughts' of suspects via Brain-Computer Interface?

Arvin Khozooei
Student number: 2013210

THESIS SUBMITTED IN PARTIAL FULFILLMENT OF
THE REQUIREMENTS FOR THE DEGREE OF
MASTER OF LAW & TECHNOLOGY
DEPARTMENT OF TILBURG LAW SCHOOL
INSTITUTE OF FOR LAW, TECHNOLOGY AND SOCIETY ("TILT")
TILBURG UNIVERSITY
2020

Supervisors:
M. Galič
T. Broer

Tilburg University
School of Humanities and Digital Sciences
Department of Tilburg Law School
Tilburg, The Netherlands
January 2020

Table of Contents

Acknowledgements

This thesis is the result of a one-year accumulation of study and research during my enrollment for the track LL.M in Law and Technology. The knowledge I gained during this study program has been expressed in several ways in this thesis.

Especially, I am grateful for the guidance and expertise of Maša Galič. She has provided me with substantive feedback throughout my research and has provided me a resonance for my vision. She was very helpful in aiding me to keep my subject as concrete as possible. Furthermore, the lectures that Maša Galič together with Bert-Jaap Koops had taught during the Cybercrime course, have helped me in pointing out the relevance of decryption orders for my subject.

Also, I have gratitude for the Tineke Broer's patience and acceptance from the beginning of this trajectory in which she has helped me to develop my thesis subject together with Tom Chokrevski. She has managed to keep me focused and continue with my thesis subject after some minor hurdles. Tineke Broer's assistance on the finalization of this thesis is also very much appreciated.

In particular, I am grateful for my parents, fiancée and close friends who have managed to support me throughout my entire academic period at Tilburg University. I dedicate my efforts to them.

Abstract

The privilege against self-incrimination is a fundamental right, enshrined in many human rights treaties albeit implicitly or explicit. The European Convention of Human Rights ("ECHR") does not explicitly mention the privilege, but the European Court of Human Rights ("ECtHR") does read the 'right not to be compelled to incriminate oneself' in the right to a fair trial under Article 6 (1) ECHR. Now that research is increasingly pointing to enhanced neuroscientific possibilities for obtaining brain signals and interpreting them in new ways, this is resulting in a potentially new application of thought intervention and modulation for society and thus, also for legislators and law enforcement. However, this raises questions for the law: How does such conduct affect the privilege against self-incrimination as is read and interpreted under Article 6 (1) ECHR? In this thesis, potential novel investigative methods through *brain-computer interfaces* ("BCI") – which is a is a form of neurotechnology which can be used to control devices and can also be deployed in activities such as gaming, marketing, self-monitoring and communicating – used by Dutch law enforcement will be assessed against both the Dutch interpretation of the privilege and that of the ECtHR. In order to do so, a comparison with already existing novel investigative methods such as the decryption order will be made.

Keywords BCI • Privilege against self-incrimination • Article 6 ECHR • Decryption orders • Mental integrity • Neuroscience • Brain signals • Cognitive manipulation • Compelled Compliance • Passive thought-reading analysis

Chapter I

1.1 Introduction

Since the Cognitive Revolution of the Homo Sapiens between 70,000 and 30,000 years ago, the DNA of our ancestors *changed* in a way enabling us to think and communicate with each other in unprecedented ways (Harari, 2014, p. 23). This evolution lead to social cooperation of human beings by means of sharing information about the world through the use of sophisticated language as opposed to the primitive ways of communicating of other animals such as birds and monkey species (Harari, 2014, pp. 25-26). For a long time, it remained unknown how the mental processes made it possible for human beings to communicate and cooperate. Neurosurgery and neuroscience were namely limited to merely observations of brain tissue through surgery and did not extend to the neural and mental processes in the brain in relation to its emotions, reasoning and behavior (Ienca & Andorno, 2017, p. 2). Since the 1990s when the use of brain imaging techniques for neurobehavioral studies propagated, humans have made great progression on understanding the functioning and reasoning of the human brain through interpreting and correlating certain brain signals to certain emotions, reasoning and behavior (Illes, 2003). As a result, a recent study where human brains were directly linked to each other and enabled their brain activity to interact with each other, demonstrated the potential for

bypassing language as communication method (Martone, 2019). In this study, two human subjects gave instructions to a third individual to perform a certain task through the transition of electrical brain signals in the form of magnetic signals rather through verbal communication for instance (Martone, 2019). Whereas brain imaging techniques were initially deployed within the medical sphere and for neuroscience research, it is currently possible for healthy users to use neurotechnology applications for non-medical purposes (Steinert & Friedrich, 2019).

Studies concerning direct brain-to-brain communication that exhibit the possibilities of neuroscience in making new (non-medical) means of human collaboration and communication possible, involves a technology which is called Brain-computer interface ("BCI").
BCI is a form of neurotechnology which can be used to control devices and can also be deployed in activities such as gaming, marketing, self-monitoring and communicating (Ienca & Andorno, 2017, p. 4). Think of BCI as an intermediary between the biological brain activity and a practical output. The output translates this activity into information which is observable for a human being or into instructions to other devices such as a prosthetic robot arm. The implementation of 68 electrodes into the visual cortex of the brain, that produce the sensation of seeing light for a blind man is an example of a BCI application in the form of electrical and magnetic brain stimulation (Anupama, Cauvery, & Lingaraju, 2012). BCI can furthermore be used for real-time neuromonitoring purposes such as with the use of cortical stimulation mapping where the function of specific brain regions is localized using direct electrical stimulation (Lesser, Arroyo, Crone, & Gordon, 1998), neurosensory-based vehicle operator systems to improve driving safety, wearables for mental wellbeing, and virtual reality systems (Ienca & Andorno, 2017, p. 4).

It is expected that the progressive developments in neuroscience and the use of new neurotechnology will impact the society as we know it today (Gladden, 2016b). Facebook CEO Mark Zuckerberg stated that one day, people will be able to share full sensory and emotional experiences online (Marsh, 2018). Whereas Elon Musk believes neurotechnology is the "next big thing" and wants to directly tap into the brain and read "thoughts" (Marsh, 2018). From the perspective of law enforcement, the application of neurotechnology also becomes more interesting as it may also become possible for the police to use this in police conduct.

1.2 Brain-computer interfaces in criminal investigations

As such, Dutch secret services are also engaged in the neuroscientific possibilities within the criminal investigative domain and are being informed about the possible implications of "penetrating one's brain against one's will" when the services measure "emotions" or read "minds" of possible suspects in the future (Versteegh, 2019).[1] These possibilities, however, raise serious questions when it comes to fundamental notions about individual identity and autonomy in particular in the relationship between the government and its citizens. From a broader perspective, BCI technology may have an impact on the mental privacy of the suspect,

[1] Text from source interpreted and translated from Dutch to English by A. Khozooei.

i.e. the freedom of thought. This is a result of the human "mind" becoming more accessible in contrast with the past. Therefore, the use of BCI technology possibly enabling the government to grasp the contents of the "mind" when one becomes suspected of an offence, calls for further research on its compatibility with human rights, and in particular the suspect rights. For the sake of argument, one may assume that the rights of suspects – as the way they are currently designed – may severely be infringed and that the aims and impact of this technology needs to be assessed against human values such as autonomy, privacy and the moral reactions to the designed technology. Thus, law enforcement may aim to infer thoughts from brain readings when technology has matured to this extent, but how does this relate to the right of a suspect to not incriminate him or herself?

Within this context, this thesis will focus on neurotechnology applications within the legal sphere, particularly on the use of BCI within the criminal investigation in the Netherlands in relation to the European Convention on Human Rights ("ECHR") and on the effects it may have on the privilege against self-incrimination. It will limit its scope to Article 6 ECHR and marginally touch upon the notion of (mental) privacy in a narrow sense as a part of the explanation of the privilege against self-incrimination from its rationales. Furthermore, in order to assess the compatibility of BCI conduct within the Dutch criminal investigative domain, it is necessary to understand that the Dutch criminal justice system has its main purpose laid down in 'the search for material truth' with regard to a criminal offence (Corstens, Borgers, & Kooijmans, 2018, p. 12).[2] This truth can be found, firstly, during the trial to provide evidence in order to proof its accusation during the hearing before a judge and, secondly, in the investigation that precedes this hearing which underpins its accusation (Dubbelaar, 2014, p. 18).[3] Hence, the suspect can be considered to be a very useful source of evidence when it comes to providing statements with regard to the offence and from this perspective, one can question the significance of the role of BCI technology in obtaining such statements.

So far, BCI technology has not proven its capacity to explore underlying emotions, thoughts and let alone the human mind as such. Therefore, it is important to understand that the conception of reading, or measuring, and interpreting abstract notions such as "emotions", "thoughts" or the more abstract notion of the "mind", still belong to the realm of science fiction (Miller, 2014). Nevertheless, due to rapid advancements in neuroscience, the possibility of replacing old-fashioned (and deficient) polygraph lie detectors, as a way of 'looking' inside suspects' brains, by BCI "thought-reading" devices cannot be fully exempted (Ienca & Andorno, 2017, pp. 2, 9). Since this thesis ultimately focuses on the desirability of law enforcement aiming to infer thoughts from such brain readings, the term "thoughts" will be used in brackets and the use of the term "brain signals" will be preferred where possible. Also, the broad and abstract notion of the "mind" lends itself more to a legal-philosophical approach of research, thus, this notion of the "mind" will be excluded from this thesis.

[2] Text from source interpreted and translated from Dutch to English by A. Khozooei.
[3] Text from source interpreted and translated from Dutch to English by A. Khozooei.

1.3 Literature review

In literature, there is a lot of discussion about 'new' instruments that can be used within the criminal (procedural) law compared to 'conventional' methods and about the admissibility of resulting evidence in criminal investigations from these instruments. For instance, authors such as Bublitz and Merkel (2014) question the place of the 'mind' in a world where neuroscience allows mental states to be modulated and or intervened with compared to the current natural world on which our legal thinking is based on and does not yet legitimately allow for such conduct. They state that "(…) the law affords only one-sided protection: it systematically protects bodies and brains, but only fragmentarily minds and mental states" and that the "(…) fundamental question, in what ways people may legitimately change mental states of others, is largely unexplored in legal thinking" (Bublitz & Merkel, 2014, p. 51). From the same context, in their paper *Guilty Minds in Washed Brains*, Bublitz and Merkel question the current position of the law with regard to fairness and legitimacy of responsibility when neuroscientific findings increasingly show that the brain is susceptibility to manipulative interferences (Bublitz & Merkel, 2013, p. 334).

Although Bublitz and Merkel take on a more legal philosophical approach in their papers shedding light on scenario's in which neuroscience has matured in a way that it is applicable in legal systems, others discuss the related admissibility of law enforcement compelling suspects and even companies to provide particulars in the form of biometric data, such as fingerprints to access smartphones (Brewster, 2016). The latter is one of those above-mentioned 'new' instruments that law enforcement can use within criminal investigation and is also referred to as 'decryption orders' (Kerr, 2018, pp. 20-21). Some say that compelling a suspect physically to unlock a fingerprint-protected smartphone could easily lead to a breach of the privilege against self-incrimination (Bood, 2018)[4] and, other say that this is not the case (Egberts & Ferdinandusse, 2019; Stevens, 2019).[5] The privilege against self-incrimination entails that "a person shall not be compelled to incriminate himself or herself or to confess guilt" (Koops, 2000, p. 32).[6] In the Saunders v. the United Kingdom case, the European Court of Human Rights ("ECtHR") found that "The right not to incriminate oneself is primarily concerned (…) with respecting the will of an accused person to remain silent".[7]

In this regard, there exist two boundaries for (in)admissibility of information that is obtained through the use of coercion or compulsion with regard to the privilege against self-incrimination; on one hand, compelling will-independent material such as DNA, blood, urine and perhaps brain signals, does not conflict with the privilege against self-incrimination. On the other hand, the compulsion of statements in criminal investigations, and the use of will-dependent statements compelled outside criminal proceedings (such was the case in the Saunders case), is contrary to the privilege against self-incrimination. However, between the

[4] Text from source interpreted and translated from Dutch to English by A. Khozooei.
[5] Text from source interpreted and translated from Dutch to English by A. Khozooei.
[6] Text from source interpreted and translated from Dutch to English by A. Khozooei.
[7] ECtHR 17 December 1996, *Saunders v. the United Kingdom*, Appl. No. 19187/91, para. 69.

former and the latter, there can occur events where at first sight, will-independent material is obtained which actually still depends on the will of the suspect. When the information in these situations are then used in criminal proceedings, then this will lead to a conflict with the privilege against self-incrimination (Stevens, 2019, p. 401). Such situations will be discussed in more detail in the last chapter.

Also, Koops questions the scope and judicial status of the privilege against self-incrimination in his book "*de Verdachte en ontsleutelplicht: hoe ver reikt nemo tenetur?*". In his book, he aims to give a definition for the privilege against self-incrimination since on the one hand, there is only some international treaties that have codified the privilege and on the other hand, various authors even question its raison d'être (Koops, 2000, pp. 27-32).[8]

In sum, there seems to be a lot of discussion concerning the interpretation of the privilege against self-incrimination and especially with regard to 'new' investigative methods used during the criminal investigation, such as the use of decryption orders. This ambiguity lies at the heart of this thesis which aims to examine the effect of BCI conduct as a 'new' investigative method on the privilege against self-incrimination. By studying the rationales of the privilege against self-incrimination and assessing its current interpretation by the Dutch court and the ECtHR in regard to 'new' investigative methods, this thesis will aim to provide clarification on its compatibility with potential use of BCI technology during criminal investigations in the Netherlands.

1.4 Research Question & sub-questions

The research question of this thesis is as follows:

> "Does accessing 'thoughts' of suspects through brain-computer interfaces (BCI) during criminal investigation for the purpose of truth-finding in the Netherlands affect the privilege against self-incrimination in Article 6 of the European Convention on Human Rights?"

In order to answer the research question, the following sub-questions need to be addressed at forehand:

1. What is BCI and what types of applications of BCI are most relevant for criminal investigation purposes?
2. What is the rationale of the principle against self-incrimination in criminal procedure and how is this interpreted by the ECtHR and the Dutch Supreme Court?
3. How does the use of BCIs during criminal investigation relate to the privilege against self-incrimination, in particular in light of the rationale(s) underlying this principle including ECtHR and Dutch case law on this subject?

[8] Text from source interpreted and translated from Dutch to English by A. Khozooei.

1.5 Methodology

Inspired by discussions in literature of Bublitz and Merkel, for instance the discussion about neuroimaging methods to intervene with the mind and brain and, its interpretation from a legal philosophical perspective (Bublitz, 2014, p. 9), the technology of BCI within the domain of law enforcement has been chosen as subject for this thesis. Regardless of (future) policy-making in this area, this thesis has chosen the following two practical case studies based on Bublitz' and Merkel's paper *Guilty Minds in Washed Brains* (2013, pp. 335-336) in which they examine whether manipulated persons can be held responsible from a moral philosophical stance in which manipulated agents are considered to be not responsible and, a legal doctrinal stance in which manipulated agents were not excused based on the fact that they were unduly influenced:

> *Case 1*: The suspect's brain is connected to BCI devices in an interrogation situation. The use of these BCI devices concerns the possibility of bringing a suspect into a mental state where he or she is more likely to cooperate with the prosecutor to find out what actually happened. This is done through the physically invasive means of *deep brain stimulation (DBS)* in which the brain signals are interfered with. This state can also be referred to as "compelled compliance".
>
> *Case 2*: The suspect's brain is connected to physically invasive or non-invasive BCI devices in an interrogation situation. The use of these BCI devices concerns that of the communicating and intervening possibility of passively reading brain signals of a suspect and *possibly* deriving thought of these signals or using this possibility as a lie detector for the purpose of truth finding.

The above-mentioned case studies will be discussed extensively from the next chapter on. Although these case studies are discussed from a more philosophical perspective by Bublitz and Merkel (2013) in which they question the permissibility of "mind" interventions by arguing whether individuals' should be held responsible for their actions, this thesis does not approach the matter in question from a philosophical perspective, but more from a legal evaluative perspective as regards to the privilege against self-incrimination. Thus, it will not address the related philosophical objections.

Due to the novelty and rather comprehensive scope of the subject of this thesis, a systematic description of current practices is not possible. However, in order to provide a contribution towards a comprehensive body of legal practices within the domain of BCI adoption in criminal proceedings, methods of doctrinal legal research and desk research will be used to analyze legal doctrines about the privilege against self-incrimination in connection to 'new' investigative methods. Hence, this thesis does not rely on empirical data, but on the interpretation and qualitative analysis of law and literature in the context of human rights and criminal law with

a sidetrack to neuroscience and novel types of investigative powers such as the decryption order.

In order to gather the materials that are relevant, several databases such as HeinOnline, Google Scholar, SSRN and ResearchGate will be consulted for English legal literature. For Dutch legal literature, Kluwer Navigator will be used. Furthermore, the HUDOC-database will be consulted for case law from the ECtHR. For Dutch case law, the website www.rechtspraak.nl will be used. This 'desk research' started from content comprehensive articles by Jan Bublitz & Reinhard Merkel, Marcello Ienca and Roberto Andorno and further progresses by studying academic publications by Koops, Stevens, Van Door, Ovey and Holloway, among others.

This thesis will show the possible effects of future technology on current normative frameworks. This methodology has been chosen because evaluating current comparable technologies and current norms that protect suspects and their (mental) privacy, provides a reference framework that can be used to analyze the efficacy of these comparable technologies and current norms regarding the use of new technologies.

The chosen national legislation in this study will be that of the Netherlands. Since the Netherlands is a Convention member of the Council of Europe ("CoE") and since Member States are uniformly bound by ECtHR ruling, it does not make much difference for the choice of whether Dutch criminal law is considered or that of another Member State. However, Michiel Luchtman & Rob Widdershoven (2018) find that the Dutch criminal law is increasingly subjected to influences from regulation of the EU and that of the CoE. Their view on these influences goes to the extent that (future) practitioners within the criminal justice should be able to cope with the opportunities (and difficulties) presented by European law (Luchtman & Widdershoven, 2018, p. 889).[9] Thus, the focus in this thesis will be on how emerging BCI applications could be used within the criminal investigation in the Netherlands in relation to European regulation and on the effects it may have on the privilege against self-incrimination involving the dynamics between the ECHR (case)law and the national (case)law of the Netherlands.

