

STUDI

Responsibility Between Neuroscience and Criminal Law. The Control Component of Criminal Liability

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Abstract The paper discusses the contribution that the neuroscience of action can offer to the legal understanding of action control and responsibility in the case of adult individuals. In particular, we address the issues that follow. What are the cognitive capacities that agents must display in order to be held liable to punishment in criminal law? Is the legal model of liability to punishment compatible with a scientifically informed understanding of voluntary behaviour? To what extent should the law take into account people's subjective feelings about their own actions? As a result of our analyses, we indicate some areas where the contribution of the neuroscience of action to the law is potentially relevant. We focus on the subjectivity mechanisms of action control, specifically the requirement that the agent must violate the law voluntarily in order to be held responsible, and on the factors that modulate the wrongdoer's experience of agency. Overall, we advocate more cross-disciplinary work, aimed to bridge the gap between conceptual boundaries, on the theme of responsibility for actions.

KEYWORDS: Responsibility; Neurolaw; Sense of Agency; Criminal Law; Criminal Liability

Riassunto *La responsabilità tra neuroscienza e diritto penale. La componente di controllo dell'imputabilità penale* – L'articolo discute il contributo che la neuroscienza dell'azione può offrire ai temi del controllo dell'azione e della responsabilità in ambito legale, nel caso degli individui adulti. In particolare, ci occuperemo delle questioni che seguono. Quali sono le abilità cognitive che un agente deve possedere per essere considerato penalmente responsabile e quindi punibile? Il modello legalistico della responsabilità è compatibile con il modello scientifico-naturalistico del comportamento umano? Fino a che punto variazioni nel senso di controllo soggettivo sulle azioni dovrebbero essere considerate un parametro rilevante in sede penale? Sulla scorta della nostra analisi, indicheremo alcune aree nelle quali il contributo della neuroscienza dell'azione a questioni legate al tema della responsabilità legale potrebbe rivelarsi rilevante. L'articolo si concentra sui meccanismi che regolano il senso soggettivo di controllo dell'azione – in particolare il requisito secondo il quale l'agente deve violare la legge volontariamente per essere ritenuto responsabile –, e sui fattori che modulano il senso di agentività del colpevole. In conclusione, difenderemo l'appropriatezza di una più ampia riflessione multi-disciplinare volta a ridurre le incompatibilità fra differenti approcci al tema della responsabilità per le nostre azioni.

PAROLE CHIAVE: Responsabilità; Neurodiritto; Senso di agentività; Diritto penale; Imputabilità penale

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INDIVIDUAL RESPONSIBILITY FOR ACTIONS IS a central component in individual self-assessment and interpersonal relations. It is also a key notion in the law, representing a precondition for liability to punishment in criminal law. However, its psychological prerequisites remain partially underexplored. The goal of the present paper is twofold. First, it aims to elucidate the minimal psychological abilities that an adult individual must display in order to be considered liable to punishment. Second, it investigates the plausibility of such criteria with respect to an empirically informed picture of voluntary agency.

Based on our analyses, we provide some suggestions about possible contributions that neuroscience can offer to the law. Whereas the scope of our paper is mostly theoretical, to support our view we will use some examples drawn from English criminal law.

In order to effectively target individual behaviour and promote social cohesion, the law must incorporate – implicitly at least – a model of intentional, goal-oriented agency, whose nature has increasingly become an object of interest for psychology and neuroscience. Looking for a unified model of human psychology, which is both empirically tractable and suitable for the law, is therefore crucial. However, it is a common view among neuroscientists and legal scholars that neuroscience and the law must remain two separate enterprises.¹ A separation in scope and methodology between the two disciplines is indeed worth preserving. While science has a descriptive duty and is concerned with “what there is”, the law has an essentially normative goal and deals with what “ought to be”. In this light, Stephen Morse has plausibly suggested that neuroscience can describe what conditions “count” as impairments to human cognition and reasoning, but does not have the power to tell the law what impairments to human’s cognition and reasoning “should count” as excuses from punishment.²

In the emerging field of “neurolaw”,³ at least two different approaches have emerged. From a theoretical, forward-looking point of

view, the discussion has focussed on the potential transformative role of neuroscience and cognitive psychology. These disciplines are seen as potentially revolutionising our understanding of the bases of voluntary agency, directly affecting the legal notions of “criminal culpability” and “liability to punishment”. For example, Green and Cohen have suggested that neuroscience will transform the law by highlighting that the inflated libertarian conception of metaphysical free will, which seemingly inhabits the law, is not compatible with a scientifically informed picture of human agency.⁴

