NATURALIZING THE SUBJECTIVE SIDE OF THE CRIME: A FEW INTRODUCTORY REMARKS ON THE ROLE OF CONSCIOUSNESS IN CRIMINAL LAW BASED ON AMERICAN AND POLISH EXAMPLES

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Abstract:
Advancements in neuroscience cast new light on the functioning of the human mind. This is especially important within the context of criminal law, wherein consciousness plays a crucial role in determining criminal responsibility. Yet, there are some caveats in the direct application of these new findings, most of which are related to the specific conceptual framework of law based upon commonsense knowledge and (sometimes) outdated psychology. This framework has also produced different doctrines of interpretation in the systems of common and civil law. Moreover, the goals of the law are to some extent different from scientific research on the brain. The aim of this study is to assess to what extent and under what interpretation scientific knowledge concerning consciousness might be useful for legal purposes, especially for the criminal law. Our assessment is that most of the current concepts of criminal law are directly related to outdated psychological and neuroscientific theories, and that the content of those concepts should be updated according to the newest scientific findings while remaining in accordance with the primary functions of criminal law.

Key words: neurolaw, consciousness, criminal law, comparative law.

1. Introduction

Achievements in modern neuroscience have shed new light on the functioning of the human mind. Nevertheless, there are some mysteries which remain to be solved. The most complex of these is the phenomenon of consciousness: despite attempts to find the so-called neural correlates of consciousness (i.e. the activity in the specific parts of the brain that are necessary for awareness or specific perceptual experiences), the functioning of consciousness remains one of the most discussed and controversial topics in cognitive science (Chalmers, 2000).

From the legal perspective, questions about the state of mind of a perpetrator is one of the most important issues when assessing criminal responsibility. Advances in neuroscience can allegedly help us determine whether the defendant had specific knowledge at the time of the crime and whether they could control their behaviour; as such, it is clear that modern science provides us with increasingly accurate models of the nature of the human mental sphere. Criminal law, on the other hand, is often based on old psychological concepts and commonsense terminology. The idea of the naturalization of criminal law — which would aim at fully harmonizing law with the state of neuroscience — is very tempting, albeit it might cause considerable trouble. What is required is the bringing together of three different conceptual schemes: the scientific scheme, which aims to explain and predict phenomena in the natural world; the legal scheme, which aims to deliver justice; and the ordinary scheme, the role of which is to allow people to communicate with each other and to function in the society. The last one manifests itself through so-called "folk psychology": the universal ability to predict and explain the human behaviour, which often lacks scientific accuracy and has a limited predictive power (Stich & Nichols, 2003).

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Criminal law generally adopts the commonsense understanding of the mind (Sifferd, 2006). The important question is this: should we abandon the commonsense understanding of the mind in the light of new scientific theories? Or, do the specific functions of criminal law practically exclude the idea of filling it with neurobiological terminology? By analyzing the role of the commonsense concept of consciousness, we will try to show how advances in modern cognitive science can aid criminal law.

Before proceeding, we should point to how consciousness is perceived as the *mens rea* within the context of criminal law — or the Anglo-American concept of "guilty mind" — a theme which is also present in other modern civil law systems. Polish and American criminal law systems will be provided as examples for the analysis of the function played by folk-psychological elements of consciousness in legal settings. They will also be employed to provide a background against which the difficulties of incorporating elements of modern neuroscientific findings into criminal law system will be illustrated. Finally, we will present a few ideas pertaining to how these achievements can help in assessing criminal responsibility.

2. The concept of consciousness in criminal law

Consciousness, understood loosely in the terms of folk psychology, is a crucial element to assess whether a crime (which will be understood generally in this article as an act prohibited by criminal law, including misdemeanors) occurred, as well as its gravity. Intuitively, the legal concept of "crime" boils down to two elements: the general cognizance pertaining to a deed committed by a person, and the freedom of action to commit it (Shen et al., 2011). According to commonsense psychology, people act on the basis of their beliefs and desires, which is to say that their actions are targeted towards certain results (i.e. they have intentions). Given this model of human agency — in order to organize a community — specific social norms need to emerge in order to ascertain order and facilitate cooperation.[1] Therefore, we want to ascribe responsibility to people, the role of which is to create a necessary condition of punishment. By creating such a condition, we seek to ensure that our normative system is both just and efficient. Criminal law shaped in this way aims at pursuing specific goals. There is a variety of functions of criminal law. In the Polish criminal law doctrine, Włodzimierz Wróbel and Andrzej Zoll (2011) describe four main functions of criminal law: protective, equitable, guarantee and compensative.