1.6 Structure

In the second chapter of this thesis, BCI as a technology within neuroscience is discussed and described. After a comprehensive outline of this technology is given, the *possible* and relevant applications of this technology by (Dutch) law enforcement are set forth. In the third chapter, which is also descriptive of nature, the rationale(s) of the privilege of self-incrimination are more elaborated on after which a literature review is conducted as regard to this privilege and its interpretation by the ECtHR and the Dutch court. Furthermore, references are made in this chapter to the standard investigative methods and conventional types of self-incrimination such as lie detection. The fourth chapter, will evaluate the findings in the former chapters and

[9] Text from source interpreted and translated from Dutch to English by A. Khozooei.

address and outline the compatibility of BCI technology deployment in police conduct with the privilege by comparing it to the (novel) investigative method of decryption orders. Eventually, in the concluding chapter, it will be examined whether truth finding through using BCIs by law enforcement can take place within the scope of current human rights and the principle against self-incrimination as interpreted by the Dutch legislator and CoE.

Chapter II: The possibilities of applying BCIs during criminal investigation

In assessing the main question in this thesis, it is first necessary to go into more detail about BCI technology. This chapter will contribute to the understanding of the significance of BCI technology as a part of neuroscience outside of the medical sphere. After this outline, the *possible* and relevant applications of this technology by (Dutch) law enforcement are set forth. These relevant applications for criminal investigation have the supposed aim of *compelling compliance* and *passive brain-reading analysis* by law enforcement with the use of BCI during criminal investigation. These aims have similarities with conventional methods such as hypnosis or the use of a polygraph as a lie detector which are extensively discussed in literature. At the end of this chapter an appropriate answer can be given to the first sub-question: *What is BCI and what types of applications of BCI are most relevant for criminal investigation purposes?*

2.1 Brain-computer interfaces

BCI entails the technology that makes communication between brain signals and external devices possible. Daly & Huggins (2015) define BCI as "a system that acquires brain signal activity and translates it into an output that can replace, restore, enhance, supplement, or improve the existing brain signal, which can, in turn, modify or change ongoing interactions between the brain and its internal or external environment". For this interaction it is necessary that brain signals (activities) are measured, possibly emphasized and then processed (Erp, Lotte, & Tangermann, 2012, p. para. 4.3). Depending on its relevance, the processed data may give rise to follow-up actions.

The definition of BCI above consists of several elements that need some further explanation in order to comprehend the significance of developed technology of BCI. Firstly, it is to be understood that the brain is the main focus of BCIs and therefore, the applicable field of science with regard to BCIs, is neuroscience (Olaronke, Rhoda, Gambo, Oluwaseun, & Janet, 2018). Thus, BCI can be considered to be a discipline within the neuroscience.

Then, in order to understand how BCI relates to the brain, a small notion of the brain's anatomy is necessary. The construction of the brain consists out of neurons that fire when they are triggered by mental activity (Anupama et al., 2012, p. 741). This engagement causes electrophysiological signals of the brain (Anupama et al., 2012, p. 740). The changes in electrophysiological signals are then detected by BCI devices through signal acquisition and transformed into a 'control signal'. These signals are called 'control signals' because after being classified, these signals can be used in different applications to direct a certain feedback to the brain and *control* the reaction from the brain that derives from such feedback (Anupama et al., 2012). Altogether, BCI connects the brain to a computer system.

This interaction between BCI devices and the brain indicates both a system of communication and a system of control.

On the one hand, an accurate discrimination of different patterns of brain activity by BCI devices takes place and the adapted execution of different mental tasks by the user of the BCI can be made in order to produce distinct brain signals for this interaction to take place (Anupama et al., 2012). This results into *communication* between the brain and the BCI. In simpler terms, the BCI is designed in such a way that it filters out irrelevant brain signals and aims at the desired signals in which interaction can take place. Think of the insertion of a marker liquid in the blood flow that depicts the brain signals through a BCI device when a certain brain signal is triggered, whereas other brain signals will remain invisible.
On the other hand, BCI devices can interpret these patterns of brain activity in such a way that it is only set to *trigger* programmed actions of feedback to which the brain is subjectively exposed to. For example, a BCI connected to a prosthetic limb – that replaces a left arm – will only interpret the pattern of brain activity intended for moving the left arm and not the right arm after which the limb is triggered by the BCI to move.

The abovementioned distinction between a *controlling* system and a *communication* system becomes more relevant later in this chapter when discussing *compelled compliance* – the possibility to control and modulate the mental state of the suspect to the extent that it is more likely that he will cooperate in the criminal investigation – and *passive brain-reading analysis* – where law enforcement intervenes in the brain of a suspect and reads the brain signals of a suspect and *possibly* deriving thought of these signals or using this possibility as a lie detector for the purpose of truth finding.

Finally, in understanding the given definition of BCI, the definition speaks of the ability to "replace, restore, enhance, supplement, or improve the existing brain signal". Brain imaging techniques that BCI devices apply, were initially deployed within the medical sphere (Ienca & Andorno, 2017, p. 4). These techniques were meant to improve the quality of life of those who were medically restricted and have helped them restore their ability to move by substituting the lost motor functionality (Abdulkader, Atia, & Mostafa, 2015).

Due to advancements within the domain of BCIs, brain imaging techniques are now also available to healthy users and available for the commercial market, broadening the scope of usability of BCIs to users outside of the medical domain (Abdulkader et al., 2015). This change makes it also interesting for policy makers, legislatures and judges to adopt the use of BCIs within the public domain within their policies and legal frameworks (Ienca & Andorno, 2017). Notwithstanding this interest, BCI applications currently have their limitations such as a poor 'information transfer rate' (ITR), poor user acceptance (Abdulkader et al., 2015, p. 223) and the state of the science is not yet matured to the extent of a "universal mind reading machine" that could "(a) take an arbitrary person, (b) decode arbitrary mental states and (c) do so without long calibration" (Miller, 2014). This thesis will not focus on these restrictions since BCIs as an investigative tool are still very novel (Miller, 2014) and therefore, not suitable yet for the

police to include in their arsenal of powers. However, there are already serious objections from scholars concerning the capability of these devices, what they could actually measure and can reveal when the technology has matured (Bublitz, 2014; Ienca & Andorno, 2017). Hence, this thesis rather aims to show the possible effects of BCI conduct on current normative frameworks in the case BCI technology has become suitable for the police to use as an investigative tool.

2.2 Function and methods of Brain-computer interfaces

For an accurate representation of the possibilities of BCI applications, the function and the different kinds of signal acquisition – also referred to as recording methods – will be set forth.

The application of a BCI system includes the following components: signal acquisition, signal (pre)processing, feature extraction, and classification (Abdulkader et al., 2015, p. 218). First, the brain waves must be acquired through the component of signal acquisition after which, the acquired signals can be enhanced by filtering out the unnecessary signals (or reducing its noise) through (pre)proccesing. After (pre)processing the brain signals, discriminative characteristics are generated from that improved signal by the feature extraction component. This extraction makes it easier for the classification component to translate the produced features into device commands as the size of the collected data is reduced and marginalized. From the four components within a BCI system, signal acquisition is the main component (Abdulkader et al., 2015). In the figure below this interaction in depicted.

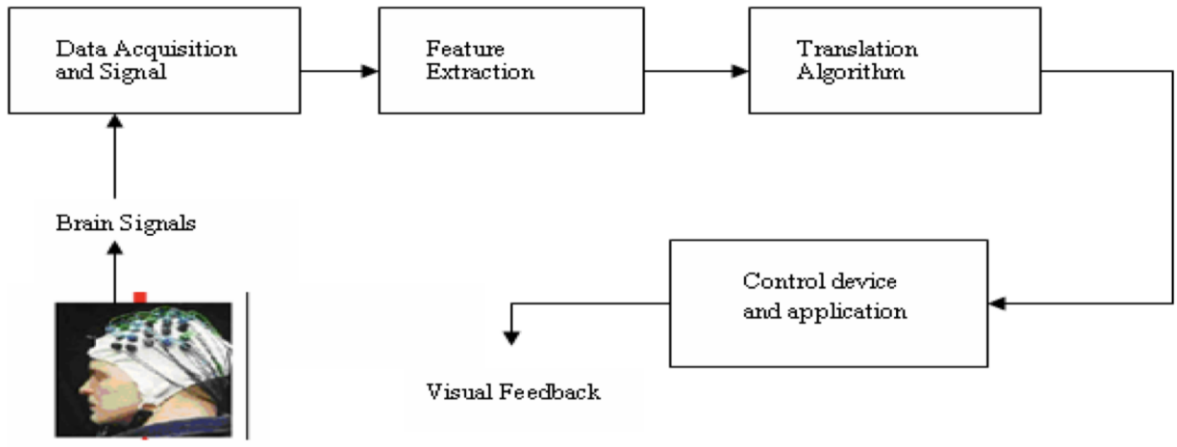

Fig. 1: Representation of a BCI (source: Anupama et al. (2012))

Depending on the physical installment of the device containing BCI technology, being implantable or surface-based, BCI technology can be classified as 'non-invasive', 'partially invasive', or 'invasive' (Gladden, 2016b). Invasiveness in this sense concerns the degree of severity with regard to the physical intrusion of the human body.
The acquisition process involves various methods of BCI usage. 'Invasive' BCIs concern physically intrusive measures of surgically implanting electrodes on the inside of the user's brain ('intracortically'), whereas implanting these electrodes over the surface of the brain

('cortical surface'), is considered to be 'partially invasive' (Abdulkader et al., 2015; Anupama et al., 2012). An example of invasive BCI is Deep Brain Stimulation (DBS). With DBS, particular neurons in the brain are stimulated or repressed through operative implanted thin and insulated wires containing typically four electrodes that are electronically stimulated through an "implanted pulse generator" that is implanted under the shoulder or in the abdomen (Greely, 2008). An example of partially invasive BCI is Electrocorticography (ECoG), where operative implanted electrode grids or strips over the cortex surface records electrical activity of neurons at the embracing area (Abdulkader et al., 2015). In contrast, there are also 'non-invasive' methods of BCI (Gladden, 2016a). Such methods do not physically enter organic tissue, but rather acquires brain signals through mounted sensors on headbands or other external mediums that are situated on or around the head (Gladden, 2016a). Familiar examples of non-invasive BCIs are the Electroencephalogram (EEG), where electrical activity in the scalp is recorded through measuring voltage fluctuations and neurotransmission activity within the brain through electrodes attached on a headband and, functional Magnetic resonance imaging (fMRI), where certain activity is connected to the corresponding brain areas by detecting changes in blood flow in the brain through a special device (Abdulkader et al., 2015). Other non-invasive BCIs use inter alia magnetic fields or infrared light as observation tools.

(Partially) Invasive methods of BCI provide the highest quality signals as they are directly implanted in the motor cortex or on the cortical surface (Abdulkader et al., 2015; Anupama et al., 2012). Non-invasive methods involve measuring brain activity using external sensors situated on or around the head without (permanently) implanting external objects into the brain through surgery.

In the next section of this chapter, the BCI applications most relevant for criminal investigation, with the aims of *compelling compliance* and *passive brain-reading analysis* by law enforcement with the use of BCI during criminal investigation, will be discussed. Since the scope of BCI conduct in this thesis will be narrowed down to the use of such technology by law enforcement through suspect, it is important to acknowledge the use of the term 'users' in context with BCIs during criminal investigation.
Although the term 'users' is primarily used within the medical sphere or at least there where the BCI application is undergone by individuals who have voluntarily assented to its deployment, the cooperation of suspects in criminal investigations, however, usually will not have a voluntarily nature when *compelling compliance* and *passively analyzing the brain-reading* by law enforcement with the use of (invasive and non-invasive BCI recording methods) BCI during criminal investigation. Hence, suspects are more considered to be "objects" or "subjects", while actually the police, in particular the medical staff working for the police, are the users. For this reason, in the following chapters, the police will be regarded to be the users of BCI technology in the criminal investigation.

2.3 'Compelled Compliance' & Passive thought-reading analysis

At the beginning of this chapter, a distinction was made between a controlling system and a communication system in the application of BCIs. Bublitz and Merkel (2013) make a similar distinction and discuss the new neuroscientific possibilities, such as those BCIs that can intervene into "minds" (and thus, *communicating with "the mind"*) and, those that can modulate "thoughts", emotions and behavioral dispositions (and thus, *controlling "the mind"*).

Whilst the two possibilities of using BCI for *compelling compliance* purposes (the possibility to control and modulate the mental state of the suspect to the extent that it is more likely that he will cooperate in the criminal investigation) and, the application of BCI for *passive brain-reading analysis* (where law enforcement intervenes in the brain of a suspect and reads the brain signals of a suspect and *possibly* deriving "thought" of these signals or using this possibility as a lie detector for the purpose of truth finding) are set forth, there may be other possibilities that can potentially be introduced within the criminal investigation. The viability of these possibilities is ultimately a political matter as the content of criminal procedural law depends on political considerations

2.3.1 The Dutch Criminal Procedural Law in connection with the privilege against self-incrimination

Before discussing the abovementioned cases in more detail, it is valuable to elaborate more on the Dutch Criminal Procedural Law in connection with the privilege against self-incrimination in order to understand the context in which the investigative methods through BCIs in both cases can be implemented by Dutch law enforcement.

The Dutch Criminal Procedural Law knows different phases. The first phase, concerns the investigation ('opsporingsonderzoek') where law enforcement gathers evidence related to criminal offences for the purpose of preliminary study by means of powers assigned by the legislator. The second phase, concerns the examination in court ('onderzoek ter terechtzitting') where the suspect is summoned to appear before court as he or she is suspected to have committed a criminal offence. After the possibility to reside to domestic remedies ('rechtsmiddelen') and contest the results of the examination in court, the last phase of enforcement follows ('tenuitvoerlegging') where the judgment is enforced by a sentence, for instance (Kronenberg & Wilde, 2012, p. 163).[10]

As mentioned briefly in the introduction, the main purpose of the Dutch criminal justice system is to search the material truth with regard to a criminal offence. In this search, the inquisitorial process form of Dutch Criminal Procedural Law does not allow the defendant to be an equivalent party to the proceedings compared to the prosecutor and is rather considered an object of investigation that has to tolerate coercive investigative measures (Corstens et al.,

[10] Text from source interpreted and translated from Dutch to English by A. Khozooei.

2018, p. 12).[11] Whereas in an accusatorial process two equal parties compete against each other in front of a passive judge who limits himself to performing the role of an arbitrator (Corstens et al., 2018, p. 12).[12]
Although the Dutch criminal procedural law has an inquisitorial form, the Dutch criminal law system can be considered to be a moderately accusatorial or a mitigated inquisitorial system since during the investigation in the hearing, the trial has a more accusatorial character as the defendant is treated equally, partly due to the effect of Article 6 of the ECHR (Corstens et al., 2018).[13]

In practice, Dutch law enforcements' efforts to establish the truth can be found, firstly, during the trial to provide evidence in order to proof its accusation during the hearing before a judge and, secondly, in the investigation that precedes this hearing which underpins its accusation (Dubbelaar, 2014, p. 18).[14] The latter shows that the truth finding strongly depends on evidence obtained during the criminal investigation and evidence provided before the court. According to Article 338 of the Dutch Code of Criminal Procedure ("DCCP"), evidence is admissible before court when the judge obtains the conviction from the content of the evidence provided of which he or she is convinced by. Thus, statements given by defendants are considered to be useful as evidence since the judge, absent from the crime scene, can only marginally decide to the extent of his or her own sensory observation during the hearing (Dubbelaar, 2014, p. 61).[15]
In other words, given statements with regard to the committed crime are an important source of evidence for the judge to use in order to draw a conviction based on his or her contemplation, since he or she was not present on the crime scene in order to be convinced by the allegedly occurred facts.
Furthermore, Dutch criminal procedural law distinguishes *active* and *passive* cooperation by the suspect in the criminal investigation; active cooperation entails for instance providing statements; passive cooperation entails to have to endure coercive measures such as enduring the collection of blood samples (Stevens, 2005, p. 116).[16]
Although the defendant is an important source of information, he or she is traditionally considered to be a source of little use as statements by the suspect are unreliable mainly due to two challenges. On the one hand, due to the (un)conscious making of incorrect statements and on the other hand, due to legal restrictions as regards the examination of witness statements (Dubbelaar, 2014, p. 61).[17] Such legal restrictions which may under circumstances justify a violation of the right of interrogation may include, for instance, the untraceability of the witness, the objective fear of reprisals by the accused based on supporting evidence, attorney-client privilege, and the health or mental condition of the witness (Dubbelaar, 2014, p. 123).[18]

[11] Text from source interpreted and translated from Dutch to English by A. Khozooei.
[12] Text from source interpreted and translated from Dutch to English by A. Khozooei.
[13] Text from source interpreted and translated from Dutch to English by A. Khozooei.
[14] Text from source interpreted and translated from Dutch to English by A. Khozooei.
[15] Text from source interpreted and translated from Dutch to English by A. Khozooei.
[16] Text from source interpreted and translated from Dutch to English by A. Khozooei.
[17] Text from source interpreted and translated from Dutch to English by A. Khozooei.
[18] Text from source interpreted and translated from Dutch to English by A. Khozooei.

2.3.2 BCI conduct through the lens of the Dutch Criminal Procedural Law

With the prospect of the future ability to extract thoughts from measured brain signals or intervening in brain signals of the suspect to bring him or her in a cooperative state, it is desirable for the police to do so especially because of the former challenge of incorrect statements. With Gladdens interpretation of BCI, law enforcements could examine the quality of available information which could *possibly* be inferred from the measured brain signals by means of "thought-to-text translation" (2016b).

According to Koops (2016), respecting the suspect's autonomy is at the essence when protection from the interference with the mind in criminal procedures is provided. This autonomy lies in particular in his or her decision-making process, referring to the cooperation (whether it be a passive or active act of cooperation), denial and residing in silence of the suspect during the criminal investigation (Koops, 2016, p. 27). The rationale hereof, concerns that of the ability of the suspect to determine *freely* how he or she positions him or herself in the case. The right to remain silent and the privilege against self-incrimination are fundamental doctrines for this which are embedded in Article 6 ECHR, the right to a fair trial.[19]

The privilege against self-incrimination entails that "a person shall not be compelled to incriminate himself or herself or to confess guilt" (Koops, 2000, p. 32).[20] In other words, applying BCI technology in criminal investigation can lead to legal implications with regard to a fair trial when BCI technology is used to compel a suspect to provide incriminating information to the law enforcement, such as compelling suspects to give their passwords by conferring these passwords from brain signal measurements (*passive thought-reading analysis*) (Ienca & Andorno, 2017, p. 7), or when he or she is compelled to confess guilt when his or her state of cooperation is modulated or the prosecutor finds the suspect guilty after a voluntarily conduct of neuro lie detection (*compelled compliance*). For now, it is useful to know that following the Saunders case, material that exists dependent of the will of the suspect (such as oral statements), does fall under the protection of the privilege and material that exists independently of the will of the suspect (such as blood and urine samples) in principle does not.[21]

The conduct in the first case, the brain signals of the suspect is subjected to modulation through intervention what results into an 'adjusted' expression of the suspect's will, affecting the rationale of the suspect's autonomy namely, to determine *freely*. For instance, a police officer could control the state of cooperation and designing the reasoning process in such a way that the suspect is brought into a mood where he feels comfortable and at ease (similarly to a good cop offering a coffee and sympathy), as a way to increasing the likelihood of cooperation. At first glance, this conduct would not eliminate the non-binding nature in cooperating since the suspect maintains his autonomy to a certain extent.