By contrast, Morse has claimed that the law incorporates a concept of personhood that has nothing to do with metaphysical free will and is fundamental to our understanding of people as humans, i.e., humans are practical deliberators who are able to act intentionally. This view is so strongly ingrained in human normative practices that cannot be easily put in jeopardy by neuroscientific advances. According to Morse, unless the neuroscience of decision-making is able to demonstrate that no one can resist one’s impulses and cravings, it would be implausible to assume it can really transform our legal concept of responsibility.⁵

From an empirical point of view, the core question is what contribution psychological and brain sciences can currently offer in court. Neuroscientific evidence could be used to inform decisions about the degree to which an individual agent is responsible for a specific action. In several cases, the law is already sufficiently sensitive to the advances in the scientific study of the mind and the brain. In particular, the contribution of neuroscience and psychology in specific cases of deviation from the standard is already accepted in some jurisdictions.⁶ In individual cases, the presence of specific psychopathologies may be invoked in order to exempt some people from criminal liability or reduce individual responsibility. For example, clarifying whether the defendant’s action (when the person kills or is a party to the killing of another) is

attributable to a recognised medical condition may allow the defendant to plead a defence of diminished responsibility.⁷ In this respect, the main point at stake concerns the admissibility of neuroscientific techniques for establishing a causal connection, and not just a correlation, between a physical brain state and a specific outcome, explaining how given mental states are traceable to brain abnormalities.⁸

In the present work, we adopt a meta-approach in order to address the following issues. What are the cognitive capacities that healthy agents must display in order to be held liable to punishment in criminal law? Is the legal model of liability to punishment compatible with a scientifically informed understanding of voluntary behaviour? To what extent should the law take into account people's subjective feelings about their own actions? Clearly, neuroscience is unlikely to provide evidence that no one can ever resist one's impulses and cravings or fulfil the criteria for minimal rationality. Actually, it remains unclear why the contribution of neuroscience to the law should go in this direction at all, i.e., by showing that individuals entirely and always lack self-control. By contrast, we already know from neuroscience that self-control, as the capacity to inhibit actions,⁹ is precisely one of the key features of human cognition,¹⁰ which can be impaired in case of damages to the frontal lobe.¹¹ Furthermore, neuroscience can explain the mechanisms underlying purposive behaviour, i.e., in terms of the ability to act in view of a goal and on the basis of rewards and punishments,¹² rather than showing that people are unable to act on the basis of reasons.

Morse acknowledges that neuroscience may rather play a role in adjudicating cases of excuses and mitigation, by further understanding of the conditions that prevent people from exercising rationality and self-control. However, he seemingly dismisses this point as ultimately not so relevant for the law. We take a different perspective, by emphasising the importance of this challenge.

Despite sharing Morse's doubts about the overall transformative role of neuroscience for the law, we suggest that neuroscience can both play a role in refining the criteria for minimal rationality and action control and specify what good candidates for excuses and mitigation should look like. In arguing for this, we mainly focus on the element of action control (among other cognitive abilities that the defendant must display to be liable to punishment), which is central to the neuroscience of volition and action.

Should discrepancies between neuroscience and the law be individuated, this should trigger a proper discussion about how to integrate the two approaches. Examples in this direction are already offered by discussion in cognate research fields. For example, the empirical study of memory has uncovered problematic phenomena, including false and imagined memories or reconsolidation, thus showing that people's memory (e.g., of a witness in a crime) is not as reliable as it was thought to be in the past. Recognising that the human capacity to remember past events is partially undermined by cognitive biases has appropriately triggered a discussion on the usage of memory in the courtroom.¹³

The paper is organised as follows. First, we discuss how moral responsibility relates to criminal liability for action in order to single out the notion of "responsibility" that is relevant in the courtroom. Second, we introduce the theme of what counts as an excuse. The topic of excuses represents a useful conceptual tool for shedding light on the psychological prerequisites for criminal responsibility. Building on this, we distinguish between a control-component and a cognitive-component of responsibility for actions, in order to assess whether these criteria could match reliable evidence in psychology and neuroscience about how voluntary agency unfolds. In discussing the contribution that the neuroscience of volition and action can offer to the law, we focus on the subjective feeling of agency naturally accompanying the performance of voluntary bodily movements. Some final remarks are

outlined in the last section. Whereas the theoretical scope of the paper is not limited to a single jurisdiction, we mostly focus on examples taken from the English criminal law.

■ Moral responsibility and criminal liability

This section of the paper discusses the notion of “responsibility” that is central to criminal liability for law violation. In modern democracies, criminal sanctions are usually thought to derive from the violation of some shared code whose respect is imposed by the law. Such a code seemingly derives from the combination of moral or conventional “oughts” and biological needs.