Rules of criminal law protect certain legal values. In order to do so, a potential wrongdoer is discouraged from violating them by threat of punishment. This is based on an assumption that one makes a decision about one's own behaviour with its consequences in mind. The protective function of the law is realized by the deterrence, the role of which is twofold: general prevention ought to affect all potential criminals with theoretically inevitable sanctions, and individual prevention is directed at the person who has already committed a crime — it should cause fear of another punishment in the event of committing another crime. As we can see, the preventive role requires awareness of the consequences of an action from the members of a society.

The equitable function of criminal law (i.e. ensuring the social feeling of justice and fair retribution) also requires taking consciousness into consideration: the basic condition of justice would not be realized if a person without explicit knowledge of the meaning of their behaviour were treated the same way as a fully conscious perpetrator.

Also, the guarantee and compensative roles are based on the commonsense understanding of human behaviour. The guarantee function, setting the limits of penal interventions in terms of the principles of a democratic legal state[2] and human rights, puts the emphasis on the principle of definiteness of criminal statutes — or, that rules of criminal law should be understandable and precise. Once again, it assumes that the addressee of criminal law can acknowledge it and direct their behaviour according to the law. The compensative role, which brings out the importance of recompense, also underlines the element of repentance and forgiveness, both of which require awareness of the significance of action within the physical and social world.

Modern criminal law systems are based on the aforementioned two conditions of culpability, which seem universal and commonsense (Shen et al., 2011). *Mens rea* refers to "guilty mind", a state of mind covering the meaning of the act (for instance knowledge or intent). *Actus reus* ("guilty act") describes the act as free-willed (unlike, for example, automatic body movements, reflex actions or con-

[1] For an analysis of evolutionary genesis of legal norms see e.g. Załuski (2009).

[2] Or *Rechtsstaat* (in German).

vulsions). In Polish criminal law, the equivalent of *mens rea* is described as the subjective side of a crime — the inner, psychological element: the attitude of the wrongdoer toward her act. The voluntariness of an act is in fact an element of the objective side of a crime, because the freedom of physical action can be turned off only by physical duress (*vis absoluta*) and not by psychological duress (*vis compulsiva*). A person acting under psychological duress (for example, a direct threat) commits an act in the sense of criminal law, but can be exculpated on the other grounds (Wróbel & Zoll, 2011). It is noteworthy that the element of consciousness is not only crucial for the subjective side of crime, but also appears in the element of *actus reus* (Pardo & Patterson, 2015). Voluntariness presupposes the conscious control of one's actions. As noted by Michael Pardo and Dennis Patterson, the minimal conditions to classify an act as willed are twofold: the power to act, as well the power to refrain from acting (Pardo & Patterson, 2015). Even these simple conditions can create some philosophical problems (Frankfurt, 1969). As noted by these authors, advances in neuroscience can be helpful to determine that the wrongdoer lacked the minimal conscious capability to perform voluntary act. The voluntariness of an act may be problematic if we adopt a radical, deterministic view of the world (Aharoni et al., 2008); but, such a case presents potential solutions for saving the traditional concept of free will in criminal law exist. One is compatibilism, i.e. the claim that determinism and free will are not mutually exclusive. The other might be connected with creating specific normative standards (which would in fact be a case of pragmatic compatibilism: to fulfill the goals of criminal law policy, we would delineate a borderline for those cases in which we would hold some people responsible for their actions).

The problems referring to *mens rea* seem more tractable than the whole debate on free will, and the advances in neuroscientific accounts of consciousness are promising in this context. Yet, some questions arise: how can the progress of the cognitive sciences aid criminal law; and, should the cognitive sciences influence the shape of criminal codes or doctrinal views? In order to answer these questions, we need to examine the role of consciousness from the subjective side of a crime.