[19] ECtHR 17 December 1996, *Saunders v. the United Kingdom*, Appl. No. 19187/91; ECtHR 23 February 1993, *Funke v. France*, Appl. No. 10828/84.
[20] Text from source interpreted and translated from Dutch to English by A. Khozooei.
[21] ECtHR 17 December 1996, *Saunders v. the United Kingdom*, Appl. No. 19187/91, para. 69.

Furthermore, in the context of Dutch criminal law and when lawful, compelling compliance of the suspect through BCI can be considered to be *passive cooperation* (although he or she is actively providing statements). There is cooperation, albeit not entirely voluntary, as the suspect has to endure coercive recording measures by the use of Deep Brain stimulation which is aimed at material that exists independent of the will of the suspect, namely the brain neurons that are being recorded.

However, it can be argued that the suspect does not maintain its autonomy as his or her autonomy has been compromised to the extent that the outcome of the decision-making process would have been different in the case when BCI is applied as opposed to the case when no BCI is applied in the investigation. In other words, the desires of the suspect can be modified by the police officer and, the initiation of the reasoning process of the suspect to cooperate, deny or remain silent can be manipulated resulting into the likelihood of the suspect's state to cooperate (Pereboom, 2003), whereas he or she was unlikely to have cooperated when there was no modification of these desires through the use of DBS where particular neurons are stimulated or repressed which are correlated with the mental state of the suspect.

Whereas with 'compelled compliance' the suspect actively contributes to the investigation through his or her cooperative state, passive brain-reading analysis focuses on BCIs that can on the one hand, acquire information from the brain signals of an individual with no necessity of any effort or intention from the suspect (Brouwer, Erp, Heylen, Jensen, & Poel, 2013) and on the other hand, can be used as a lie detector through BCI recording methods such as ECoG, fMRI, fNIRS, MEG and EEG (Ienca & Andorno, 2017, p. 6). From this perspective, a police officer can for instance confer cognition related to a criminal offence from the acquired brain signals of a suspect in order to obtain knowledge on the actual facts occurred or examine the quality of given statements.
Also, passive brain-reading analysis can be considered to be *passive cooperation* of the suspect in the context of Dutch criminal law as the suspect is subjected to the use of BCI methods during the interrogation through which brain signals that exist independent from the will of the suspect are recorded an thus, the suspect has to endure this conduct passively.

2.4 Conventional criminal investigative methods & BCI methods

Although the former two approaches may resemble a future scenario, from a perspective of reducing criminal behavior and the adoption of new methods to "treat criminal brains" (Greely, 2008, p. 1116), there already seem to be similar techniques that governments could use to manipulate the 'free' will of offenders.
By way of off-label use or intended use of approved drugs, biologics, and devices, measures such as chemical castration, anti-addiction programs and mandatory treatment with anti-psychotics to manipulate chemicals in the body with the use of drugs that affect certain biological processes in order to control thoughts and impulses, can be currently used in the United States (Greely, 2008). However, according to Greely the potential applications that

neuroscience have to offer due to their advances could stimulate interests in preventing crimes or intervene in criminal behavior (Greely, 2008, p. 1116).

Less intrusive means where the free will is weakened, concerns methods of hypnosis or the use of a polygraph as a lie detector. Literature and case law on the latter instruments provide a relevant framework with regard to the admissibility of such instruments and perhaps also for the two mentioned approaches through BCI.

With regard to the polygraph which records data, such as blood pressure and sweating which could be correlated to lying, the introduction hereof into Dutch criminal procedure law will not be obviously possible since there is insufficient expertise and experience in the Netherlands (Koops, Schooten, & Prinsen, 2004, p. 95)[22] and that the use of statements based on the polygraph would lead to lack of evidential value (Koops, 2016, p. 27). Aside from the unreliability of the polygraph, Lensing finds the polygraph in the criminal procedure admissible on the count of not compromising de *verklaringsvrijheid* (Corstens et al., 2018) – the freedom of making statements following the Dutch criminal procedural law – since it merely records bodily responses (Lensing, 1988).[23] Also, the Dutch Working Group on Lie Detection mentioned in its report in 1993 that the polygraph does not go against fundamental human rights when a person waives those rights and cooperates voluntarily (Koops et al., 2004, p. 95).[24]

Taken the above into account, it may be held that a taken polygraph-test, to which is consented and when fundamentals rights are waived, would only be inadmissible on the ground of lack of reliability as such rather on the ground of unlawfulness. This could be considered controversial based on the mental intrusiveness of the polygraph.

To some extent the use of hypnosis, where the suspect is brought into a similar state of cooperation with the use of compelled compliance through BCI, is just as intrusive as the polygraph, if not more. Nevertheless, the Dutch Supreme Court ruled that when the use of hypnosis on a suspect leads to exculpatory data in relation to him or her, this is not considered unlawful (Koops et al., 2004, p. 96).[25]

Hence, the discussion in literature on the use of the polygraph as a lie detector and hypnosis during the criminal investigation is noteworthy in the context of compelled compliance and brain-reading analysis through BCI. Not yet investigated whether the use of BCI in the criminal investigation is in line with the privilege against self-incrimination, the impression can already be created that this conduct which can be seen as just as controversial, if not more, is, in any case, admissible when exculpatory material towards the suspect is obtained.

[22] Text from source interpreted and translated from Dutch to English by A. Khozooei.
[23] Text from source interpreted and translated from Dutch to English by A. Khozooei.
[24] Text from source interpreted and translated from Dutch to English by A. Khozooei.
[25] Text from source interpreted and translated from Dutch to English by A. Khozooei.

Thus, on the basis of the discussion in literature with regard to these instruments discussed above, it can be stated that the use of compelled compliance & brain-reading analysis through BCI, when consented to and when the suspect waived his or her fundamental rights, being highly reliable, and the possibility that it would provide exculpatory data, its conduct would be considered admissible.

2.5 Conclusion

The first sub-question of this thesis "What is BCI and what types of applications of BCI are most relevant for criminal investigation purposes?" which is assessed in this chapter, can now be answered accordingly with the following: BCI is a product of efforts made within neuroscience aimed at signal acquisition of brain signals via various recording methods from which particular signal(s) are extracted from that then is classified or translated into controllable or interactable output usable from human or technological perspective.

With respect to the relevant types of applications of BCI for criminal investigation purposes, the answer is twofold. On the one hand, brain signal acquisition can provide the police to derive "thoughts" from these signals to depict the 'passive mental statements' on the actual criminal offences that have occurred or to use the mapped brain-readings to assess the verbally given statements against their quality in the sense of honesty. The conventional conduct of polygraph usage as a lie detector can be considered a similar reflection to the former type of application. In this thesis, this is referred to as *passive brain-reading analysis* and can be realized through the use of various BCI recording methods which can be physically invasive.
On the other hand, acquired brain signals can lend itself to modulation, creating a mental state of the suspect which results into the likelihood of cooperation of the suspect. Again, this conduct can be compared to the conventional method of hypnosis where a suspect can also be brought into a state where he is more likely to cooperate with the police. In this thesis, this is referred to as *compelling compliance*. This all could be realized through various BCI recording methods being (non)invasive, such as DBS or EEG.

Chapter III: The rationales and scope of the privilege against self-incrimination

In the previous chapter two relevant possibilities were depicted where BCI could be applied by the police during criminal investigation: (1) the application of BCI for *compelling compliance* purposes and, (2) the application of BCI for *passive brain-reading analysis*. These possibilities, however, raise questions with regard to its compatibility when assessing the BCI application against the framework of the privilege against self-incrimination of which the free will of the suspect is one of the conditions of the privilege. As briefly mentioned in the previous chapter, the condition of the free will of the suspect could be at stake when applying the two former mentioned BCI-based investigative methods by the police. Before being able to assess the compatibility, it is valuable to provide a good understanding of the privilege and its underlying rationales. Therefore, a brief explanation will be given about the considerations and the rationales of the privilege. After this, providing an outline of the scope and applicability of the privilege under Article 6(1) of the ECHR through jurisprudence review, this chapter will contribute to answer the main question in this thesis by answering the second sub-question: *What is the rationale of the privilege against self-incrimination during criminal procedures?* Ultimately, it will be clear what values the privilege aims to protect on one hand and on the second hand, to what extent a suspect can actually invoke the privilege in the period leading up to and during the criminal proceedings.

The privilege against self-incrimination ("the privilege"), is a doctrine commonly found in criminal law and intends to provide protection against compelled self-incriminating conduct (Stevens, 2005, p. 1).[26] In other words, it concerns the "principle that a suspect cannot be forced to cooperate in his own conviction" (Koops, 2000, p. 32).[27] With regard to this cooperation, there exists a distinction concerning the admissibility of obtaining information through compulsion by the law enforcement and which is reiterated in the landmark case of *Saunders v. the United Kingdom*; on the one hand, since the privilege primarily sees to respecting the will of the suspect, compelling will-independent material such as DNA, blood and urine do not conflict with the privilege as this kind of material already exist independently of the will of the suspect and therefore, the will of the suspect remains untainted.[28] On the other hand, the compulsion of statements in criminal investigations, and the use of will-dependent statements compelled outside criminal proceedings, is contrary to the privilege against self-incrimination as this kind of material are depend on the will of the suspect which ought to be respected in the light of the privilege.[29]

[26] Text from source interpreted and translated from Dutch to English by A. Khozooei.
[27] Text from source interpreted and translated from Dutch to English by A. Khozooei.
[28] ECtHR 17 December 1996, *Saunders v. the United Kingdom*, Appl. No. 19187/91, para. 69.
[29] *Ibid*, para. 71-72.

The privilege is neither explicitly codified in the Dutch legislation nor in the ECHR. The interpretation by the ECtHR has been mainly casuistic (Koops, 2000, pp. 32-33).[30] Regardless of its codification, this chapter will assess the key points in case law and relevant (inter)national provisions in order to understand the current scope of applicability of the privilege within the CoE and the Netherlands. In the next chapter, the interpretation of the privilege in connection with BCI conduct by law enforcement in the criminal investigation will be discussed.

3.1 Background of the privilege against self-incrimination

The origin of the privilege that no one is compelled to help the opposing party to prevail in the case or contribute to charges or evidence against him, is far in the past. It would even descend from the medieval times (Helmholz et al., 1997, p. 6). However, in this thesis the focus will be on the rationale of the privilege from the mid-17th century since the early modern principle had then been established within the "Western" law (Lamberigts, 2016, p. 421).

According to Myjer (1978, pp. 6-10), the shift from the accusatorial process form where the suspect was considered to be an equal party to the proceedings to an inquisitorial process form where the suspect was subject of the proceedings and was not an equal party, gave rise to the privilege as it is currently known.[31] For instance, the Dutch government initially allowed its law enforcement to use torture as a means to end in order to obtain statements from the suspect which in its 'new' inquisitorial process form was considered to be the 'greatest good' in the search of the substantive truth (Myjer, 1978, pp. 6-7).[32] Due to objections in regard to the inhumanity of tortures and the false statements derived here from, as a part of the reforms during the Age of Enlightenment, these torturing means of the inquisitorial process form were contended from the beginning of the 17th Century. Aside from the inhumane nature of such means, there were arguments in favor of civil rights and freedoms of the suspect, such as the assistance of a legal counsel in criminal matters, which was prohibited before the eighteenth century (Stevens, 2005, p. 29).[33] As a result, the privilege became more common within the continental and traditionally inquisitorial legal system (Myjer, 1978, pp. 9-10).[34] However, it is good to reiterate that the Dutch criminal law system currently adheres to a moderately accusatorial or a mitigated inquisitorial system as was discussed in the previous chapter.

The privilege is nowadays recognized – by various human rights treaties and statutes of international tribunals – to be a universally fundamental and international principle in criminal proceedings (Wilbrink, 2013, p. 6).[35] The privilege is included in the International Convention Covenant on Civil and Political Rights (ICCPR) in its Article 14 (3)(g) and described as "Not

[30] Text from source interpreted and translated from Dutch to English by A. Khozooei.
[31] Text from source interpreted and translated from Dutch to English by A. Khozooei.
[32] Text from source interpreted and translated from Dutch to English by A. Khozooei.
[33] Text from source interpreted and translated from Dutch to English by A. Khozooei.
[34] Text from source interpreted and translated from Dutch to English by A. Khozooei.
[35] Text from source interpreted and translated from Dutch to English by A. Khozooei.

to be compelled to testify against himself or to confess guilt." The same wording of regulation can be found in Article 21 (4)(g) of the Statute of the International Tribunal for the Former Yugoslavia and Article 20 (4)(g) of the Statute of the International Tribunal for Rwanda. Note that these provisions are focused on statements made orally: "*testify* against himself or *confess* guilt"[36]. Article 55 (1)(a) of the Statute of the International Criminal Court however, grants a broader formulation to the privilege as it provides protection against all forms of compelled self-incrimination (Wilbrink, 2013, p. 6)[37] when dictating that "a person shall not be compelled to incriminate himself or herself or to confess guilt". Note the alternative formulation of the term *testify* in the ICCPR as opposed to the term *incriminate himself or* herself.

Although the U.S. and the European Union also share the privilege in their jurisdiction similarly to various other shared values (Smith, 1968), this thesis focuses on the EctHR its interpretation of the privilege which will be discussed later in this chapter.

3.2 Rationales of the privilege against self-incrimination

In order to understand how the application of the privilege is realized, it is first necessary to determine the rationale behind the privilege. In this section, the rationales of the privilege and their interpretation as discussed in literature and case law will be reviewed.

3.2.1 Rationales

1. Prohibition of undue pressure and the quality of evidence

The rationale of pressure prohibition stems from the earlier mentioned realization in the 18th century that torture as a means in the criminal investigation should be prohibited as – next to the fact that it was considered to be inhumane – it would be ineffective since it results into unreliable statements (Koops, 2000, p. 44).[38] Thus, the use of physical and psychological pressure to attempt to elicit statements were to be avoided (closely related to the right to silence). Hence, this rationale implies that the privilege can be considered to be an instruction for the government not to exert undue pressure on the suspect to incriminate him or herself.
From this perspective, it can be considered that the government should lean less towards the output of the suspect in terms of cooperating to provide 'evidence-worthy' material and incentivize itself to gather evidence outside of the suspect. This reasoning was mostly confirmed in the Saunders v. the United Kingdom case, where it was held that the prosecution must bring up evidence against the suspect without seeking refuge in the use of evidence obtained through coercive methods or repression contrary to the will of the accused and that thus, the privilege is linked with the presumption of innocence of the suspect under Article 6 (2) ECHR.[39] In this sense, the pressure prohibition rationale seems to be related to the

[36] The words 'testify' and 'confess' in the ICCPR are emphasized in order to depict the difference in tone when compared to the Statute of the International Criminal Court.
[37] Text from source interpreted and translated from Dutch to English by A. Khozooei.
[38] Text from source interpreted and translated from Dutch to English by A. Khozooei.
[39] ECtHR 17 December 1996, *Saunders v. the United Kingdom*, Appl. No. 19187/91, para. 68.

innocence presumption of the suspect where a suspect shall be held innocent until proven guilty.

Nevertheless, it should be noted that the approach of the innocence presumption in relation to the privilege primarily extends to the point where there is lawful evidence regardless of the source. What if there is reasonable suspicion concerning the suspect based on evidence from other sources than the suspect against the suspect and that, from that point on, the suspect is coerced to cooperate in his criminal proceedings? Hence, the presumption of innocence principle under Article 6 (2) ECHR must be seen more complementary to defining the privilege than as a fundamental source hereof since, the privilege can also be considered to be relevant in the cases after existence of reasonable suspicion based on other sources of evidence (Wilbrink, 2013, p. 8).[40]

2. Reliability of evidence

The interest of truth finding requires acquired evidence to be reliable (Koops, 2000, p. 45).[41] Hence, the reliability of the evidence is another rationale of the privilege since the privilege aims to guarantee reliable evidence by prohibiting compelled compliance of the suspect which may result into unreliable statements, as discussed above. In the Saunders case, the significance of the quality of the law and criminal proceedings, is expressed by the ECtHR through considering 'the avoidance of miscarriage of justice' to be as a part of Article 6 ECHR.[42] The prohibition of compelling the suspect to comply, is mainly focused on activities of the suspect that may affect the resulting evidence, such as torture-induced statements (Koops, 2000, p. 45).[43]

3. Human dignity

The power relation between the government and its citizens is central for the rationale of human dignity. This rationale focuses on to protection of the will of the 'weak' citizen against the power of the 'great' government (Wilbrink, 2013, p. 8).[44] Whereas the rationale of reliability of evidence sees to the perspective of the government in which it has its instruction standard to not coercively extract statements, the rationale of human dignity sees to the inhumane nature of compelling someone's cooperation in his own conviction. The inhumanity manifests itself when a suspect has to choose between incriminating him or herself and consequently get prosecuted for the criminal offence or; not to cooperate after which he or she gets prosecuted for perjury, misconduct or failure to comply with an official order (Koops, 2000, p. 44; Redmayne, 2007, p. 220).[45] The 'weak' citizen is helped when the possibility of the government to impose such a dilemma is contained (Wilbrink, 2013, p. 8).[46]

[40] Text from source interpreted and translated from Dutch to English by A. Khozooei.
[41] Text from source interpreted and translated from Dutch to English by A. Khozooei.
[42] ECtHR 17 December 1996, *Saunders v. the United Kingdom*, Appl. No. 19187/91, para. 68.
[43] Text from source interpreted and translated from Dutch to English by A. Khozooei.
[44] Text from source interpreted and translated from Dutch to English by A. Khozooei.
[45] Text from source interpreted and translated from Dutch to English by A. Khozooei.
[46] Text from source interpreted and translated from Dutch to English by A. Khozooei.

However, one may argue that this dilemma only concerns those who are actually guilty since, an innocent person does not have to choose in this dilemma and have his or herself incriminated when he or she provides relieving statements or acting on their own moral duty to abide by their truth (Redmayne, 2007, p. 224).