The kind of responsibility that is targeted by criminal sanctions is essentially “retrospective personal responsibility for a wrongful action” (e.g., “Oswald is responsible for killing Kennedy”), as distinct from prospective responsibility, which may come in the form of general obligations (e.g., “Ted is responsible for his child’s health and education”) or specific duties (e.g., “Melanie is responsible for feeding the lovebirds within the next few days”). The emphasis on *retrospection* means that the action in question, i.e., the violation of the code, has already occurred, namely that the physical facts regarding individual agency are not in doubt.

In evaluating the agent’s responsibility, criminal law takes into account the connection existing between the agent’s wrongful purpose and the actual harm. Once the agent’s involvement in a wrongful action is acknowledged, different degrees of connection between the agent’s intent and the outcome (i.e., different kinds of “*mens rea*”) determine alternative classes of crimes. This view of the connection between the agent’s mental state and the action largely relies on classic belief-desire psychology: conscious mental states, i.e., intentions, cause the corresponding outcomes.¹⁴ In the absence of exempting or justifying conditions, the agent is to be held as fully responsible for her own behaviour because she acted as she intended to act.¹⁵

“*Mens rea*” is a legal term, with a moral flavour. It has been suggested that criminal liability supervenes on moral responsibility,¹⁶ without the two concepts necessarily coinciding. For an act to be criminally culpable, it must also be explicitly made criminal by the statute or common law: despite being morally despicable, many actions (e.g., breaking an informal promise) are not illegal. Furthermore, the pre-conditions for moral responsibility and legal accountability may differ. Philosophers working on moral responsibility often suggest that moral responsibility depends on the agent displaying some sort of free will, which might be compatible or not with metaphysical determinism.¹⁷

We suggest that the problem of free will is potentially more relevant when it comes to defining the role and the justification of punishment, i.e., whether these concepts must be framed in retributivist or consequentialist terms, which is the actual main target of Greene and Cohen’s 2004 paper. In this respect, the question about free will, i.e., of whether people are biologically determined or not in making their choices and act upon them, is seemingly more important. No single justification of punishment is offered in criminal law, which is usually a mixture of retributivist (i.e., the wrongdoer deserves to be punished for violating the law) and consequentialist (i.e., punishment sub-serves utilitarian scopes) intuitions. According to Greene and Cohen, neurobiological determinism is incompatible with a retributivist view of punishment, which must therefore be abandoned in favour of a consequentialist or forward-looking (prospective) view.¹⁸

In our view, the issue about the role and justification of punishment must be kept conceptually separate from the question about the pre-conditions for responsibility. Thus, since the law tends not to see the question of free will as a pre-condition for legal responsibility, in this context we also consider this issue of free will as orthogonal to our discourse. By contrast, we suggest that responsibility is a social concept that depends

upon intersubjectively shared norms of cooperation: the concept would lose any grip if the agent were not part of a social community, or if she did not have the capacity to mentalise (i.e., to understand other people's states of mind) and to see others as intentional agents (i.e., as capable of acting upon their mental states). Its pre-conditions, including self-control and self-awareness, are psychological rather than metaphysical.¹⁹

■ Justifications and excuses

What elements contribute to justify or exempt from punishment someone who commits a wrongdoing? Personal responsibility is usually assumed to be a primitive or default condition by the law. In the absence of exempting or mitigating factors, a wrongdoer is treated as fully responsible for her own behaviour. Personal responsibility for action is justified by drawing on some version of the idea that each individual, at least in principle, is to be regarded as able to behave autonomously and control her own actions.²⁰ This is generally invoked as a principle of fairness regulating interpersonal relationships. Treating the wrongdoer as someone who is unable to control her behaviour might seem to be detrimental to her individual autonomy and "dignity".

In a seminal paper, Hart treats responsibility in terms of "defeasibility": a person is responsible for something unless such responsibility attribution can be defeated by the presence of a justification or an excuse.²¹ The distinction between justifications and excuses is a mainstay in the philosophy of criminal law and in the classification of defences established by the English common law.²² Justifications work as follows: when an offence actually takes place, the defendant can be exculpated by proving that her conduct was not legally wrong due to the particular circumstances in which the action was performed. By contrast, when excuses can be invoked, the action remains legally wrong, but the defendant is not to be pun-

ished – or, at least, the punishment should be mitigated. The distinction has undergone a number of criticisms.²³ However, admitting the possibility of justifications and excuses allows the defendant to be treated according to the specific circumstances of the action and the agent's peculiar cognitive abilities and mental states.²⁴

With justifications (e.g., cases of self-defence), responsibility is preserved. With excuses, it is nullified or diminished. For this reason, excuses are particularly relevant for the analysis of the psychological pre-conditions of responsibility in criminal law. Excuses are effective if they can appropriately question the presence of at least one of the necessary elements for criminal liability, i.e., "*actus reus*" and "*mens rea*". But what counts as an excuse? When the agent performs a wrongful action, she could be (partially) exempted from criminal liability if the presence of given psychological conditions is acknowledged.