As remarked by Gideon Yaffe, the American Model Penal Code provides no definition of consciousness. Instead, it provides a list of examples for when a condition of being conscious is not satisfied: reflex actions, somnambulism, hypnosis, etc. (Yaffe, 2011). It provides four types of culpability: intent, knowledge, recklessness, and negligence (Model Penal Code §2.02). A person acts purposely when it is his or her goal (a conscious object) to cause a specific result or to pursue the nature of a mode of conduct, or they have in mind the attendant consequences (or hope that they exist). The condition of knowledge relates to specific material elements of a crime, which could be either a contemporary circumstance or a practically certain consequence — if one is aware of them, one acts knowingly. Recklessness refers to disregarding some substantial, unjustifiable risk linked to the existence of some material element of a crime (or the appearance of it as a result) in specific circumstances. Negligence has a purely normative character — some person in a specific situation should have known that this risk existed. To some extent, these conditions overlap — to act purposefully, one must know their purpose.

The Polish Penal Code uses similar elements when describing the mental sphere of a perpetrator. A slight but important difference is how the subjective side of a crime is not a form of culpability: guilt in Polish law is defined purely normatively (Lachowski, 2015) — it is the ultimate charge that a model, law-abiding person (a solid professional in a specific domain, cautious and respecting legally relevant values) would not have chosen to engage in a given form of conduct in that specific situation (Wróbel & Zoll, 2011). The Polish Penal Code divides acts into two groups: committed with intent (intentionality) or without it (unintentionality) (Polish Penal Code, Article 9). Intent is similarly bifurcated: intent is defined as having the will to commit an act, or as accepting the possibility of perpetrating an act when it was foreseeable. The first type of intent is described in the literature as direct intent (*dolus directus*), and the second is called an eventual intent (*dolus eventualis*).[3] It is noted that, when assessing the intent, we should analyze two aspects: the intellectual — the perpetrator's awareness of the fragment of the world encompassed by the structure of a crime — and the volitional — the person's psychical attitude toward an act. These two

[3] Many authors note that the word used to phrase the concept of *dolus eventualis* - "godzenie się" is somewhat vague, especially from the psychological viewpoint. It could be described as a kind of a passive approval towards the hypothetical possibility of committing the act. On the theoretical controversies about this concept see e.g. Dębski (2017).

aspects reflect the classic intuitions of the Humean theory of moral motivation: belief is not sufficient, instead requiring the presence of a separate state of mind to account for motivation (i.e. desire) (Smith, 1987). The abovementioned distinction between awareness and psychical attitude towards an act might be considered in terms of belief about the perceived reality and desire for some state regarding it. It is interesting to note that the Humean theory of motivation gives a simple way to account for the differences between those two mental states by postulating that their difference consists in the direction belief-aims to fit the world and desire-aims to change the world (Anscombe, 1963). Thus, it turns out that the principal structure of intent mirrors the traditional view of a philosophical theory of motivation.

The Polish Penal Code does not use the terms *niedbalstwo* (negligence) and *lekkomyślność* (recklessness),[4] as they are the terms used in tort law. Instead, it introduces two equivalents: a prohibited act can be committed without intent when a perpetrator does not have the intent to do so, yet does so as a result of not being careful enough in some manner required under the circumstances, though they could (conscious act without intent, the counterpart of recklessness) or should (unconscious act without intent, the counterpart of negligence) have foreseen the possibility of committing the prohibited act.[5] As we can see, both the Polish and American constructions of *mens rea* introduce some normative criteria (negligence or unconscious unintentionality) aside from factual evaluation of the mental state of the perpetrator. Having analyzed these constructions, we can conclude that the following factors relating to the perpetrator's mental sphere are legally relevant: first, beliefs about attendant circumstances and the significance of the act; second, beliefs about the results of actions; third, the goal that the act ought to achieve, and finally, the inner evaluation of the act by the perpetrator.

A more problematic issue concerns the overlapping and intermingling of these questions with the legal notion of insanity. Insanity, like the aforementioned constructions of *mens rea*, is a legal term that does not have its direct counterpart in psychology and medicine; yet, the expertise exhibited in these fields is essential to identify this state (Pardo & Patterson, 2015). Insanity describes a general lack of ability to control and understand the meaning of one's behaviour, typically due to some kind or set of psychiatric conditions. Because a person should not be held responsible for his or her actions if such actions were the result of a mental disturbance, this notion is used as an exculpatory condition. Given such a case, he or she should be the subject of the proper medical treatment, rather than some form of punishment.