4. Process autonomy

As an response to the previous counter argument against the human dignity rationale, the principle of 'equality of arms' as a component of the privilege, can be brought up to argue that on the basis hereof, the suspect must be acknowledged as a process participant who must be able to react to the claims of the counterparty and decide its own strategy (Wilbrink, 2013, p. 7).[47] Hence, this requires equal 'arms'. Meaning that as a part of the privilege, the suspect has process autonomy where he or she should decide its own stance during the criminal investigation and the case at trial to the extent of means and opportunities during the criminal proceedings (Koops, 2000, p. 44).[48]

Following the given rationales, the rationales of process autonomy and human dignity can be considered to be in the interest of the suspect and, the rationales of pressure prohibition and reliability of evidence within the interest of the criminal investigation, which consists out of the process of truth-finding (Koops, 2000, p. 46)

3.2.2 Interpretation of the privilege

Broad / Narrow interpretation of the privilege

The privilege can be interpreted broadly or narrowly (Koops, 2000, pp. 46-47; Wilbrink, 2013, p. 12).[49] From the angle of the rationales in favor of the suspect, the broad interpretation includes the passive cooperation of the suspect and is not restricted to merely the right to silence, but also involves compliance or refusal of taking a blood test for instance (Wilbrink, 2013).[50] Consequently, the broad interpretation is more favorable for the suspect.

In contrast, the rationale of evidence reliability seems to rely on a narrow interpretation of the privilege as from this perspective, the more a suspect has the ability to affect the quality of the evidence, the lesser compulsion can be justified, or the more reliable an evidence is (such as a DNA result), the lesser the protective scope of the privilege applies (Koops, 2000, p. 45).[51] In other words, the privilege should only protect will-dependent material, such as statements, because the quality of such can be affected by the suspect when compulsion is applied. Hence, the narrow interpretation emphasizes the right to silence and non-compliance by the suspect when it comes to will-dependent material, and allows the use of will-independent material such

[47] Text from source interpreted and translated from Dutch to English by A. Khozooei.
[48] Text from source interpreted and translated from Dutch to English by A. Khozooei.
[49] Text from source interpreted and translated from Dutch to English by A. Khozooei.
[50] Text from source interpreted and translated from Dutch to English by A. Khozooei.
[51] Text from source interpreted and translated from Dutch to English by A. Khozooei.

as blood samples for DNA-testing (Wilbrink, 2013).[52] Hence, the narrow interpretation is more favorable for law enforcement in the context of truth-finding.

Koops (2000, p. 47) argues that from the perspective of process autonomy one should not be compelled to provide will-independent material or tolerate coerced acts – such as tolerating a blood sample to be taken for a DNA-test – since he or she must be able to define his or her own procedural position.[53] Furthermore, Koops (2000, p. 47) argues from a human dignity perspective, that there does not seem to be a clear demarcation on what is to be considered active or passive cooperation and even if a material can be considered to be will-independent material (think of passwords or documents of which its existence is not certain).[54] These points should incite one to interpret the privilege broadly. In this sense, Koops contests that the will-independent material is excluded from the scope of the privilege in the Saunders case and emphasizes that coerced extradition of will-independent material infringes the privilege just as much as statements taken under duress do (Koops, 2000, p. 48).[55]

Similarly, Wilbrink (2013, p. 14) states that the privilege should be interpreted broadly because she thinks that the privilege goes beyond the rights to be silence and that the suspect needs to be protected against improper pressure (even to the extent of torture).[56] She supports the view of Trechsel (2005) in which he finds the 'right to silence' and the 'privilege against self-incrimination' to be separate doctrines instead of being the same thing. He argues that the two doctrines, although independently of one another, partly overlap each other (Trechsel, 2005, p. 342). On the one hand, the right to silence is narrower than the privilege in the sense that the right to silence refers to acoustic communication alone as opposed to the privilege that also refers to non-verbal incriminating acts that are coerced, such protection against pressure to produce documents. On the other hand, because the privilege merely provides protection to the person concerned against the pressure to make detrimental statements, the privilege is more restricted since the right to silence refers to any declaration regardless if he or she is compelled to speak (Trechsel, 2005, p. 342). In other words, the privilege aims to protect suspects from statements induced from compulsion, whereas the right to silence includes both forced statements as voluntarily given statements and hence, the privilege is narrower than the right to silence in that sense.

3.3 The privilege against self-incrimination under the ECtHR

As mentioned earlier, the ECHR does not explicitly mention the privilege. Following the Funke v. France case, the ECtHR reads the 'right not to be compelled to incriminate oneself' in the right to a fair trial under Article 6 (1) ECHR.[57] In doing so, the ECtHR has provided some

[52] Text from source interpreted and translated from Dutch to English by A. Khozooei.
[53] Text from source interpreted and translated from Dutch to English by A. Khozooei.
[54] Text from source interpreted and translated from Dutch to English by A. Khozooei.
[55] Text from source interpreted and translated from Dutch to English by A. Khozooei.
[56] Text from source interpreted and translated from Dutch to English by A. Khozooei.
[57] ECtHR 23 February 1993, *Funke v. France*, Appl. No. 10828/84, para. 44.

reference to explain the privilege in the cases of inter alia Funke, Murray, Saunders, J.B and Jalloh. These cases will be examined hereunder.

Funke v. France

In the case of Funke v. France, the German representative Funke had admitted towards French customs officials that he possessed foreign bank accounts. He promised to provide access to bank statements when he was accused of infringing the rules on foreign financial transactions. However, he did not live up to this promise after which the French government, through judicial procedures, condemned Funke with a fine and an order to provide access to the bank statements on pain of a penalty payment. The fact that the French custom officials were not certain that the required documents existed and that Funke possessed these, was the key point in this case.[58] Koops (2000, p. 29) argues in this case that a delivery order for which non-compliance is sanctioned is only lawful when there is certainty that the respondent can comply with this order.[59] The ECtHR speaks of a "*the right of anyone "charged with a criminal offence", within the autonomous meaning of this expression in Article 6 (art. 6), to remain silent and not to contribute to incriminating himself*".[60] This statement of the ECtHR lends itself for the interpretation that the phase of 'criminal charge' counts as departure point for the applicability of the privilege rather than one's suspicion to have committed a crime. Thus, without prejudice to the interpretation of the ECtHR whether the situations of a given case can be considered to be a 'criminal charge' (related to the 'autonomous meaning'), the initiation of the 'criminal charge' phase must be apparent in order for one to reasonably determine that he or she is subjected or will be subjected to a criminal prosecution, based on the actions of the government (Koops, 2000, p. 37).[61]

Murray v. the United Kingdom

In the case of Murray v. the United Kingdom, John Murray remained silent during his interrogation by the police, even after he was told that under the Criminal Evidence Order 1988 failure to mention exculpatory facts can be used against him in court. During the interrogation he was asked why he was found at the house where L. was kept captive. As supporting evidence, Murray's silence was used against him to find him guilty of the offence by the judge. The ECtHR decided in this case that the right to remain silent ("the right to silence") together with the privilege, included that these rights lie at the heart of the right to a fair trial, are not absolute and that drawing adverse inferences from someone's silence, depending on the all the circumstances of the case, does not necessarily infringe the right to a fair trial.[62] The ECtHR did not find the circumstances in this case contrary to the use of Murray's silence as evidence of his right to a fair trial, as there was a "formidable case" against him where this case "called for an answer".[63] Hence, the drawing of inferences had been natural and in accordance with

[58] ECtHR 23 February 1993, *Funke v. France*, Appl. No. 10828/84, para. 44.
[59] Text from source interpreted and translated from Dutch to English by A. Khozooei.
[60] ECtHR 23 February 1993, *Funke v. France*, Appl. No. 10828/84, para. 44.
[61] Text from source interpreted and translated from Dutch to English by A. Khozooei.
[62] ECtHR 8 February 1996, *John Murray v. the United Kingdom*, Appl. No. 18731/91, para. 45.
[63] *Ibid*, para. 43.

common sense. Thus, the key point of this case is that where already the case against someone is formidably strong, then (and only then) can the fact that a suspect remains silent be used as incriminating evidence. Nevertheless, an infringement was found on the right to a fair trial under Article 6 ECHR because Murray was deprived access to a solicitor (lawyer) at the initiation of the interrogation by the police.[64] This was infringing because actually at this stage, one could choose to remain silent – from which inferences could be drawn from – or, choose to speak – which could ultimately affect the defense of the suspect.[65]

Saunders v. the United Kingdom

In the case of Saunders v. the United Kingdom which is a landmark case in particular with regard to the privilege, the hearings held outside of the criminal investigation with the general director of the company Guinness (Saunders), were declared admissible to use in later proceedings by the British judge when Saunders was suspected of possible trade fair fraud and a "criminal charge" was held against him. The alleged crime in this case concerned the takeover of another company by Guinness through unlawful deals and agreements which triggered an investigation under the 1985 United Kingdom's Companies Act. Saunders was then found guilty and convicted for five years. By extension, it must be noted that the way the public prosecution read out the statements – including those taken prior the criminal charge – to the jury, pressured Saunders to make a self-incriminating statement during the trial and not to invoke his right to silence. This case is significant to the privilege since the ECtHR stated that the prosecution must bring up evidence against the suspect without seeking refuge in the use of evidence obtained through coercive methods or repression contrary to the will of the accused and that thus, the privilege is linked with the presumption of innocence of the suspect under Article 6 (2) ECHR.[66] Furthermore, the ECtHR explained that "The right not to incriminate oneself (…) does not extend to the use in criminal proceedings of *material* which may be obtained from the accused through the use of compulsory powers but *which has an existence independent of the will of the suspect* such as, inter alia, documents acquired pursuant to a warrant, breath, blood and urine samples and bodily tissue for the purpose of DNA testing".[67] Then, it determined that the given statements by Saunders during the administrative phase were obtained under coercion since refusing to give statements was sanctioned with by two years' imprisonment and Saunders could not invoke his right to silence when making incriminating statements.[68] The ECtHR also decided that not only directly incriminating statements fell under the scope of the privilege, but also indirect incriminating statements fall under the scope of protection of the privilege since in this case, Saunders felt pressured to give statements during the main trial as a result of the exposure of previously given statements (which were of indirect incriminating nature) to the jury, reflecting the likelihood of Saunders being guilty.[69] Hence, statements obtained during a control phase (i.e. of an administrative procedure) cannot be used

[64] ECtHR 8 February 1996, *John Murray v. the United Kingdom*, Appl. No. 18731/91, para. 72.
[65] ECtHR 17 December 1996, *Saunders v. the United Kingdom*, Appl. No. 19187/91, para. 68.
[66] ECtHR 17 December 1996, *Saunders v. the United Kingdom*, Appl. No. 19187/91, para. 68.
[67] *Ibid*, para. 69; my own italics.
[68] *Ibid*, para. 70.
[69] *Ibid*, para. 72.

as evidence against suspects in a later prosecution process as this is in conflict with the right to a fair trial under Article 6 ECHR.[70] In other words, use of resulting evidence acquired prior the 'criminal charge' phase does not infringe the privilege unless at a later stage this cooperation is used against the suspect taken into consideration the amount of coercion applied (Koops, 2000, p. 52).[71]

J.B. v. Switzerland

In the case of J.B. v. Switzerland, J.B. was accused of tax evasion and had admitted to have done some investments in companies which he did not report with the tax authorities. As a response, the tax authorities demanded J.B. to produce all documents which may refer to the companies in which he had invested. J.B. was imposed four administrative fines after he refused the various requests from the tax authorities to produce the relevant documents. J.B. brought his case before the ECtHR, stating that the forced disclosure of the documents is in conflict with the privilege and infringed his right to a fair trial under Article 6 (1) ECHR. Also J.B. held that the conduct of the Swiss government amounted to "fishing expeditions" when imposing several fines on J.B. in quest for the relevant documents of which its existence they were not sure of. Against the fact that the Swiss authorities tried to forcibly order the documents from J.B. which would have provided information on his income and on whether the income had been taxed, the ECtHR first held that "While it is not for the Court to speculate what the nature of such information would have been, the applicant could not exclude that any additional income which transpired from these documents from untaxed sources could have constituted the offence of tax evasion".[72] Then, the ECtHR held that the requested documents were not to be considered as material as was considered in the Saunders case; it did not exist independent of the will of the suspect and is not, "therefore, obtained by means of coercion and in defiance of the will of that person". Furthermore, the ECtHR continued to find that the Swiss government infringed Article 6 (1) ECHR as it was not convinced that the government was certain about the existence of the concerned documents based on the coerced delivery of the documents (orders up to eight times, with the imposition of four fines).[73] "As a result, and against the above background,"[74] the ECtHR considered that there has been a violation with the privilege. Compared with the Saunders case where the ECtHR seemed to have given a clear indication with regard to the application of the privilege – one does not have to make statements (which are will-dependent), but one has to deliver material such as documents and blood samples which exists independently of one's will –, the ECtHR gives a different meaning to its previous criteria and primarily sees to whether the cooperation could lead to incriminating material obtained in violation of the defendant's will. In other words, a suspect can decide whether the ordered documents exist by forging such documents for instance and risking to incriminate him or herself by doing so when the government indirectly requires the suspect to confess to the existence of these documents by compelling him or her to deliver these regardless

[70] ECtHR 17 December 1996, *Saunders v. the United Kingdom*, Appl. No. 19187/91, para. 69-70.
[71] Text from source interpreted and translated from Dutch to English by A. Khozooei.
[72] ECtHR 3 May 2001, *J.B. v. Switzerland*, Appl. No. 31827/96, para. 66.
[73] *Ibid*, para. 68-69.
[74] *Ibid, para. 71.*

of the fact that the government is not certain of the existence as such (Wilbrink, 2013, p. 32).[75] The ordered material does then not concern will-independent material as was meant in the Saunders case, since its existence especially depends on the will of the suspect. Koops and Stevens (2003, p. 293) emphasize that the key distinction between these cases lie in the type of evidence obtained through compulsion in these cases; on the one hand, (1) cooperation may be compelled with regard to material that exists independently of the suspect as an individual person (referring to i.e. documents which could simply be handed over) and on the other hand, (2) cooperation may be compelled with regard to material obtained independently of the suspect's will (referring to i.e. information which, depending on the will of the defendant, could be given).[76] The rationale of reliability of evidence is mainly related to the first type and the rationales of prohibition of undue pressure and process autonomy is related to the second type of evidence.

Still, it should be noted that the ECtHR reiterated from the Saunders case that "the right not to incriminate oneself in particular presupposes that the authorities seek to prove their case without resort to evidence obtained through methods of coercion or oppression in defiance of the will of the "person charged"".[77]

Jalloh v. Germany

In the case of Jalloh v. Germany, Jalloh was arrested by law enforcement when he was caught for possession and selling of drugs as it was observed that he pulled out small plastic bags from his mouth for the purpose of selling these. When he underwent the arrest, he swallowed the remaining bag. With a high degree of compulsion used by law enforcement when forcible administrating emetics to the suspect, Jalloh threw up the swallowed drugs that he was selling, which then was used as incriminating evidence against him. Following this conduct, Jalloh brought his case before the ECtHR claiming that his privilege was infringed and thus, also his right to a fair trial under Article 6 (1) ECHR. The ECtHR, in this case, acknowledged that unlawfully obtained evidence would constitute an infringement of Article 6 ECHR, and assessed whether the way in which evidence was obtained in this case, would infringe the privilege. The ECtHR held that in this case the subject-matter (the vomited bag of incriminating substance) were to be considered as 'real evidence' as opposed to statements which are will-independent. In this context, the ECtHR considered the nature of this 'real evidence' to be similar to the will-independent evidence examples given in Saunders, such as blood samples or urine for DNA-testing. However, the ECtHR found the manner in which this evidence was gathered problematic as it was obtained by infringing the bodily integrity of Jalloh. Firstly, it stated that the subject-matter as such was not used as indirect evidence for the purpose to indicate traces of drugs or alcohol in the blood of a suspect, but it was used to obtain the 'real' evidence that could then be used against the suspect at trial. Secondly, the ECtHR stated that in this case, the nature of the cooperation by the suspect exceeded passively enduring a minor infringement of the bodily integrity, but it concerned to actively intubating

[75] Text from source interpreted and translated from Dutch to English by A. Khozooei.
[76] Text from source interpreted and translated from Dutch to English by A. Khozooei.
[77] ECtHR 3 May 2001, *J.B. v. Switzerland*, Appl. No. 31827/96, para. 64.

and eliciting a pathological response, namely the active action of vomiting. Furthermore, the intubation and administration of vomiting agents was found to be in conflict with Article 3 ECHR which prohibits torture and inhuman or degrading treatment or punishment. Eventually, the ECtHR found the conduct of the German law enforcement to infringe the principle on the basis of the following considerations:

- "*the nature and degree of compulsion used to obtain evidence";*
- *"the weight of the public interest in the investigation and punishment of the offence in issue";*
- *"the existence of any relevant safeguards in the procedure";* and
- *"the use to which any material so obtained is put"*.[78]

3.4 The privilege against self-incrimination in Dutch legislation

Similar to the ECHR, the Dutch legislation lacks an explicit legal basis for the privilege. Nevertheless, the privilege can be recognized in various articles in the DCCP such as Article 29 (2) DCCP, which consists out of the right to silence, Article 160 (2) and 162 (3) DCCP, which relieves the suspect from the obligation to file a statement in case the suspect has the knowledge of a committed crime and risks being prosecuted for this crime, and Article 96a (2) and 125m (1) DCCP, which also relieves the suspect from the obligation to provide incriminating evidence by order of the investigator.