In "case" law, no unified and complete list of excusing psychological conditions is available. Potentially, individual cases could always establish new precedents. Moreover, since the success of a plea is subjected to the judge's or jury's verdict, the possible presence of an excuse is to be considered as a sufficient condition for acquittal, but not as an element that will necessarily lead to a discharge. In English common law, the need to guarantee that people displaying given psychological conditions can appeal to excuses of some sort is regulated by the automatism/insanity defence (full defence), and the diminished responsibility and loss of control defence (partial defence).²⁵

Methodologically speaking, considering cases of full and partial defences (i.e., what is missing for full-fledged responsibility) may offer some insights on the pre-conditions for responsibility in regular cases. The focus is not on pleas "per se": we will consider them as valuable tools for shedding light on the elements characterising cases of responsibility for actions.

■ *Insanity and automatism*

In English common law, insanity and automatism are two different kinds of (mutually incompatible) defences that may nullify criminal responsibility for a crime. Exempting completely from criminal liability, insanity and automatism are both considered forms of full defence.

■ *Insanity*

The verdict of «not guilty by reason of insanity» is a full defence to a crime that may apply to three different situations, i.e., insanity before the trial, unfitness to plead, and insanity at the time of the offence.²⁶

Given that the focus is on the psychological elements of responsibility for actions, insanity at the time of the offence appears particularly relevant. In the English common law, it is regulated by the application of the M'Naghten rules (1843), which aimed to set up a test for establishing a specific defect of reason that makes the defendant not guilty by reason of insanity. As stated by the House of Lords in 1843: «To establish a defence on the ground of insanity, it must be clearly proved that, at the time of the committing of the act, the party accused was labouring under such a defect of reason, from disease of the mind, as not to know the nature and quality of the act he was doing; or, if he did know it, that he did not know he was doing what was wrong».²⁷

Recently the Law Commission has proposed to replace the defence of insanity with the lack of capacity defence, leading to a verdict of «not criminally responsible by reason of a recognised medical condition», which must be professionally recognised.²⁸

The grounding idea of the proposal is that the defendant can be recognised «not criminally responsible by reason of a recognised medical condition» if, at the time of the offence, she could not have done otherwise. In this context, the impossibility of doing otherwise is verified if the defendant lacks one

or several of the cognitive capacities that follow: (1) the capacity to rationally form a judgment about the relevant conduct or circumstances; (2) the capacity to understand the wrongfulness of what she is charged with having done; (3) the capacity to control her physical acts in relation to the relevant conduct or circumstances. The recent introduction of a reference to a medical condition goes in the direction of assessing insanity on a potentially more objective ground, which might subtract weight and explanatory power from individual subjective reports. The aim is to move towards a more empirically driven understanding of the conditions for insanity whereby the focus remains nonetheless on the cognitive aspect of the incapacitation.

To be unable to do otherwise in this sense, the defendant must suffer from a condition of permanent or temporary cognitive impairment, which is thought to make her unable to distinguish right from wrong, or to understand the nature and quality of her own actions. The cognitive faculties that are usually associated with these capacities are those of reason, memory and understanding.²⁹ The term «insanity» per se is a (stigmatising and out-dated) legal and not a medical, term: insanity defines cognitive deficiency rather than irrationality.³⁰ To count for the insanity defence, a «defect of reason» must be caused by an internal source, identifiable as a disease of the mind (including arteriosclerosis,³¹ epilepsy,³² sleepwalking,³³ hyperglycaemia arising from diabetes³⁴).

The vagueness of the criteria for cognitive insanity and the thin distinction between internal and external causes of the disease have been extensively criticised in the literature.³⁵ In particular, the definition of «insanity» could prove to be too narrow to capture borderline cases, including cases in which people happily did the wrong thing knowing that it was wrong. The interpretation of the concept of «wrong» itself eludes straightforward explanations. On the one hand, the emphasis on rationality as a capacity is meant to avoid confusions between cognitive impairment

(i.e., being unable to understand that something is legally wrong) and ignorance of the contents of the law (e.g., not knowing that doing something is prohibited by the law).