As pointed out by M. Pardo and D. Patterson, despite the fact that the aforementioned terms relate to the evaluation of mental states, insanity and *mens rea* are different legal institutions, and one of them does not necessarily entail the other (Pardo & Patterson, 2015). Indeed, one can be classified as insane and still qualify under *mens rea* conditions: a mentally ill defendant may still possess a clarity of thought and action regarding a specific act (e.g. in a period of so-called *lucidum intervallum*, or a "lucid interval" in some disease).

The Polish Penal Code states that any prohibited act committed by a person who was not capable of controlling it or recognizing the significance of such an act shall not be qualified as an offence. This rule provides the following reasons for a lack of capability: mental disease, mental deficiency, or other mental disturbance (Polish Penal Code, Article 31). Additionally, this rule has both cognitive (recognizing the significance of an act) and volitional (controlling one's behaviour) elements/aspects, which makes it similar to the regulation of the American Model Penal Code. The other classic standard in common law, the M'Naghten test, emphasizes only the first aspect, i.e. the inability to identify one's behaviour as wrong (Pardo & Patterson, 2015).

Still, there are a number of problems when assessing insanity. Focusing on the actual mental state of a perpetrator during an act supposedly resulting from some psychological disturbance could be difficult from an evidentiary point of view, as well as being potentially too broad: such would exclude cases in which a perpetrator may be held responsible

[4] These concepts were present in the former criminal code of 1969, but were removed, as the construction of intent was reformulated. The main idea behind this change was that it is generally irrelevant for classifying the subjective side as "unintentionality", whether a person acted negligently or recklessly. See Giezek (1998).

[5] It is noteworthy, that the category of acts committed without intent is a quite complex construction, rather than being a simple lack of intent (understood in the legal sense). For example, it incorporates, inter alia, some elements of the objective side of the crime - "not being enough careful in the manner required under the circumstances". See e.g. Majewski (2012)

for the circumstances leading to this disturbance. On the other hand, focusing solely on some source of insanity (such as mental illnesses) allows for the justification of even those people whose mental state during the act were not influenced by some illness (Wróbel & Zoll, 2011). Both American and Polish models of insanity combine these elements. As remarked by M. Pardo and D. Patterson, two components of insanity tests need to be fulfilled: a source regarding those psychiatric causes impairing normal functioning, and the capacity which provides the lack of ability to recognize the meaning of an act for the perpetrator (Pardo & Patterson, 2015).

The concepts of *mens rea* and insanity are specific, autonomous legal constructions, filled with obsolete notions taken from nineteenth century psychology, but with no direct reference to contemporary research in psychology, psychiatry, or neuroscience (Denno, 2016). This can lead to several important practical problems. As Deborah Denno points out, the main sin of legal doctrine regarding conscious behaviour is the attachment to binary classifications: voluntary versus involuntary and conscious versus unconscious (Denno, 2016). These dichotomies, unsupported in the light of current research, may cause significant inconsistencies in judicial classifications (Denno, 2003). This could bring about grave consequences, ranging from acquittal to institutionalization in cases of selected mental problems (Denno, 2003). It is true that consciousness is a complex phenomenon, and there are many borderline cases in which it is hard to assess whether the conditions such as knowledge or intent are met. For instance, switching lanes in traffic is often done without reflection, being an instance of semi-automatism; yet, it is definitely a voluntary act in the sense of criminal law (Pardo & Patterson, 2015). This simple example is particularly useful because it can also show individual differences. A professional driver going on a daily routine probably would not even be aware of it, hardly remembering changing the lane; in contrast, a young and inexperienced driver may need to put considerable more conscious psychical effort into such maneuvering. Considering this, Denno proposes two ways in which neuroscientific research should reform law.

Firstly, acknowledging the multi-faceted and gradual (rather than dichotomous) nature of consciousness points toward the introduction of a third category: acts that are semi-voluntary (or semi-conscious) (Denno, 2003). Such a three-tiered approach is a step forward, but it still faces the problem of borderline cases. Rather than substituting two categories with three, the law should acknowledge that consciousness is a matter of degree. Such a rule is present in the Polish Penal Code regulation concerning insanity: if the perpetrator's capability to either recognize the significance of an act or to control an act is deemed diminished to a significant extent, the court may apply extraordinary mitigation of the punishment (Polish Penal Code, Article 31 §2). The second point made by Denno, answering the question of how neuroscience could help criminal law, is to create a scientific theory of mental states (Denno, 2016). Still, while updating the scientific (i.e. psychological models) of behaviour embedded in legal settings with the newest theories of consciousness may seem a good idea, it encounters a lot of difficulties.