This gap with regard to the codification of the privilege was confirmed by the Dutch Supreme Court in a judgment in which it stated that nowhere in Dutch law an unconditional right or principle has been given whereby the suspect can in no way be obliged to cooperate in obtaining evidence that might be incriminating to him or her.[79] Although Article 29 (2) DCCP might strongly correlate with the right to silence under Article 6 ECHR and therefore exemplify the privilege, Ansmink (1981, p. 437) explains that this article is an independent suspect right that has evolved from the abolition of the torture to make a confession.[80]

As the Murray case showed that the privilege is not absolute and the Saunders case confirmed that the suspect is not inviolable when it comes to compelled delivery of incriminating material when this material exists independently of his or her will, the Dutch Code of Criminal Procedure similarly states that the suspect has to endure investigative measures. Measures such as examination of body and clothing (Article 56 and 195 DCCP), seizure of objects carried by the suspect (Article 95 (1) DCCP), recording of photographs, fingerprints and body measurements (Article 61a DCCP) and collection of blood samples for DNA testing (Article 195d DCCP) require passive cooperation. However, in specific (criminal) legislation, suspects may be required to cooperate actively by providing "*any cooperation as may reasonably be*

[78] ECtHR 11 July 2006, *Jalloh v.* Germany, Appl. No. 54810/00, para. 117.
[79] Dutch Supreme Court 15 February 1977, ECLI:NL:HR:1977:AC3994, NJ 1977, p. 557, with note by G.E. Mulder.
[80] Text from source interpreted and translated from Dutch to English by A. Khozooei.

required" (Koops, 2000, p. 34).[81] Active cooperation entails for instance providing statements; passive cooperation entails to have to endure coercive measures such as enduring the collection of blood samples (Stevens, 2005, p. 116).[82]

Furthermore, non-compliance is punishable under Article 180 and 184 Dutch Criminal Code ("DCC") (articles see to the resentment against an official order) with a maximum prison sentence of three months. Thus, suspects do not have to actively cooperate in their own conviction, but the collection of passive evidence must be tolerated and, where reasonably necessary, a suspect may also be forced to hand over active material that could be used as evidence against him or her (Koops, 2000, p. 34).[83]
From this perspective, the Dutch legislator does not seem to have embedded a clear distinction between material that exists independently of the suspect as an individual on the one hand, and material that exists independently of the suspect's will such as was the case since J.B. v. Switzerland on the other. Hence, the Dutch court adheres to a more material-based approach (material (in)dependent of the will of the suspect) as was defined in the Saunders case, leading to the narrow interpretation of the privilege merely including the right to silence and the freedom of declaration in the meaning of Article 26 DCCP (Wilbrink, 2013, p. 57).[84]
In other words, the Dutch court will to a lesser extent assess whether the material (depending on the degree of compulsion) could be obtained independently of the will of the suspect.
Thus the Dutch court seems to give another meaning to the privilege compared to the ECtHR, resulting to a lesser emphasize on a unconditional process autonomy of the suspect (the freedom a suspect has to decide his own strategy at criminal proceedings) (Stevens, 2005, p. 67).[85] However, the Dutch court seems to attach great weight to the right to silence by protecting the freedom of declaration and the standardization of the methods of interrogation (Stevens, 2005, p. 67).[86]

3.5 Scope of the privilege

Against the information provided above, in this section key points with regard to the privilege will be summarized in order to answers questions such as: What exactly does the privilege aim to protect? In what cases is the government be allowed to compel someone to cooperate in his own criminal proceedings? What are the legal grounds for applying the privilege?

Firstly, the ECtHR excludes material that exists independently from the suspect's will, from the scope of the privilege in Saunders and thus, the privilege does not offer protection for will-independent material such as blood samples or documents, but in any case, always applies to given statements. Some authors contest this demarcation and argue that the will of the suspect

[81] Text from source interpreted and translated from Dutch to English by A. Khozooei.
[82] Text from source interpreted and translated from Dutch to English by A. Khozooei.
[83] Text from source interpreted and translated from Dutch to English by A. Khozooei.
[84] Text from source interpreted and translated from Dutch to English by A. Khozooei.
[85] Text from source interpreted and translated from Dutch to English by A. Khozooei.
[86] Text from source interpreted and translated from Dutch to English by A. Khozooei.

may evenly be undermined by forced statements as it would when will-independent material is forcibly delivered (either through passive or more active cooperation) (Bood, 2018; Koops, 2000, p. 36).[87]

Secondly, in the Funke and Saunders case the EctHR held that the moment of applicability of the privilege is when there is a 'criminal charge' against the suspect and that the use of resulting evidence acquired through compulsion prior this phase infringes the privilege when this is used against the suspect at a later stage. Thus, compelled compliance is admissible up until the point the phase of the 'criminal charge' goes into effect, making it possible to compel cooperation in the phases of inspection, investigation and of suspicion that does not yet involve a criminal charge.

Thirdly, the aforementioned compliance manifests itself into either active or passive cooperation from the suspect. Following Koops (2000, p. 42), the scope of protection of the privilege focuses primarily on active cooperation.[88] For the discussion in the next chapter, it is valuable to understand that emphasis lies on whether the suspect is obliged to provide evidence (active cooperation) or on whether the government is obliged to obtain evidence and the suspect has to endure this (passive cooperation) (Stevens, 2005, p. 116).[89] From this perspective, the legislator plays an active role in deciding on the nature of the investigative powers; either the suspect has the duty to cooperate or the suspect must endure that the government obtains evidence from him or her (Koops, 2000, p. 42).[90] The protective scope of the privilege is stronger when the requested cooperation is more active in nature and when the acts of the suspect are more dependent of the will of the suspect. A statement of a suspect is a good example of an active act of a suspect which certainly depends on the will of the suspect.
From this perspective, it can be stated that the right to silence is an absolute right where there is no margin in which infringement can be tolerated. With respect to compelled active cooperation, the margin is more lenient and the admissibility depends on the nature of the cooperation and if it is similar to that of giving statements or that it leans more towards passive cooperation. Where the cooperation enjoys the least protection of the privilege, concerns the area where the cooperation has a passive nature and this cooperation is based on public interests that outweigh the interests (and thus the rationales) of the privilege to provide protection. In order to determine the amount of coercion and its use for gathering evidence, Koops finds that the privilege must be balanced against public interests through the use of the principles of subsidiarity (were there other less intrusive means available?) and proportionality (is the extent of coercion from the perspective of the rationales of the privilege proportional compared to the aimed goal of truth-finding in a certain case?) (Koops, 2000, p. 52).[91]

[87] Text from source interpreted and translated from Dutch to English by A. Khozooei.
[88] Text from source interpreted and translated from Dutch to English by A. Khozooei.
[89] Text from source interpreted and translated from Dutch to English by A. Khozooei.
[90] Text from source interpreted and translated from Dutch to English by A. Khozooei.
[91] Text from source interpreted and translated from Dutch to English by A. Khozooei.

Furthermore, it should be noted that in the J.B. case, the EctHR maintained a very broad interpretation of will-independent material following the Saunders-regime when deciding to extend the scope of the privilege to even documents. In the same sense, the Jalloh case confirms again that the privilege is more than the mere right to silence as was strongly implied in Saunders. In the Jalloh case, the scope of the privilege included the material of a small bag containing a substance which existed independent of the will of the suspect. As a result, it seems that the EctHR departs from its material-based assessment on whether coerced acquisition of evidence infringes the privilege under Article 6 (1) ECHR to a more 'degree of coercion'-approach (Wilbrink, 2013, p. 34).[92] This 'new' approach is also used in the case Allan v. the United Kingdom, where the EctHR held that in assessing whether the privileged is compromised, it will "*examine the nature and degree of the compulsion, the existence of any relevant safeguards in the procedures and the use to which any material so obtained is put*".[93] In the same way, Redmayne (2007, p. 215) argues that the principle is means, and not material based and that thus, not the type of information should be relevant but the 'means' of obtaining information through cooperation is relevant. Ashworth (2008b, p. 760) goes one step further in the same direction by questioning whether the requirement to deliver evidence should be considered as "coercion on the mind of the subject" when it comes to ordering documents which exist independent of the person.

Conclusive, it is reasonable to consider the narrow interpretation of the privilege to be too restrictive as in which it is mostly equated to the right to silence, while the privilege goes beyond that. In the next chapter, the broad and narrow interpretation of the privilege in context with BCI conduct law enforcement will be discussed in more detail.

3.6 Conclusion

In the previous chapter, the discussed relevant possibilities of BCI conduct by law enforcement in the Netherlands gave rise to the possible implications of the containment of the free will of the suspect when he or she is subjected to such conduct, in particular with regard to its privilege against self-incrimination. In order to assess the compatibility of these possibilities and give answer to the main question of this thesis, this chapter had to give an answer to the sub-question: *What is the rationale of the privilege against self-incrimination during criminal procedure?* From the perspective of the suspect, the rationales of the privilege included the process autonomy in which the suspect can determine his or her own strategy at trial, and the human dignity of the suspect which refers to the will of the suspect, which the ECtHR considered in Saunders to be the main focus of the privilege. The rationale of prohibition of pressure embodies the idea against unlawful coercion, ultimately protecting the reliability of evidence, being another rationale of the privilege, for the sake of truth-finding during the criminal proceedings.

[92] Text from source interpreted and translated from Dutch to English by A. Khozooei.
[93] ECtHR 5 November 2002, *Allan v. the United Kingdom*, Appl. No. 48539/99, para. 44.

The interplay of the rationales of the privilege would lead to the situation where the suspect is not only regarded as the subject of an investigation but also as a party to the proceedings. The latter seems to be in line with the moderately accusatorial or mitigated inquisitorial system of the Dutch criminal law system where the defendant is treated equally at trial, whereas he or she is treated as a subject of an investigation during the investigative phase of the criminal proceedings (Corstens et al., 2018).[94] However, the Dutch court seems to adhere stringently to the narrow interpretation of the privilege and the aspect of process autonomy seems less present. Thus, it gives much weight to the material-based approach of the privilege and determines the scope of the privilege on the basis of material that exists (in)dependently of the will of the suspect. Whereas the ECtHR seems to lean more towards a degree of coercion approach, where rather looking into the type of information being assessed as (un)lawful evidence, it increasingly looks at the manner this information is acquired similar to the Jalloh case. This difference in approach that the Dutch court and the ECtHR take on with regard to the interpretation of the privilege, allows this thesis to examine how the use of BCIs during criminal investigation in the Netherlands relate to the privilege, in particular taken into account the rationale(s) underlying this principle from both a Dutch perspective and from the perspective of the CoEto which the Netherlands is a member of. Hence, this thesis will aim to answer the last sub-question: *How does the use of BCIs during criminal investigation relate to the privilege against self-incrimination, in particular in light of the rationale(s) underlying this principle including ECtHR and Dutch case law on this subject?*

[94] Text from source interpreted and translated from Dutch to English by A. Khozooei.

Chapter 4: The use of BCIs during criminal investigation as a legitimate investigative method by the Dutch police

The second chapter has described the possible use of BCI applications for (1) *compelling compliance* purposes and, (2) for *passive brain-reading analysis* during criminal investigation in the Netherlands. It has also been discussed that these possibilities may constrain the free will of the suspect which, as described in chapter three, is part of the rationales of the privilege against self-incrimination, namely the underlying rationale of human dignity. Following the exposition of the underlying rationales and scope of this privilege in chapter three, in this chapter, the BCI applications are assessed on their compatibility with the privilege. Hence, the last sub-question reads as follows: *How does the use of BCIs during criminal investigation relate to the privilege against self-incrimination, in particular in light of the rationale(s) underlying this principle, including ECtHR and Dutch case law on this subject?* This sub-question will be answered by demonstrating the values and scope of the privilege in relation to modern applications of criminal investigative powers of the police, such as gaining access to suspects' computers and smartphones by ordering their passwords and finding the similarities and differences relating to obtaining access to brain signals during criminal investigations using BCI. On this basis, the protected legal subject of the aforementioned 'computer systems' ("The Convention on Cybercrime,") and those of brain signals that are collected by means of BCI applications are compared. The interpretation of ECtHR and Dutch case law will be used for this comparison in addition to the discussion on the protective scope of the privilege in literature when it comes to novel possibilities of conduct by law enforcement.

4.1 The free will of suspects in relation to using Brain-computer Interfaces during the criminal investigation

For the demonstration of the compatibility of BCI applications during criminal investigations with the privilege, it is first necessary to understand what is actually at stake when (1) bringing a suspect into a more cooperative state or (2) when passively reading the brain signals that are fired during an interrogation as a form of a lie detector or merely reading and interpreting brain signals. In the second chapter it was briefly mentioned – by the means of a comparison with conventional investigative methods such as the use of a polygraph as a lie detector – that the aforementioned BCI applications, possibly affect the free will of the suspect. Hence, the free will of the suspect can be considered to be at stake. In relation to the privilege, the free will of the suspect is considered to be part of human dignity as one of the rationales of the privilege.

The Cartesian dualism argues that the brain is already determined to perform a certain action (or have it performed) before our consciousness has opted for this action (Mobbs, Lau, Jones, & Frith, 2007, p. 695); humans are tied to the physical brain and have little personal choice or even a free will. Similarly, novel behavioral, cognitive, and neurosciences ("BCN-sciences") show that automatic processes triggered by external cues determine most of our everyday life

rather than that our ability to act is based on our reasoning (which involves our free will: doing something of our own free will) (Sie & Wouters, 2009, pp. 124, 127). BCN studies indicate that "many factors that influence our behavior escape our attention and we are inclined to fill in the gaps in our knowledge with fabrications that are experienced as real" (Sie & Wouters, 2009, p. 128). From a philosophical perspective, Sie and Wouters (2009) argue that our views of free will and responsibility cannot be prima facie grounded in the ability to act for reasons (thus willingly) without looking into the metaphysical obscurities. Without addressing recent scientific developments (in particular within neuroscience) and when denying that one is able to act different than one wants (so, doing something unwittingly outside of our own free will), the real motives of our actions will remain unclear. Hence, the way we treat each other – treating each other with the assumption that everything we do depends on our own will – is based on fiction (Bublitz & Merkel, 2013, p. 361).
While many authors propose to rethink the concept of free will, in this thesis, it is not feasible to elaborate extensively on the neuro-philosophical discussion about the 'free will' as a human condition. Since many neuroscientists assume that free will emerges from the immense assembly of neurons that are fired (to some extent caused by our environment) (Mobbs et al., 2007, p. 693), the view of Cartesian dualism will be discarded in this thesis and rather the hierarchical view of Frankfurt (1988, p. 21) is adopted in which he explains that the free will both includes desires of certain things (e.g. the willing desire of having a career) and desires that move us into action (e.g. the craving of eating chocolate). In Frankfurt's paper "Freedom of the Will and the Concept of a Person" (1971), he ranks the following terms:

- *first-order desire*: the desire to perform a certain action. A desire to eat chocolate is a first-order desire;
- *will*: a first-order desire which causes one to do what one desires to do, making it an effective desire. A desire to eat chocolate is one's will when that desire brings one to actually eat chocolate;
- *second-order desire*: a desire to have a certain desire. For instance, one's desire that he or she should desire something healthy rather than chocolate;
- *second-order volition*: a desire that a certain desire should be one's will. For instance, a desire that a certain desire brings one to an actual action: not only having the desire for something healthy, but that the desire for the healthy snack over cholate becomes effective and brings one about to eat the healthy snack instead of chocolate.

Frankfurt's hierarchical view shows that the determination of doing something out of your own will, consists out of multiple levels of considerations that involve an immense assembly of neurons to fire. These perceptible brain activities can then be measured with BCI devices.

In connection with the possible violation of the free will of the suspect, one might ask whether brain signals as such can be considered to be material that exists dependently of the will of the suspect. For answering this question, the consideration in the Saunders case is critical where

the ECtHR held that "the right not to incriminate oneself is primarily concerned (…) with respecting the will of an accused person to remain silent"[95].

Where brain signals are modulated (through methods such as DBS) and neurons associated with cooperation are stimulated to the extent that the suspect is brought into a more cooperative state, the will of the suspect is being affected as this conduct contravenes with the ability of the suspect to choose to remain silent. In other words, modulating the suspect's neurons in certain brain zones, contravenes with the suspect's ability to have a free will as it hinders the suspect to determine fully autonomous its decision to cooperate or not (particularly in regard to second-order desires and volitions). Thus, this conflicts with the privilege as the privilege is primarily concerned with the will of the suspect to remain silent.
Although, there is no *direct* obvious *coercion* applied in the sense of physical coercion where one is physically tortured to make statements or mentally tortured by threatening him or her with a gun. Nor does bringing a suspect into a more cooperative state guarantee the cooperation from the suspect, it may seem farfetched that the privilege is violated by such conduct.
However, similarly in the Allan case, the EctHR did not identify factors of *direct coercion* and yet acknowledged a violation of the privilege.[96] It seems from this case that psychological pressure to act in a certain way which might result into incriminating statements or confessions, impinges the "voluntariness" of any disclosure by the suspect (second-order desires and volitions) an thus, indirectly compels the suspect to make statements. Hence the wording of 'compelling compliance', which thus defies the will of the suspect, and the use of all material resulting from it, affects the suspect's right to remain silent and his or her privilege.

On the other hand, there is the possibility of passive brain-reading analysis through BCI which includes BCI applications used as a more reliable method when compared to the polygraph to detect lies. This is done by means of an MRI that maps specific brain zones which are increased in activity when individuals lie, and the measures the brain's reaction when a suspect is presented an image, he or she recognizes versus ones that are not recognized. The latter shows the 'firing up' of specific zones in the brain by neurons when for example a suspect is presented with pictures of a specific weapon he or she did or not use to kill a person in a crime. This technique is called 'Brain Fingerprinting' (Mobbs et al., 2007, p. 696). When such passive brain-reading analysis is being conducted through BCIs during the criminal investigation, the free will of suspects does not seem to be constrained and thus, not to be at stake since this analysis only obtains brain signals with no necessity of any effort or intention from the suspect (Brouwer et al., 2013). In addition, this method merely records bodily responses which are independent from the will of the suspect.

Thus, (1) bringing a suspect into a more cooperative state seems to affect the free will of the suspect and thereby contravenes with the ability of the suspect to choose to remain silent and thus, conflicts with the privilege. Because the mere conduct of applying such methods already

[95] ECtHR 17 December 1996, *Saunders v. the United Kingdom*, Appl. No. 19187/91, para. 69.
[96] ECtHR 5 November 2002, *Allan v. the United Kingdom*, Appl. No. 48539/99, para. 52.

seems to be incompatible with the privilege and thus contravene with the right to a fair trial under Article 6 ECHR, this thesis does not elaborate into further details how the police in the Netherlands should approach to compel suspects into compliance prior the actual deployment of BCI methods in doing so. In other words, there is no relevance in assessing the compatibility of the manner how the police would obtain statements from the suspect with the privilege as these statements still depend on the will of the suspect which then would have been indirectly altered to a certain extent.

In contrast, (2) when passively reading the brain signals that are fired during an interrogation as a form of a lie detector or merely reading brain signals after presenting images to the suspect or posing questions, this conduct only includes the observation and interpretation of brain activity in certain zones of the brain with the use of BCI methods and hence, does not directly affect the free will. The registration of brain signals that come about after presenting the suspect with a set of images or questions, can namely be considered to exist independently of the will of the suspect and therefore, fall outside of the scope of protection of Article 6 ECHR, making it possible for law enforcement to lawfully include BCI technology to their conduct. Brain signals can namely be considered the types of material referred to in the Saunders case, namely those that are produced and can be obtained by the normal functioning of the body (contrary to the 'artificial' conception of a cooperative state when compelling compliance), such as urine or breath samples.[97]

However, brain signals cannot be *obtained independently of the will of the suspect*. In other words, its delivery depends on the willingness or cooperation of the suspect. Therefore, it cannot be said that compelling a suspect by coercion or force to cooperate in passive brain-reading analysis is fully compatible with the privilege. In the next section, the compatibility will be further analyzed by comparing brain signals with passwords. By way of illustration, the system – that grants access to the user when provided with the password – is familiar with the password, which makes the existence of the password will-independent on the one hand. On the other hand, the password cannot be obtained independently of the will of the suspect in particular due to its immaterial nature as it is mostly memorized by the suspect. (Obviously, this is different with passwords written down on a piece of paper, but for this thesis, the intangible nature of a password is more relevant since brain signals are also intangible.) Hence, the relevance to make this comparison derives from the fact that similar to brain signals, passwords also exist independently of the will of the suspect but cannot be obtained without the cooperation (and thus, the will) of the suspect.

4.2 Decryption orders

As mentioned above, in order to demonstrate the scope of the privilege with regard to passive brain-reading analysis, it is useful to compare this conduct to (biometric) decryption orders

[97] ECtHR 11 July 2006, *Jalloh v. Germany*, Appl. No. 54810/00, para. 114.

(compelling suspects to provide their password so that the police can obtain access to a computer system). The following paragraph from the Saunders case is relevant for such orders:

"The right not to incriminate oneself (…) does not extend to the use in criminal proceedings of *material* which may be obtained from the accused through the use of compulsory powers but *which has an existence independent of the will of the suspect* such as, inter alia, documents acquired pursuant to a warrant, breath, blood and urine samples and bodily tissue for the purpose of DNA testing."[98]

4.2.1 Degree of compulsion and the "balancing" approach

Regardless of the tangibility of passwords (whether it is written down somewhere or memorized), in the previous chapter, it was mentioned that contrary to the Dutch interpretation of the privilege which adheres to the considerations made by the ECtHR in the Saunders case (referring to the "material-based" approach), the ECtHR seems to use a combination of factors to interpret the privilege, one of which is the existence of material as evidence independent from the will of the suspect (Saunders-criterium) but also the aspect of coercion is taken into account. Thus, when examining decryption orders on the basis of the Saunders-criterium, one might say that the lawfulness of a decryption order depends on the 'nature' of the password; if it is written down on a piece of paper, then compelling a suspect to deliver such passwords can be lawful, but when it is memorized, then such an order is likely to be unlawful.

On the other hand, from the perspective of coercion, the degree of coercion determines the lawfulness of compelling a suspect to cooperate. The latter consideration depends in particular on the circumstances of the case in which the ECtHR will "balance" the nature and degree of compulsion against the public interest as was done in the Jalloh case (Ashworth, 2008a, p. 767).[99] To a similar extent, when in the J.B. case, the ECtHR showed that the degree of compulsion (the four fines imposed) did not justify the public interest of combating tax evasion (especially since the Swiss authorities evidently were not certain of the existence of the ordered documents), one could interpret this as a way of "balancing".[100] From this perspective, and although in the Funke case the ECtHR held that the criminal charge phase was considered to have an autonomous meaning[101], the ECtHR assigned three criteria for the determination of this phase in the J.B. case which it took into account when assessing the lawfulness of the imposed fines in relation with the privilege.[102] In this way, the ECtHR added circumstances related to the public interest (the criteria of the criminal charge phase) and weighed it against the compulsion applied in the form of the imposed fines which indirectly compelled the suspect to deliver the ordered documents while he could not rule out the possibility that he might

[98] ECtHR 17 December 1996, *Saunders v. the United Kingdom*, Appl. No. 19187/91, para. 69; my own italics.
[99] ECtHR 11 July 2006, *Jalloh v.* Germany, Appl. No. 54810/00, para. 117.
[100] ECtHR 3 May 2001, *J.B. v. Switzerland*, Appl. No. 31827/96, para. 69: "in view of the persistence with which the domestic tax authorities attempted to achieve their aim.".
[101] ECtHR 23 February 1993, *Funke v. France*, Appl. No. 10828/84, para. 44.
[102] ECtHR 3 May 2001, *J.B. v. Switzerland*, Appl. No. 31827/96, para. 44. These were namely: "the classification of the offence under national law, the nature of the offence and the nature and degree of severity of the penalty that the person concerned risked incurring."

incriminate himself when he provides these passwords.[103] Hence, also in the J.B. case the degree of coercion was determined by its lawfulness by the way the criminal charge was interpreted (and thus the circumstances).
In other words, and according to the ECtHR, even when material exists independently of the will of the subject but when it is obtained in a coercive manner, this goes against the privilege and thus Article 6 ECHR when this coercion cannot be justified. Based on this it can be argued that in the case of abstract notions, such as passwords, which also exist independently of the will but can only be obtained with the cooperation (will) of the subject, the manner in which such abstract notions are obtained is even more important. For instance, the privilege provides the least protection to cooperation when the cooperation has a passive nature and is based on public interests that outweigh the interests of the privilege. Hence, in order to determine the amount of coercion and its use for gathering evidence compatible with the privilege, the privilege must be balanced against public interests through the use of the principles of *subsidiarity* (were there other less intrusive means available?) and *proportionality* (is the extent of coercion from the perspective of the rationales of the privilege proportional compared to the aimed goal of truth-finding in a certain case?) (Koops, 2000, p. 52).[104]

In addition to (1) the degree of compulsion, the ECtHR considered in the Jalloh case that also (2) the existence of any relevant safeguards – such as the attendance of a lawyer and the issuing of a caution – in the procedures, (3) the weight of the public interest and (4) the use into which any material so obtained is put, are relevant elements in the assessment of the ECtHR on whether the privilege is infringed.[105] The latter element, refers to the extent that law enforcement seek resort to obtained evidence through coercing a suspect to provide such in defiance of his or her will in order to prove the case against the suspect. Thus, with the incident of some degree of coercion and contrary to the will of the suspect, a decryption order cannot be lawful when law enforcement resort to a conviction in evidence obtained from the suspect without providing other evidence themselves. In other words, it is unlawful for the police to order passwords from suspects in cases where the only source of evidence relies on the access the suspect could provide to the police with the delivery of these passwords. A practical example is that of the use of crypto-enabled computer networks such as Freenet for 'file swarming' where a file cut is stored in bits and pieces across the world, only accessible with the right user name and password. In such cases, it is difficult for the police to provide supportive or alternative evidence other than the contents of those crypto-enabled computer networks because it is actually impossible to access unlawful content as a whole since the content is divided in bits and pieces across the world to which access is only possible by using the credentials of the suspect, making such password orders – in absence of other evidence to which the police could resort to – unlawful (Koops, 2009, p. 6). This approach is also confirmed in the Saunders case when the ECtHR held that the privilege "(…) presupposes that the prosecution in a criminal case seek to prove their case against the accused without resort to

[103] ECtHR 3 May 2001, *J.B. v. Switzerland*, Appl. No. 31827/96, para. 66.
[104] Text from source interpreted and translated from Dutch to English by A. Khozooei.
[105] ECtHR 11 July 2006, *Jalloh v. Germany*, Appl. No. 54810/00, para. 117.

evidence obtained through methods of coercion or oppression in defiance of the will of the accused".[106]

From a Dutch law point of view, it is interesting to analyze Dutch case law with regard to decryption orders of biometric data to unlock a device, even if it includes some force – without it being contrary to the privilege. From the cases described hereunder it follows that biometrics such as fingerprints, iris scan, urine which exist independently of the will, might be obtained by the police, with *proportional* force, and it will not be countered by the privilege when its acquisition is *necessary*. This approach is similar to the balancing approach of the ECtHR as discussed above where the principles of subsidiarity and proportionality are applied.
In one case, a suspect was prosecuted for drug trafficking at a Dutch airport.[107] Dutch law enforcement obtained the pin code from the suspect to access his smartphone after threatening him to forcibly take his fingerprint in order to unlock the smartphone if the suspect was not willing to provide his pin code 'voluntarily'. The compatibility of this conduct with the privilege was contested by the suspect. However, the Dutch court found that (1) there was no violation with the privilege and forcibly taking the fingerprint of the suspect to unlock his smartphone would have been authorized as such an order is comparable to taking fingerprints under coercion for investigative purposes. Also, (2) the court held that fingerprints are biometric material that exist independent from the will of the suspect and could be obtained without his cooperation. (3) The serious interest derived from the criminal offence in unlocking the smartphone and the minor violation of physical integrity (taking the finger of the suspect by force and placing it on the phone), were taken into account.[108]
In another case, a suspect who was suspected of very serious offences, including the unlawful deprivation of liberty of two minors, was forced to cooperate by the police by unlocking his smartphone. [109] The Dutch court found the used force to be proportionate in this case. It acknowledged the need for rapid action due to deprivation of liberty of two young children and allowed a forced unlocking of a smartphone since at the time of the requested cooperation the police had no idea where the children were staying.[110]

These two cases, show that the Dutch court weighs the seriousness of an offence against the severity of physical coercion in order to determine the proportionality and necessity of compelling suspects their passwords through a pin code or a fingerprint. Based on this, it can be stated that the seriousness of an offence is a factor in determining the lawfulness of a certain degree of coercion applied in addition to the view that biometrics are will-independent material and that used force must be proportionate when weighed against its purpose.

[106] ECtHR 17 December 1996, *Saunders v. the United Kingdom*, Appl. No. 19187/91, para. 69; my own underlining.
[107] Dutch District Court North-Holland 14 December 2018, ECLI:NL:RBNHO:2018:11578 15/168454-18.
[108] *Ibid*, para. 3.3.
[109] Dutch District Court The Hague 12 March 2018, ECLI:NL:RBDHA:2018:2983 09/818727-17.
[110] Dutch District Court The Hague 12 March 2018, ECLI:NL:RBDHA:2018:2983 09/818727-17, para 3.4.

4.2.2 Permissibility of compulsion

In these Dutch cases, physical coercion (or the threat of physical coercion in the first case) was the chosen conduct by law enforcement to acquire access to smartphones. However, the Funke and J.B case show that coercion can also be expressed in the form of imposing fines with a penal nature when the suspect does not cooperate or by imposing (high) prison sentences such as is done in the United Kingdom where Article 53(5) of the Regulation of Investigatory Powers Act 2000 defines that if one does not comply with a decryption order, he or she can risk a prison sentence up to 2 or 5 years. A prison sentence has a compulsory nature because a suspect might feel compelled to provide a password after he or she is ordered to do so, when refusal results into a high prison sentence. Another interpretation could be that when the punishment of this refusal is lower than the sentence you could get from being convicted of the crime, a suspect would not provide the password since he or she might get a lower sentence.

The interesting question here is: to what degree is compulsion permitted? As mentioned above, the ECtHR takes the (1) character and extent of compulsion, (2) the weight of the public interest, (3) the relevant safeguards present in the procedure and (4) the use to which any material so obtained is put into account when answering this question. Following Toor (2011), the permissibility of compulsion depends on the material that is being sought for. If it concerns will-independent material such as blood, breath and DNA, then the applied compulsion would not be quickly considered to be prohibited. However, when it concerns will-dependent material such as statements, then the applied compulsion would be more quickly considered to be prohibited and therefore, incompatible with the privilege (Toor, 2011, p. 2849).[111] This reasoning can be recognized in the Dutch cases discussed above and in its strict protection in Dutch laws when it comes to statements; compulsion with regard to will-dependent material is tolerated to a lesser extent compared to will-independent material and thus, the Dutch criminal law system seems to adhere to the Saunders-criterium when it comes to obtaining passwords (which are will-independent material).

In the same context, there seems to be a broad discussion with regard to the permissibility of the use of biometrics obtained forcibly by the law enforcement from suspects (Brewster, 2016). Bood (2018) states that compelling a suspect physically to unlock a fingerprint-protected smartphone could easily lead to a breach of the privilege.[112] Whereas, both Stevens (2019) and Egberts and Ferdinandusse (2019) do not share the same conclusion. Bood thinks that the will-independent nature of a fingerprint does not justify coerced unlocking of a smartphone as this conduct is contrary to the privilege, if the coercion imposed on the suspect is aimed at obtaining material dependent on its will. He also finds that especially the nature of obtained information determines whether it can be considered to exist will-independent or not. In more detail, he makes the distinction of documents containing data concerning objective facts that may be of incriminating nature (such as an invoice) and obtained *Whatsapp* messages of the defendant that actually make a confessing statement (Bood, 2018, p. 2746).[113] The former can be considered to be will-independent and the latter cannot. Thus, will-dependent information

[111] Text from source interpreted and translated from Dutch to English by A. Khozooei.
[112] Text from source interpreted and translated from Dutch to English by A. Khozooei.
[113] Text from source interpreted and translated from Dutch to English by A. Khozooei.

obtained through compelling a suspect physically to unlock a fingerprint-protected smartphone (in which the fingerprint is actually will-independent material) is not in line with Article 6 ECHR following Bood.
In sum, the lawfulness of obtained information on a smartphone being will-independent, strongly depends on the nature of that information following Bood. On the one hand there are objective facts that are incriminating, such as financial records of payments made through a cryptocurrency app for weapons, and on the other, there are subjective facts that have a confessing nature such as Whatsapp-messages describing the intent of the suspect to shoot with these weapons.

Egberts and Ferdinandusse (2019) contend Bood's interpretation of what is and what is not to be considered will-(in)dependent material by describing the Dutch procedural law approach to material that does (not) exist dependent of the will of the suspect. As discussed earlier, Dutch criminal procedural law distinguishes *active* and *passive* cooperation by the suspect in the criminal investigation; active cooperation entails for instance providing statements; passive cooperation entails to have to endure coercive measures such as enduring the collection of blood samples (Stevens, 2005, p. 116).[114] Egberts and Ferdinandusse (2019) contradict Bood's assumption that it is the suspect who is being compelled to 'deliver' the information on the phone and incriminate him or herself, this being a form of *active* cooperation. They believe that it should actually be seen as a form of *passive* cooperation in which the suspect must endure the decryption of the phone by providing his fingerprints that acts as a 'key' since the phone is already lawfully obtained, for instance through the use of a warrant. They make the parallel to the key of a house which has been forcibly seized. From this perspective, Stevens (2019) contends Bood's assumption that by the mere act of compelling the suspect to provide his fingerprint to unlock a smartphone would directly lead to will-dependent material, which can be used as evidence.[115] Stevens (2019) believes that the law enforcement still needs to search, organize and interpret the significant amount of information on the smartphone since the suspect is not likely to actively cooperate by recognizing, assigning or interpreting this information.[116]

It follows from the foregoing that both the ECtHR and the Dutch court (through the interpretation of the Dutch criminal law system) have a similar approach when assessing the privilege in cases where law enforcement has applied coercion to obtain evidence from the suspect. Namely by identifying the type of evidence being will-(in)dependent and by assessing the degree of compulsion applied in a given situations. When looking into decryption orders, however, there seems to exist an interesting discussion on the mainly "material-based" driven approach of the Dutch court in which the decryption of a computer system is contested when the coercion imposed on the suspect is aimed at obtaining material dependent on its will on the one hand, and on the other hand this decryption is compared to the mainly passive cooperation

[114] Text from source interpreted and translated from Dutch to English by A. Khozooei.
[115] Text from source interpreted and translated from Dutch to English by A. Khozooei.
[116] Text from source interpreted and translated from Dutch to English by A. Khozooei.

of handing over the key to a house, after which law enforcement still has to undergo efforts to find useful material and that will-dependent material is not simply transferred when a computer system is decrypted through a (biometric) key. This brings us to the following: Can brain signals obtained through passive brain-readings similarly be compared to the contents of a home which individually are objective items but within context can be interpreted accordingly with the investigation? Or are these signals to be considered as material which are dependent on the will of the suspect regardless of its independent existence?

4.3 Passively obtained brain signals

4.3.1 Brain signals interpreted through the lens of the Jalloh criterium

As mentioned earlier, passive brain-reading analysis does not seem to constrain the free will of the suspect since brain signals (similar to passwords) exist independently of the will of the suspect. However, with regard to obtaining brain signals, the mere existence of such brain signals independent of the will of the suspect does not suffice according to the ECtHR for it to be compatible with the privilege when law enforcement obtains these signals through unproportionate and unnecessary coercion or force. This has to do with the fact that these signals cannot be obtained independently of the will of the suspect. It is reasonable to think that a suspect does not want to be 'hooked' to a device that can read his 'thoughts' and refuses to comply with such conduct. Consequently, the perspective of the ECtHR in the Jalloh case showed insight with regard to the (high) degree of compulsion used by law enforcement when forcible administrating emetics to the suspect so that he could throw up the swallowed drugs that he was selling, which then was used as incriminating evidence against him. The ECtHR acknowledged that it gives the privilege a broader meaning on occasion "so as to encompass cases in which coercion to hand over real evidence to the authorities was in issue" as the privilege is "primarily concerned with respecting the will of the defendant to remain silent in the face of questioning and not to be compelled to provide a statement."[117] The latter is in line with the fact that the ECtHR interprets the Convention as a whole and as a living instrument in light of societal tendencies and developments (Sloot, 2017, p. 340). Eventually, the ECtHR held in the Jalloh case that the conduct by the police interfered with the physical and mental integrity of the suspect.[118] Questions revolving the bodily and mental integrity of an individual are primarily considered under the right to privacy within the meaning of Article 8 ECHR by the ECtHR as a distinguished type of privacy including among others: one's sexual freedom and the right to reputational protection (Sloot, 2017, p. 341).[119]

When obtaining brain signals in relation to questions or images based on (possible) previous occurred events, the memory of the suspect is the research object (or cognitive track). Therefore, it seems only logical to treat this acquisition of the cognitive track under the mental integrity as part of private life in addition to the protection of the physical integrity when the

[117] ECtHR 11 July 2006, *Jalloh v. Germany,* Appl. No. 54810/00, para. 110-111.
[118] *Ibid*, para. 110.
[119] Text from source interpreted and translated from Dutch to English by A. Khozooei.

bodily brain of a suspect is subjected to technical devices (Toor, 2017, p. 264).[120] However, it must be noted that the memory is strongly linked to the role of accuracy and meaning when one reconstructs its past (Luna, 2016, pp. 323-324). From this notion it can be said that accuracy is subjected to the meaning of the past in relation to our goals and current actions (Luna, 2016, p. 329). Hence, the reconstruction of the past (or 'remembering') allows dynamic and different meanings since the recollection of the past is considered to be strongly linked with our ever-changing present (Luna, 2016, p. 329). In other words, every instance of 'remembering' can be said to change something in the mind of someone and make it impossible to assess the "true" events as they have occurred.
In this regard, this might be considered as a limitation when it comes to the accuracy and/or the merit of obtaining brain signals through passive brain-reading analysis. I do not see this as a limitation since following the DCCP, as discussed in chapter two, the judge always depends in his or her conviction on the evidence provided. Both given statements and obtained brain signals through passive brain-reading analysis with regard to the committed crime, are an important source of evidence for the judge to use in order to draw a conviction based on his or her contemplation. After all, the judge cannot be present at the crime scene in order to be convinced by the allegedly occurred facts. So, the provided evidence with the use of BCI-based investigative methods will be no different than current interrogation methods as in both cases, the police provide the obtained evidence to the judge based on the recollection of the suspect's memory. Hence, the same limitation of (un)consciously given statements that are incorrect remain with BCI-based investigative methods and thus, the accuracy of the memory remains a hurdle and no particular limitation in regard to BCI-based investigative methods.