3. Can modern research on consciousness be helpful?

As we can see, some traditional psychological accounts which were the scientific background of legal texts are definitely outdated. In this case, modernizing the shape of criminal law to update its scientific basis may seem like a necessary venture. However, adapting modern neuroscientific research directly may pose a number of problems. Indeed, David Chalmers divided problems relating to the nature of consciousness into two groups, easy and hard (Chalmers, 1995). Easy problems include questions such as: how can we discriminate or categorize environmental stimuli?; what is the nature of attention or control of one's behaviour?; what are the differences between different states of consciousness, e.g. sleep and being awake? The hard problem is the quest for explanation of the phenomenal side of consciousness — the subjective side of an experience (so-called *qualia*). Another interesting distinction in the field of consciousness was made by Ned Block: the phenomenal aspect (*p-consciousness*), describing *qualia*, and the access aspect (*a-consciousness*), referring to the mental function of processing and using pieces of information (Block, 1995).

Fortunately, all the interesting issues from the legal viewpoint fall into the category of easy problems, mostly related to the "access" aspect of consciousness. From the criminal law perspective we just need to know and explain how the function of processing the information about the material elements of a crime works, and in what way it can steer one's behaviour. This is by no means a simple scien-

tific challenge. Easy problems focus on specific mental functions — we have some data and local psychological or neuroscientific theories on them, yet they are mostly far from being solved. Rather than focusing on creating some grand theory on consciousness, criminal law would benefit more from acknowledging up-to-date research on selected "easy problems." The complexity of the topic of consciousness makes it very hard to create one, unified research paradigm — there are a lot of philosophical, psychological, and neuroscientific theories that try to explain consciousness from different perspectives; but, they remain to a large extent incommensurable (Van Gulick, 2017). The state of the art in this discipline could be described as remaining at the pre-paradigmatic stage, to use Thomas Kuhn's terms (Kuhn, 2012).

For example, let us take one of the most promising neurobiological theories on consciousness: Giulio Tononi's integrated information theory (Tononi, 2008). This theory aims to somehow quantify the level of consciousness that would seem ideal for legal purposes by creating normative standards for the minimum level needed to fulfill the criteria for voluntary, semi-voluntary, and non-voluntary acts. Yet, the mathematical goal of the theory seems too abstract for legal purposes — the factor of integrated information tells us almost nothing regarding whether the perpetrator has known certain facts, or even how, which is crucial in the context of criminal law.

Modern neuroscientific proposals of a general theory on consciousness are still in their infancy, with other notable examples including Francis Crick and Christof Koch's framework based on the analysis of interactions between coalitions of neurons (Crick & Koch, 2003), as well as "consciousness as a workspace" theories, e.g. Bernard Baars' Global Workspace Theory (2005), as well as Stanislas Dehaene and Lionel Naccache's framework (2001). However, one might argue that the proper way to understand the problem of consciousness in criminal law is by employing the Higher Order Theories of consciousness. Those theories argue that conscious awareness is a phenomenon that can be explained by using a two-level framework. In essence, conscious mental states are representational states of which subjects are aware (Carruthers, 2007). The criminal law framework mirrors the two level structure of those theories. A detailed interpretation of this issue is beyond the scope of this paper; still, it might be an interesting direction for the future research.

Despite theoretical problems with choosing the best theory of consciousness, the search for the neural correlates of consciousness can still be very helpful for legal purposes on the other grounds. The main role would be to aid the psychiatric and psychological expertise. Most of the helpful research has a neuropsychological character — showing various deficiencies in the perpetrator nervous system. Such evidence may be useful in proving that, at the time of the act, a person was unable to be in a particular mental state, which would be a requisite for holding them responsible for the act (Pardo & Patterson, 2015). Of course, the neural abnormalities need to have enduring characters (for example lesions or brain tumors) in order to do so since the evidence is always presented *ex post*. Determining the mental state at the moment of the crime without disproving the general capacity is, of course, far more problematic (Pardo & Patterson, 2015).

There is also one more line of research that could contribute to evidentiary measures. The field of neuroscience-based lie detection tries to apply technologies of brain scanning (mainly fMRI and EEG) to polygraph testing. For example, so-called *Brain Fingerprinting* is based on an assumption that a specific type of electrical activity in the brain, the P300 wave, which is a sign that a selected stimuli is familiar to the person being tested, could be used as a Guilty Knowledge Test (Farwell, 2012). These new methods are still very controversial and inherit most of the disadvantages related to traditional polygraph testing (Rosenfeld, 2005).

The use of typical "neuroscientific evidence" like brain scans has met with some skeptical voices. One of the threats was called the "christmas tree phenomenon" — the concern that colorful brain images could make a much more powerful impression on judges, and especially juries, than they should due to the shortcomings of brain monitoring techniques. Of course, brain scans can only be used in an auxiliary role in psychiatric or neuropsychological expertise. However, this concern was misplaced, as jurors are far more critical in assessing brain scans that it seemed (Denno, 2016). In a recent empirical study it was shown that the: "mere display of a neuroimage did not increase jurors' willingness to find a defendant not guilty by reason of insanity." (Schweitzer & Saks, 2011) This might suggest the conclusion that, despite the fact of how the importance of neuroimaging evidence in forensic expertise grows, jurors still rely mainly on traditional evidence. This might be due to the fact of the overall

unfamiliarity with the neuroscientific research specificity, or even general skepticism about the field (Schweitzer & Saks, 2011).

4. Conclusions

Consciousness plays an imminent role in the assessment of criminal responsibility. Yet, the subjective side of a crime is often based on folk psychology and outdated psychological views in modern legal systems. The newest research in cognitive science may prove to be helpful in harmonizing the understanding of the legal concepts of *mens rea*, as well as insanity and *actus reus*. One of the most important facts is that consciousness is not a binary state — it has a gradual and complex character. Nonetheless, the full naturalization of these legal concepts is pointless. Firstly, with regard to the consciousness research, it is too early to point out a single, unified paradigm that could be adapted as a functional model by the law. Secondly, one might argue that the law needs to use vernacular language, rather than sophisticated scientific terminology, because it has to be understandable. Judges and jurors lack specific knowledge in this field and it is not their task to explain the mental states of the defendant. Moreover, in order to ensure the guaranteed function, criminal law should be especially clear to the addressees of its rules: laypeople, who function in the social order following their folk psychological model of human behaviour. As shown by empirical studies (Shen, 2011), laypeople perform quite well in understanding the current legal intricacies of *mens rea*.

This does not mean that we should not educate judges and jurors. Quite the contrary: the newest achievements in the mind sciences can help in explaining human behaviour, which is crucial in determining criminal responsibility. What is more, judges and jurors need to critically assess opinions presented by expert witnesses — psychiatrists, psychologists, neurologists, etc. The role of expert witnesses cannot be overestimated, especially in hard, borderline cases. Their opinions should nonetheless be reviewed by other specialists, as well as judges, because psychiatric expertise is hardly unanimous (Gowensmith et al., 2013), and the low quality of expertise may have grave consequences (Denno, 2016).

References

Aharoni E, Funk C, Sinnott-Armstrong W, Gazzaniga M (2008) Can neurological evidence help courts assess criminal responsibility? Lessons from law and neuroscience. *Annals of the New York Academy of Sciences*, 1124(1): 145–160.

Anscombe G E M (1957) *Intention*. Harvard University Press.

Baars B J (2005) Global workspace theory of consciousness: Toward a cognitive neuroscience of human experience. *Progress in Brain Research*, 150: 45–53.

Block N (1995) On a confusion about a function of consciousness. *Behavioral and Brain Sciences*, 18(2): 227–247.

Carruthers P (2007) Higher-order theories of consciousness. *The Blackwell companion to consciousness*, 277–286.

Chalmers D J (2000) What is a neural correlate of consciousness? *Neural correlates of consciousness: Empirical and conceptual questions*, 17–40.

Chalmers D J (1995) Facing up to the problem of consciousness. *Journal of Consciousness Studies*, 2(3): 200–219.

Crick F, Koch C (2003) A framework for consciousness. *Nature Neuroscience*, 6(2): 119.

Dehaene S, Naccache L (2001) Towards a cognitive neuroscience of consciousness: Basic evidence and a workspace framework. *Cognition*, 79 (1–2): 1–37.