In sum, brain signals obtained through passive brain-reading analysis, relate both to the physical integrity of the suspect when BCI devices, for instance, are attached to the suspects head (non-physical invasive), and to mental integrity when the cognitive track of the suspect is objected to the investigation. From this perspective, the examination of the compatibility of passive brain-reading analysis with the privilege should resemble the considerations of the ECtHR in the Jalloh case: (1) the nature and degree of compulsion used to obtain the evidence; (2) the weight of the public interest in the investigation and punishment of the offence in issue; (3) the existence of any relevant safeguards in the procedure; and (4) the use to which any material so obtained is put need to be assessed.
From the perspective of the Dutch court that retains to the Saunders criterium, the compatibility depends on the nature of the material sought and the seriousness of the crime which determines the permissibility of the compulsion applied as is shown in the Dutch cases discussed above.

4.3.2 Brain signals interpreted through the lens of the Saunders criterium

The discussion in Dutch literature as reviewed above, shows that there exist two boundaries for the permissibility of information that is obtained through the use of coercion or compulsion; on one hand, compelling will-independent material such as DNA, blood, urine, that does not conflict with the privilege. On the other hand, the compulsion of will-dependent material (such

[120] Text from source interpreted and translated from Dutch to English by A. Khozooei.

as statements) in criminal investigations, and the use of will-dependent material compelled outside criminal proceedings (such was the case in the Saunders case), which is contrary to the privilege. However, between the former and the latter, there can occur events where at first sight, will-independent material is obtained which actually still depends on the will of the suspect. For instance, when the earlier discussed Whatsapp conversation obtained on a smartphone seems to have a subjective and confessing nature which mainly depend on the will of the suspect. When the information in these situations are then used in criminal proceedings, then this will lead to a conflict with the privilege (Stevens, 2019, p. 401).[121]

From this perspective and with regard to passive brain-reading analysis, Bood rightfully argues that there should be made a distinction between objective facts that are incriminating and subjective facts that have a confessing nature in order to assess the compatibility of the obtained information through coercion or force with the privilege. For example, the situation should be taken into consideration where questions or images are posed during an interrogation which have a subjective nature and consequently lead to (false) confessing statements or refusal of providing such. In such a situation, the suspect is classically put in a position where he or she has to choose between incriminating him or herself and consequently get prosecuted for the criminal offence or, not to cooperate after which he or she gets prosecuted for perjury, misconduct or failure to comply with an official order (Koops, 2000, p. 44; Redmayne, 2007, p. 220).[122] However, with the use of a BCI-enabled lie detector or with Brain Fingerprinting, brain signals are still recorded when the suspect refuses to give a statement to the subjective questions or images presented or to give a false statement. In this case, the law enforcement can recognize the discrepancy in truth (Mobbs et al., 2007, p. 696). This can then be used against the suspect at trial similarly as was done in the Murray case where the ongoing silence of the suspect was used as incriminating evidence against the suspect due the "formidable" circumstances which strongly implicated the suspect's guilt.[123] In other words, the context in the Murray made it clear that there were evident circumstances within the existing framework of evidence (i.e. his presence at the crime scene), and that regardless of his silence, there was an irrefutable probability of Murray's guilt. With the BCI conduct, it will be the brain signal registration that indicate that the reaction provided by the suspect is not in line with the activity of its brain signals after the presented questions or images.

From this perspective, it can be argued that in cases where the circumstances are "formidable" or the situation calls for answers, the nature of brain signals is will-dependent since the questions of images presented to the suspect are subjectively based on the "formidable" circumstances. In other words, the criminal proceeding in such cases is beyond the stage of relying on objective facts, such as obtained information about the suspect's whereabouts at the time of the crime scene. Stevens', Egberts' and Ferdinandusse's counterarguments on the fact that providing biometrics to access computer systems can be compared to a regular search of a

[121] Text from source interpreted and translated from Dutch to English by A. Khozooei.
[122] Text from source interpreted and translated from Dutch to English by A. Khozooei.
[123] ECtHR 8 February 1996, *John Murray v. the United Kingdom*, Appl. No. 18731/91, para. 43.

house and that law enforcement still need to search computer systems categorically in order to find incriminating material, similarly to a house search, are valid ones. However, compared to decryption orders, passive brain-reading analysis is narrower as regard to the scope of material since it only focuses on designated brain signals that are relevant to observe when posing images or questions to the suspect. Actually, the questions or images as such determine the actual scope of material. From this perspective, it can be argued that the obtained brain signals should not be approached from a material-based interpretation when assessing its compatibility with the privilege. Although the biological existence of brain signals might be will-independent, factors such as the environment to which the brain reacts give rise to certain brain signals on which these related signals rely on. Thus, the Saunders criteria do not effectively apply in such cases as the existence of related brain signals depend on the questions and images presented.[124]

By way of illustration, when the police obtain the key to a house or a password to a smartphone even, the relevant evidence for the investigation that the police can find already exists and cannot be suddenly induced to exist when the police deploys various search powers. The effectiveness of the investigation depends on having the right warrant to use the proper search powers. Contrary to this, brain signals are yet to be induced and do not exist in advance. The mere 'object' that already exists, is the memory of the suspect with regard to the alleged criminal offence that can possibly be recalled when the right questions or images are presented. Hence, the effectiveness of the investigation, depend on the (1) the recollection of the memory of the suspect and (2) the presented questions and/or images that initiate the yet 'to be' generated brain signals of the suspect (which rely on his or her will).

As discussed above, the accuracy of the memory is strongly linked to the (un)conscious criteria the suspect has for the recollection of his or her memory. In this regard, one might refute the given analogy to a house of which the key is ordered on the fact that the contents of a house are fixed and the results from the recollected memory by the suspect is not (as memories are ever-changing). In other words, once you get the 'key' to the brain, things are still changing. However, I contend this view since the 'containers' compared (a house vis-à-vis recollected memories) are not the same. The recollection of memories (initiated by the posed questions or images) is comparable to the results of a search. Although the contents in a house are fixed, does not mean that the results based on the search method will include the 'fixed' contents sought for. So, from the argument that memories are ever-changing, to a certain extent the visibility of contents of a house are also 'changing' since its perception depends on the chosen search method. It is fixed until the chosen search method is conducted and the found contents are perceived. The same goes for the recollection of memories. It can be said that the contents of a brain which has perceived certain events and has 'saved' these perceptions in its 'container' leads to the 'fixation' of memories from the moment that they are recollected. Thus, the obtained brain signals which are generated from the posed questions or images, are comparable to the found contents within a house. Ultimately, the nature of memories stops to be dynamic from the moment of accessing them or recollecting them.

[124] Looking back on the neurophilosophical discussion about free will at the beginning of this chapter, one could say that this interpretation of brain signals corresponds with the results of BCN-sciences.

In continuation of the 'yet to be' generated brain signals of the suspect, it can be said that although brain signals theoretically remain will-independent material in the same sense DNA- or blood samples are, brain signals obtained during interrogations are actually 'real' evidence as meant by the ECtHR in the Jalloh case (if there are no relevant safeguards in place). Firstly, the brain signals as such will not be used as indirect evidence for the purpose to indicate incriminating evidence 'elsewhere', but the brain signals will be used as the 'real' evidence in itself that could then be used against the suspect at trial. Secondly and in line with Bood's assumption that it is the suspect who is being compelled to 'deliver' the incriminating material as a form of *active* cooperation, the nature of the cooperation by the suspect when providing access to his or her brain signals to any questions or images without any technical safeguards, exceed the passively enduring a minor infringement of the mental integrity. The suspect, namely, generates actively brain signals. Therefore, the material-based approach will provide little prospect when it comes to the compatibility of passive brain-reading analysis by law enforcement with the privilege.

4.4 Conclusion

Taking the above into account, it is now clear that the will of the accused is the main legal asset that is at stake when BCIs are applied during the criminal investigation. With regard to (1) the use of BCIs for compelled compliance purposes, it has been discussed that such conduct impinges with the will of the suspect as it contravenes with the ability of the suspect to choose to remain silent and thus, is not compatible with the privilege.

BCIs used for (2) passive brain-reading analysis, however, did not seem to affect the free will of the suspect at first glance due to its will-independent nature, but considering brain signals to be regarded as 'real' evidence directly applicable as evidence in the court, the nature of the brain signals become less relevant in assessing the compatibility of its acquisition through force by law enforcement. Hence, the narrow approach of the privilege by the Dutch court becomes less compatible when applied with passive brain-reading analysis during the investigation as this approach is more material-based and deems compulsion applied with regard to will-dependent material (such as brain signals) incompatible with the privilege. However, passive brain-reading analysis can, under Dutch law, be considered as a serious violation of one's mental integrity and hence, the lawfulness of a certain degree of coercion applied depends on the seriousness of the crime that could possibly justify such conduct. Thus, the degree of compulsion is also taken into consideration. With regard to the latter degree and taken into account that the interpretation of the privilege by the ECtHR is very casuistic, the assessment of the compatibility of passive brain-reading analysis with the privilege by the ECtHR is done by taking into account (1) the nature and degree of compulsion used to obtain the evidence; (2) the weight of the public interest in the investigation and punishment of the offence in issue; (3) the existence of any relevant safeguards in the procedure; and (4) the use to which any material so obtained is put.

Chapter IV: Conclusion & Recommendation

In continuation of the foregoing chapters, this chapter will naturally conclude the findings of this thesis and set forth recommendations in regard to the concerning subject: BCI conduct by Dutch law enforcement during the criminal investigation. Questions in the first chapter related to the manner the privilege should be applied when (1) the application of BCI for compelling compliance purposes and, (2) the application of BCI for passive brain-reading analysis involved events where at first sight, will-independent material is obtained which, in hindsight, actually still depends on the will of the suspect? The latter concerns situations for instance, where Whatsapp-conversations which have a subjective and confessing nature, are coercively obtained from a smartphone. When such conversations are subsequently used in criminal proceedings, such use would then lead to a conflict with the privilege (Stevens, 2019, p. 401).[125] This thesis has aimed to examine the effect such conduct has on the privilege against self-incrimination and thus, to address the abovementioned ambiguity by answering the main research question: "Does accessing 'thoughts' of suspects through brain-computer interfaces (BCI) during criminal investigation for the purpose of truth-finding in the Netherlands affect the privilege against self-incrimination in Article 6 of the European Convention on Human Rights?".

5.1 Findings

First, this thesis has explained that BCI is a product of efforts made within neuroscience aimed at signal acquisition of brain signals. This is done via various, both physically invasive and non-invasive, recording methods from which particular signal(s) are extracted. These signals are then classified or translated into controllable or interactable output usable from human or technological perspective. The relevant application of such technology within the criminal investigation was shown to be the use of BCI applications for (1) *compelling compliance* purposes and, (2) for *passive brain-reading analysis* during criminal investigation in the Netherlands. The latter would enable the police to replace conventional conduct such as the polygraph as a lie detector and use it passive brain-reading analysis through BCI to map specific brain zones which are increased in activity when individuals lie, and the measures the brain's reaction when a suspect is presented an image, he or she recognizes versus ones that are not recognized. In the former case, brain signals are modulated (through methods such as DBS) and neurons associated with cooperation are stimulated to the extent that the suspect is brought into a more cooperative state.

Next, it has been discussed that the main purpose of the Dutch criminal justice system is 'the search for material truth' with regard to a criminal offence (Corstens, Borgers, & Kooijmans, 2018, p. 12).[126] This truth can be found, firstly, during the trial to provide evidence in order to

[125] Text from source interpreted and translated from Dutch to English by A. Khozooei.
[126] Text from source interpreted and translated from Dutch to English by A. Khozooei.

proof its accusation during the hearing before a judge and, secondly, in the investigation that precedes this hearing which underpins its accusation (Dubbelaar, 2014, p. 18).[127] In this search, the inquisitorial process form of Dutch Criminal Procedural Law does not allow the defendant to be an equivalent party to the proceedings compared to the prosecutor and is rather considered an object of investigation that has to tolerate coercive investigative measures (Corstens et al., 2018, p. 12).[128] Whereas in an accusatorial process two equal parties compete against each other in front of a passive judge who limits himself to performing the role of an arbitrator (Corstens et al., 2018, p. 12).[129] Although the Dutch criminal procedural law has an inquisitorial form, the Dutch criminal law system can be considered to be a moderately accusatorial or a mitigated inquisitorial system since during the investigation in the hearing, the trial has a more accusatorial character as the defendant is treated equally, partly due to the effect of Article 6 of the ECHR (Corstens et al., 2018).[130] In this context, it is understood that the privilege entails a doctrine commonly found in criminal law and intends to provide protection against compelled self-incriminating conduct (Stevens, 2005, p. 1).[131]

The rationales of the privilege with regard to the criminal investigation can be interpreted both from the perspective of law enforcement (prohibition of undue pressure and the reliability of evidence) as from that of the suspect (process autonomy and human dignity). Taken into account that the rationales of the privilege are connected to one and other, the body of evidence remains the core around which the privilege revolves. In that sense, the government benefits from applying the appropriate amount of coercion of cooperation during the phase prior and during the 'criminal charge' into account for the sake of the possible usefulness of the resulting evidence from that cooperation. For instance, an unfair trial can be determined by a judge with regard to a fulfilled investigation act that initially seemed lawful, later turns out to be unlawful due to the coercion, resulting to the nullification of the obtained evidence.

From this context, the legislator is affected in the adoption of new powers of law enforcement, as it focuses to a lawful process of evidence acquisition under coercion from suspects in the 'criminal charge'-phase.[132] Thus, and in line with the moderately accusatorial or mitigated inquisitorial system of the Dutch criminal law system, the suspect is regarded as party to the proceedings and not merely as subject when the privilege is balanced accordingly as opposed to its rationales.

However, the position of the suspect at trial is may be affected based on the interpretation of the privilege, being the 'narrow' or 'broad' interpretation as discussed in chapter three. Contrary to the narrow interpretation of the privilege applied by the Dutch judiciary which adheres to the considerations made by the ECtHR in the Saunders case (referring to the "material-based" approach), the ECtHR seems to use a combination of factors to interpret the privilege, one of which is the existence of material as evidence independent from the will of

[127] Text from source interpreted and translated from Dutch to English by A. Khozooei.
[128] Text from source interpreted and translated from Dutch to English by A. Khozooei.
[129] Text from source interpreted and translated from Dutch to English by A. Khozooei.
[130] Text from source interpreted and translated from Dutch to English by A. Khozooei.
[131] Text from source interpreted and translated from Dutch to English by A. Khozooei.
[132] Text from source interpreted and translated from Dutch to English by A. Khozooei.

the suspect (Saunders-criterium) but also the aspect of coercion is taken into account and thus, interprets the privilege broadly.

Subsequently, the compatibility of BCI conduct by the Dutch law enforcement during the criminal investigation with the privilege was examined. First, it was found that the main legal asset that is at stake when BCIs are applied during the criminal investigation, was the will of the suspect. With regard to (1) the use of BCIs for compelled compliance purposes, it has been discussed that such conduct impinges with the will of the suspect as it contravenes with the ability of the suspect to choose to remain silent and thus, is not compatible with the privilege. BCIs used for (2) passive brain-reading analysis, however, did not seem to affect the free will of the suspect at first glance due to its will-independent nature.
However, the mere existence of such brain signals independent of the will of the suspect does not suffice according to the ECtHR for it to be compatible with the privilege when law enforcement obtains these signals through unproportionate and unnecessary coercion or force. This has to do with the fact that these signals cannot be obtained independently of the will of the suspect. Nevertheless, the nature of the coercively obtained brain signals becomes less relevant, considering brain signals to be regarded as 'real' evidence directly applicable in the court and used against the suspect. This was also the case in Jalloh where such conduct was used to indicate the imposed criminal charge. Hence, the narrow interpretation of the privilege mostly used by the Dutch court becomes less compatible with the use of passive brain-reading analysis during the investigation. This has to do with the material-based approach which lends itself for the exclusion of protection under the privilege when the subject-matter exists independent from the will of the suspect, whilst the ECtHR took the same approach into consideration but still moved towards the more contextual and broad interpretation of the circumstances in which the evidence was used as 'real evidence' in the Jalloh case.
As opposed to the contextual interpretation of the ECtHR in the Jalloh case, passive brain-reading analysis can, under Dutch law, be considered as a serious violation of one's mental integrity. Hence, the lawfulness of a certain degree of coercion applied depends on the seriousness of the crime that could possibly justify such conduct. Thus, the degree of compulsion is also taken into consideration. With regard to the latter degree and taken into account that the interpretation of the privilege by the ECtHR is very casuistic, the considerations in the Jalloh case – where a high degree of compulsion was used by law enforcement to forcible administrate emetics to the suspect so that he could throw up the swallowed drugs that he was selling, which then was used as incriminating evidence against him – are the right consideration to make with regard to passive brain-reading analysis during the investigation in order for assessing its compatibility with the privilege.

In conclusion, the main research question of this thesis "Does accessing 'thoughts' of suspects through brain-computer interfaces (BCI) during criminal investigation for the purpose of truth-finding in the Netherlands affect the privilege against self-incrimination in Article 6 of the European Convention on Human Rights?", can be answered as followed:

Depending on the circumstances of the case, the privilege can be interpreted in a narrow (mainly focused on the nature of the material being will-(in)dependent) or broad (where the degree of coercion is taken into account) way. Accessing 'thoughts' of suspects through brain-computer interfaces during the criminal investigation for the purpose of truth-finding in the Netherlands is compatible with the privilege when the following two conditions are met: Firstly, in addition to the existence of material as evidence independent from the will of the suspect, the aspect of coercion is also taken into account. In this way, the privilege is being interpreted broadly. Secondly, the suspect retains its ability to choose to remain silent.

5.2 Recommendation

When comparing the answer of the main research question with the narrow interpretation of the Dutch criminal law system with regard to the privilege, it can be found that when the Dutch court predominantly focuses on the nature of the material rather than taking the aspect of coercion into account, that this will conflict with evidence obtained through BCI.

The coercion-based approach of the ECtHR allows the broad interpretation of the privilege and the interpretation of broad concepts such as 'mental privacy' as a variable to measure compatibility of BCI conduct by the law enforcement until future legislation. Moreover, the ECtHR's dynamic interpretation of the Convention as a living instrument may impose another approach such as creating a new assessment framework with regard to existing search and seizure protocols in the criminal procedures of its members which are primarily based on the architecture of physical search protocols.