Denno D W (2002) Crime and consciousness: Science and involuntary acts. *Minnesota Law Review*, 87: 269.

Denno D W (2003) A mind to blame: New views on involuntary acts. *Behavioral Sciences & the Law*, 21(5): 601–618.

Denno D W (2016) The place for neuroscience in criminal law. In *Philosophical foundations of law and neuroscience*, eds D Patterson, M S Pardo, 69–83. New York, NY: Oxford University Press.

Dębski R (2017) Przestępstwo i jego struktura [The crime and its structure]. In . *Zasady odpowiedzialności. System Prawa Karnego. Tom 3*., *Nauka o przestępstwie*, ed. R Dębski, 1–496. Warszawa, PL: C. H. Beck.

Farwell L A (2012) Brain fingerprinting: a comprehensive tutorial review of detection of concealed information with event-related brain potentials. *Cognitive Neurodynamics*, 6(2): 115–154.

Frankfurt H G (2013) Alternate possibilities and moral responsibility. *The philosophy of free will:*

Essential readings from the contemporary debates, 139–148.

Gowensmith W N, Murrie D C, Boccaccini M T (2013) How reliable are forensic evaluations of legal sanity? *Law and Human Behavior*, 37(2): 98.

Giezek J (1998) Kilka uwag o ujęciu nieumyślności w nowym kodeksie karnym. [A few remarks on the conceptualization of unintentionality in the new penal code]. In *Nowa Kodyfikacja Prawa Karnego. Tom II*, ed. L Bogunia, 9–20. Wrocław, PL: Wydawnictwo Uniwersytetu Wrocławskiego.

Kuhn T S (2012) *The structure of scientific revolutions*. Chicago, IL: University of Chicago Press.

Lachowski J (2016) Negligence in Polish and English Criminal Law. *Comparative Law Review*, 20: 87–102.

Majewski J (2012) Nieumyślność a brak umyślności. [Unintentionality and the lack of intent] In *Nieumyślność: Pokłosie VIII Bielańskiego Kolokwium Karnistycznego*, ed. J Majewski, 35–47. Toruń, PL: Dom Organizatora.

Model Penal Code and Commentaries (1985) Philadelphia, PA: The American Law Institute.

Mueller P A, Solan L M, Darley J M (2012) When does knowledge become intent? Perceiving the minds of wrongdoers. *Journal of Empirical Legal Studies*, 9(4): 859–892.

Pardo M S, Patterson D (2015) *Minds, brains, and law: The conceptual foundations of law and neuroscience*. New York, NY: Oxford University Press.

Penal Code of the Republic of Poland [Ustawa z dnia 6 czerwca 1997 r. Kodeks karny]. Dz.U.2016.1137.

Rosenfeld J P (2005) Brain fingerprinting: A critical analysis. *The Scientific Review of Mental Health Practice*, 4(1): 20–37.

Schweitzer N J, Saks M J (2011) Neuroimage evidence and the insanity defense. *Behavioral Sciences & the Law*, 29(4): 592–607.

Shen F X, Hoffman M B, Jones O D, Greene J D (2011) Sorting guilty minds. *New York University Law Review*, 86: 1306.

Sifferd K L (2006) In defense of the use of commonsense psychology in the criminal law. *Law and Philosophy*, 25(6): 571–612.

Smith M (1987) The Humean theory of motivation. *Mind*, 96(381): 36–61.

Stich S, Nichols S (2003) Folk psychology. In *The Blackwell guide to philosophy of mind*, eds S Stich, T A Warfield, 235–255. Oxford, UK: Basil Blackwell.

Tononi G (2008) Consciousness as integrated information: a provisional manifesto. *The Biological Bulletin*, 215(3): 216–242.

Van Gulick R (Summer 2017) Consciousness. In E. N. Zalta (Ed.), *The Stanford encyclopedia of philosophy*. Retrieved from https://plato.stanford.edu/archives/sum2017/entries/consciousness/.

Wróbel W, Zoll A (2011) Polskie prawo karne. Część ogólna, [Polish Criminal Law. General Part]. Kraków, PL: Znak.

Yaffe G (2010) Libet and the criminal law's voluntary act requirement. *Conscious will and responsibility: A tribute to Benjamin Libet*, 189.

Zaluski W (2009) *Evolutionary theory and legal philosophy*. Northampton, MA: Edward Elgar Publishing Inc.