Hence, I plead for a broader interpretation of the privilege in line with the considerations of the ECtHR in the Jalloh case and take into account (1) the nature and degree of compulsion used to obtain the evidence; (2) the weight of the public interest in the investigation and punishment of the offence in issue; (3) the existence of any relevant safeguards in the procedure; and (4) the use to which any material so obtained is put. For this reason, whereas BCIs for compelled compliance purposes is not compatible with the privilege, the compatibility of passive brain-reading analysis through BCIs should be assessed accordingly to the considerations in the Jalloh case and be as follows:

The nature and degree of compulsion used to obtain the evidence

In the event that the BCI method used is neither physically intrusive nor invasive, then the degree of compulsion to obtain brain signals from the suspect as biological material naturally made by the body and existing independent from the will of the suspect, should be proportionate and necessary in relation to the seriousness of the offence in order for it not to violate the privilege. In other words, as long as there is no severe physical pain or suffering, then the physical integrity is respected. However, with regard to the mental integrity, the threshold of proportionate compulsion is quickly crossed. The more subjective the questions

or images get in their nature when posed to the suspect, the more brain signals have a 'confessing' nature which can then lead to incriminating material against the suspect when used as evidence whilst according to Bood's opinion (which I share to a certain extent), the nature of this information does becomes will-dependent, resulting into the violation of the privilege.

The weight of the public interest in the investigation and punishment of the offence in issue

The necessity to use BCI applications for passive brain-reading analysis, should be supported by the public interest. On the one hand, this may be done by means of democratically elected laws concerning such conduct in relation to the corresponding criminal offences that justify the use of this power. Unfortunately, currently, neither the ECHR provides an adequate protective legal framework for the *forum internum* or thoughts and memories (Toor, 2017, p. 265), nor does the Dutch Constitution (Koops & Prinsen, 2007, p. 183).[133] Although the current state of technology is not capable to 'read' thoughts or minds as spiritual concepts as mentioned in the introductory chapter, the emergence of methods that investigate the suspect's memory calls for proper regulation. The lack of an adequate protective legal framework for the more feasible possibilities such as those extensively discussed in this thesis, could result into a regulatory gap in which regulators "*do not produce the outcomes stipulated in their mandate*" and hence, the regulation can possibly fail to address the disturbance caused by BCI methods used during the criminal investigation properly (Leenes & Kosta, 2015, p. 329; Leenes et al., 2017, p. 7). Currently, mental integrity is one of the least mentioned elements of personal identity and therefore private life under Article 8 ECHR (Toor, 2017, p. 265).[134] Mental integrity, in ECtHR case law, relates in particular to the positive obligations to prevent or sanction violations of this integrity by other citizens, and in the assessment of whether honor or reputation has been damaged (van der Sloot, 2015, pp. 32-33). Thus, contrary to the protection of physical integrity, the ECHR provides no legal framework within which violations of psychological integrity by law enforcement are prevented and sanctioned. Striking enough, compared to the ECtHR the Dutch law uses stricter conditions for searching inside the body in relation to the seriousness of infringement of the bodily integrity (see Articles 56, 195, DCCP). The investigative methods depend on the seriousness of the violation; "Taking a photograph of a suspect is a slight violation, frisking a more serious violation, taking a sample of internal body tissue is an even more serious violation, and a psychological test using a polygraph (lie detector) or truth serum is considered the most serious violation possible" (Koops & Prinsen, 2007, p. 183).[135] Thus, passive brain-reading analysis can, under Dutch law, be considered as a serious violation of one's mental integrity. However, as discussed above, the considerations for the assessment of whether the privilege is infringed or not, the material-based approach should not be used as a justification for the serious violation of one's mental integrity. On the other hand, BCI applications for passive brain-reading analysis by law enforcement during criminal investigations may be publicly supported through the democratically elected judiciary powers

[133] Text from source interpreted and translated from Dutch to English by A. Khozooei.
[134] Text from source interpreted and translated from Dutch to English by A. Khozooei.
[135] Text from source interpreted and translated from Dutch to English by A. Khozooei.

in its case law by the recognition of notions by judges such as 'cognitive freedom', 'mental privacy', or 'mental self-determination' as part of the right to respect for private life through the protection of mental integrity in the absence of adequate relevant legislation (Toor, 2017, p. 265). The latter seems very feasible since the ECtHR interprets the Convention as a whole and as a living instrument in light of societal tendencies and developments (Sloot, 2017, p. 340). Hence, new rights and freedoms under the existing provisions in the Convention may be introduced.

The existence of any relevant safeguards in the procedure

In order to respect the will of the suspect with regard to its mental integrity when cooperating in letting his or her brain signals to be read, there need to be sufficient safeguards in this procedure on which the suspect can rely. As mentioned before, the nature of questions or images presented during an interrogation can determine the nature of the brain signals of being will-independent or not. First of all, based on the seriousness of the violation on the mental integrity when obtaining brain signals of the suspect, the lawyer of the suspect must be present at all times who can consult him or her during and prior the consultation.[136] Furthermore, when questions or images are indeed subjective of nature, then the suspect should be allowed to stop the recording of brain signals when he refuses to respond in order to prevent the law enforcement to still acquire useful information that can be used against the suspect following his refusal (Murray). The latter is, however, a safeguard that will be most likely unfeasible as once the questions or images are presented, the brain signals are immediately generated. For this reason, the invasiveness of this 'search' of particular brain signals must be limited in another way which will be described under (4) when discussing the specificity of a brain-search. Another safeguard would be a caution prior the interrogation that the law enforcement should give in order for the suspect to give an informed consent to BCI conduct and providing permission for such conduct to infringe his or her mental integrity (Koops & Prinsen, 2007, p. 183).[137]

The use to which any material so obtained is put

Finally, the search for brain signals by law enforcement should be restricted and the brain signals should not be the main evidence on which law enforcement rely on in order for the passive brain-reading analysis to be compatible with the privilege. This means that the law enforcement should not pose questions or images which would amount to "fishing expeditions" such the Swiss government was alleged to do when imposing several fines on J.B. in quest for the relevant documents of which its existence they were not sure of. Brain signals and digital 'content' on computer systems are very much intangible in their nature. Compared to homes where its content offer specificity and predictability for physical searches, the extent of brain signals generated by presented questions or images is unsure to issue a specific warrant articulating the approved search protocol (Kerr, 2005, p. 566). Thus, a 'classic' search warrant that can specifically describe the physical places to search and the manner to do this, cannot be

[136] ECtHR 27 November 2008, *Salduz v. Turkey*, Appl. No. 36391/02, para. 62.
[137] Text from source interpreted and translated from Dutch to English by A. Khozooei.

sufficiently specific with regard to obtaining brain signals. Such a warrant would allow unpredictable searches and have a more general or 'open' nature due to the intangibility of brain signals which provide little expectations *ex-ante* or in advance of its relevance for the investigation. From this perspective, the architecture of physical searches does not provide sufficient safeguards and limitations with regard to the use to which brain signals so obtained is put. The architect of physical searches is currently mainly focused on safeguards with respect to information flows between individuals and the state (such as data-reduction), whilst it should include more adequate regulation on access to information by the government (such as rules regarding data-acquisition) (Kerr, 2005, pp. 584-585). In other words, due to the nature of information as evidence becoming increasingly more sensitive (notepad vis-à-vis brain signals or even 'thought'), an individual benefits more from regulating its lawful access instead of investing more in existing safeguards that regulates after the acquisition of information. Ultimately, this would contribute to the suspect's process autonomy. In the power relation between the suspect and the government, it is the government who should come with evidence against the suspect and not the other way around. It would affect the process autonomy of the suspect when an 'open' claim is advanced by law enforcement as was done in J.B. and Funke and in compliance of the suspect was compelled (Wilbrink, 2013, p. 48).[138]

The End.

Thank you for reading.

[138] Text from source interpreted and translated from Dutch to English by A. Khozooei.

Bibliography

Abdulkader, S. N., Atia, A., & Mostafa, M. M. (2015). Brain computer interfacing: Applications and challenges. *Egyptian Informatics Journal, 16*(2), 213–230.

Ansmink, A. A. (1981). Het meewerken van de verdachte aan zijn veroordeling en art. 29 Sv. *RM Themis*, 426-448.

Anupama, H. S., Cauvery, N. K., & Lingaraju, G. M. (2012). BRAIN COMPUTER INTERFACE AND ITS TYPES - A STUDY. *International Journal of Advances in Engineering & Technology, 3*(2), 739-745.

Ashworth, A. (2008a). Self-incrimination in European human rights law-a pregnant pragmatism. *Cardozo L. Rev., 30*.

Ashworth, A. (2008b). Self-incrimination in European Human Rights Law. A pregnant pragmatism? *Cardozo Law Review, 3*.

Bood, A. (2018). Geef ze een vinger …. *Nederlands Juristenblad, 1880*.

Brewster, T. (2016). FBI Can Use Dead Suspects' Fingerprints To Open iPhones -- It Might Be Cops' Best Bet.

Brouwer, A.-M., Erp, J. v., Heylen, D., Jensen, O., & Poel, M. (2013). Effortless Passive BCIs for Healthy Users. *UAHCI/HCII*(LNCS 8009), 615–622.

Bublitz, J. C. (2014). Freedom of Thought in the Age of Neuroscience. *Archiv für Rechts-und Sozialphilosphie, 100.1* 1-25.

Bublitz, J. C., & Merkel, R. (2013). Guilty Minds in Washed Brains? *Neuroscience and legal responsibility*, 335-374.

Bublitz, J. C., & Merkel, R. (2014). Crimes against minds: on mental manipulations, harms and a human right to mental self-determination. *Criminal Law and Philosophy 8.1*, 51-77.

The Convention on Cybercrime, 1(a) C.F.R.

Corstens, G. J. M., Borgers, M. J., & Kooijmans, T. (2018). *Het Nederlands strafprocesrecht* (9 ed.). Deventer: Wolters Kluwer.

Daly, J. J., & Huggins, J. E. (2015). Brain-Computer Interface: Current and Emerging Rehabilitation Applications. *Archives of Physical Medicine and Rehabilitation, 96*(3), S1-S7. doi:10.1016/j.apmr.2015.01.007

Dubbelaar, M. J. (2014). *Betrouwbaar getuigenbewijs. Totstandkoming en waardering van strafrechtelijke getuigenverklaringen in perspectief.* (Doctors Degree). Leiden University, Oestgeest.

Egberts, M., & Ferdinandusse, W. (2019). Reactie op Alex Bood. *Nederlands Juristenblad, 316*, 404.

Erp, J. V., Lotte, F., & Tangermann, M. (2012). Brain-Computer Interfaces: Beyond Medical Applications. *Computer, 45(4)*, 26-34. doi:10.1109/MC.2012.107

Frankfurt, H. G. (1971). Freedom of the Will and the Concept of a Person. *The Journal of Philosophy, 68*(1), 5-20.

Frankfurt, H. G. (1988). *The Importance of What We Care About*. Cambridge: Cambridge University Press.

Gladden, M. E. (2016a). Managing the Ethical Dimensions of Brain-Computer Interfaces in eHealth: An SDLC-based approach. *Annual Conference of the EuroMed Academy of Business: Innovation, Entrepreneurship and Digital Ecosystems (EUROMED 2016), 9th*, 860 - 874.

Gladden, M. E. (2016b). Managing the Ethical Dimensions of Brain-Computer Interfaces in eHealth: An SDLC-based Approach. *9th Annual EuroMed Academy of Business Conference: Innovation, Entrepreneurship and Digital Ecosystems (EUROMED 2016) Book of Proceedings,* 889-902.

Greely, H. T. (2008). Neuroscience and Criminal Justice: Not Responsibility but Treatment. *Kansas Law Review, 56*, 1103 - 1138.

Harari, Y. N. (2014). *Sapiens: A brief history of humankind*: Random House.

Helmholz, R. H., Gray, C. M., Langbein, J. H., Moglen, E., Smith, H. E., & Alschuler, A. W. (1997). *The Privilege Against Self-Incrimination: Its Origins and Development*. the United Stated of America: the University of Chicago Press.

Ienca, M., & Andorno, R. (2017). Towards new human rights in the age of neuroscience and neurotechnology. *Life Sci Soc Policy, 13*(1), 5. doi:10.1186/s40504-017-0050-1

Illes, J. (2003). Neuroethics in a New Era of Neuroimaging. *Am J Neuroradiol, 24(9)*, 1739 - 1741.

Kerr, O. S. (2005). Searches and Seizures in a Digital World. *Harvard Law Review, 119*, 531-585.

Kerr, O. S. (2018). Compelled Decryption and the Privilege Against Self-incrimination. *Texas Law Review, 97*.

Koops, B. J. (2000). *Verdachte en ontsleutelplicht: hoe ver reikt nemo tenetur?* . Deventer: Kluwer.

Koops, B. J. (2009). Technology and the Crime Society: Rethinking Legal Protection. *TILT Law & Technology Working Paper Series*.

Koops, B. J. (2016). Criminal investigation and privacy in Dutch law. *TILT Law & Technology Working Paper Series*(Version 1.0), 55.

Koops, B. J., & Prinsen, M. M. (2007). Houses of Glass, Transparent Bodies: How New Technologies Affect Inviolability of the Home and Bodily Integrity in the Dutch Constitution. *The Dutch Constitution, Information & Communications Technology Law, 16:3*, 177-190. doi:10.1080/13600830701680420

Koops, B. J., Schooten, H. v., & Prinsen, M. (2004). *Recht naar binnen kijken. Een toekomstverkenning van huisrecht, lichamelijke integriteit en nieuwe opsporingstechnieken* (Vol. 70): het NWO/ITeR-programmabureau.

Koops, B. J., & Stevens, L. (2003). J.B. versus Saunders. De groeiende duisternis rond nemo tenetur'. *DD, 33*, 281-294.

Kronenberg, M. J., & Wilde, B. d. (2012). *Grondtrekken van het Nederlandse strafrecht*. Deventer: Kluwer.

Lamberigts, S. (2016). The privilege against self-incrimination: A Chameleon of Criminal Procedure. *New Journal of European Criminal Law, 7.4*, 418-438.

Leenes, R., & Kosta, E. (2015). Taming the cookie monster with dutch law–a tale of regulatory failure. *CLS Review, 31*.

Leenes, R., Palmerini, E., Koops, B. J., Bertolini, A., Salvini, P., & Lucivero, F. (2017). Regulatory challenges of robotics: Some guidelines for addressing legal and ethical issues. *Law, Innovation and Technology, 9*, 1-44. doi:https://doi.org/10.1080/17579961.2017.1304921

Lensing, J. A. W. (1988). *Het verhoor van de verdachte in strafzaken*. Arnhem: Gouda Quint.

Lesser, R. P., Arroyo, S., Crone, N., & Gordon, B. (1998). Motor and Sensory Mapping of the Frontal and Occipital Lobes. *Epilepsia, 39*(s4), S69–80.

Luchtman, M., & Widdershoven, R. (2018). Het Nederlandse strafrecht in de ban van het Unierecht. *Ars Aequi*(AA20180873), 873-889.

Luna, I. B. d. (2016). From Mind to Context, from Accuracy to Meaning. Exploring the Grammar of Remembering as a Socially Situated Act. *Integr Psych Behav, 50*. doi:DOI 10.1007/s12124-016-9345-7

Marsh, S. (2018). Neurotechnology, Elon Musk and the goal of human enhancement. Retrieved from https://www.theguardian.com/technology/2018/jan/01/elon-musk-neurotechnology-human-enhancement-brain-computer-interfaces

Martone, R. (2019, 29 October 2019). Scientists Demonstrate Direct Brain-to-Brain Communication in Humans. Retrieved from https://www.scientificamerican.com/article/scientists-demonstrate-direct-brain-to-brain-communication-in-humans/

Miller, G. (2014). Scientists Can't Read Your Mind With Brain Scans (Yet). Retrieved from https://www.wired.com/2014/04/brain-scan-mind-reading/

Mobbs, D., Lau, H. C., Jones, O. D., & Frith, C. D. (2007). Law, Responsibility, and the Brain. *PLoS Biology, 5*(4). doi:doi:10.1371/journal.pbio.0050103

Myjer, E. (1978). *Van duimschroef naar bloedproef: beschouwingen over de regel dat niemand gedwongen mag worden zichzelf te belasten* (Vol. 27). Deventer: Kluwer.

Olaronke, I., Rhoda, I., Gambo, I., Oluwaseun, O., & Janet, O. (2018). Prospects and Problems of Brain Computer Interface in Healthcare. *Current Journal of Applied Science and Technology, 29*(6), 1-17. doi:10.9734/cjast/2018/44358

Pereboom, D. (2003). *Living Without Free Will*. Cambridge: Cambridge University Press.

Redmayne, M. (2007). Rethinking the privilege against self-incrimination. *Oxford Journal of Legal Studies, 27*, 209-232.

Sie, M., & Wouters, A. (2009). The BCN Challenge to Compatibilist Free Will and Personal Responsibility. *Neuroethics, 3:121*. doi:https://doi.org/10.1007/s12152-009-9054-8

Sloot, B. v. d. (2017). Where is the Harm in a Privacy Violation? *Jipitec, 322*.

Smith, J. C. (1968). *The Unique Nature of the Concepts of Western Law*. Dartmouth England.

Stevens, L. (2005). *Het nemo-teneturbeginsel in strafzaken: Van zwijgrecht naar containerbegrip.* (Doctors Degree). Tilburg University, Nijmegen.

Stevens, L. (2019). Gedwongen biometrische toegangsverschaffing is niet in strijd met nemo tenetur. *Nederlands Juristenblad, 315*.

Toor, D. v. (2011). Natuur in de mens: het 'schuldige' geheugen. *NJB, 42*.

Toor, D. v. (2017). *Het schuldige geheugen? Een onderzoek naar het gebruik van hersenonderzoek als opsporingsmethode in het licht van eisen van instrumentaliteit en rechtsbescherming*. Deventer: Wolters Kluwer.

Trechsel, S. (2005). *Human rights in criminal proceedings*. Oxford: Oxford University Press.

van der Sloot, B. (2015). Privacy as Personality Right: Why the ECtHR's Focus on Ulterior Interests Might Prove Indispensable in the Age of "Big Data". *Utrecht Journal of International and European Law, 31*(80), 25-50. doi:10.5334/ujiel.cp

Versteegh, K. (2019, 3 oktober 2019). 'Geheime diensten willen brein in'. *NRC*.

Wilbrink, A. E. (2013). *De reikwijdte en de toepassing van het nemo-teneturbeginsel. De uitleg van de Hoge Raad en het Europees Hof voor de Rechten van de Mens van het recht tegen gewdongen zelfincriminatie.*: Celsus juridische uitgeverij.