The latter does not amount to an acquittal (*ignorantia juris non excusat*): if the defendant is ignorant about the content of a norm but not cognitively impaired, she is liable to punishment. It is worth noting that a relevant cognitive impairment is also different from ignorance of what one is doing, which may potentially exculpate from liability. For example, if the defendant did not know that the drink she was serving to the victim was poisonous, she is likely to be exculpated from liability.³⁶

On the other hand, the M'Naghten rules specify that the defendant can plead the defence of insanity if she did not understand that what she was doing was wrong. However, if ignorance of the specific content of the law is not relevant for pleading the defence of insanity, it seems that what the test is actually establishing is whether the defendant was unable to understand what was morally, and not just legally, wrong – as some of the relevant cases explicitly state.³⁷ If this were the case, the requirements for criminal liability could map more precisely onto typical conditions for responsibility in moral psychology, including responsiveness to reasons or the ability to distinguish right from wrong.³⁸

The law seemingly assumes that, beyond the knowledge of specific norms, individuals have reached a certain level of moral understanding. In this sense, the defendant must be at least able to procedurally follow the norms that are prescribed by the law. This means that she should be able to understand what the law requires and to modify her behaviour accordingly. To do this, the defendant must possess some basic requirements of rationality allowing her to convert general rules into everyday practices.

■ Automatism

Non-insane automatism is a different form

of complete defence, which could be pleaded in cases where the action is produced by an external source or a reflex action, including sneezing, hypoglycaemia, and post-traumatic stress disorder.³⁹

A successful plea of automatism requires that the defendant, at the time of the offence, lacked control over her body (“lack of consciousness” or “volitional control”). The purpose of this type of defence is to deny that the unlawful action was performed under the defendant’s voluntary control so that even strict liability is absent. Pleas of automatism are limited to specific situations, which do not include cases of prior fault, intoxication, duress, and insanity.⁴⁰

The idea is that, in cases of automatism, what is absent is the mind’s control over the physical body.⁴¹

■ Diminished responsibility

Reforming section 2 of the Homicide Act 1957 (c. 11), Section 52 of the Coroners and Justice Act 2009 (England and Wales) states that, when supported by medical evidence,⁴² an abnormality in the defendant’s mental functioning could be the basis of a plea of diminished responsibility.⁴³ The grounding idea is that an abnormality of mental functioning causes (or is a significant contributory factor in causing) the wrongdoing, for example by impairing the defendant’s «ability to form a rational judgment and to exercise self-control at the relevant time».⁴⁴

Differently from the defences of insanity and automatism, the plea of diminished responsibility is a partial defence, which applies only to murder. The importance of the defence is that, when successfully pleaded, the trial judge will have discretion in the sentence to be imposed. The practical result would be that the offence can be classified as manslaughter rather than as murder. Analogously to automatism, the defence does not apply in cases of voluntary acute intoxication.⁴⁵ According to the diminished responsibility defence:

- (1) A person (“D”) who kills or is a party to the killing of another is not to be convicted of murder if D was suffering from an abnormality of mental functioning which – (a) arose from a recognised medical condition; (b) substantially impaired D’s ability to do one or more of the things mentioned in subsection (1A); and (c) provides an explanation for D’s acts and omissions in doing or being a party to the killing.
- (1A) Those things are – (a) to understand the nature of D’s conduct; (b) to form a rational judgment; (c) to exercise self-control.
- (1B) For the purposes of subsection (1)(c), an abnormality of mental functioning provides an explanation for D’s conduct if it causes, or is a significant contributory factor in causing, D to carry out that conduct.⁴⁶

■ *Loss of control*

Sections 54-55 of the Coroners and Justice Act 2009 (England and Wales) introduced an entirely new loss of control defence, which replaced the former provocation defence.

- (1) Where a person (“D”) kills or is a party to the killing of another (“V”), D is not to be convicted of murder if – (a) D’s acts and omissions in doing or being a party to the killing resulted from D’s loss of self-control; (b) the loss of self-control had a qualifying trigger;⁴⁷ and (c) a person of D’s sex and age, with a normal degree of tolerance and self-restraint and in the circumstances of D, might have reacted in the same or in a similar way to D.

Differently from what stated in the Homicide Act about provocation,⁴⁸ in the case of the loss of control defence it is not required that control is suddenly lost. At the same time the killing cannot be the result of the defendant’s desire for revenge. Where the de-

fence applies, the defendant is liable to be convicted of voluntary manslaughter, instead of murder.

■ **Responsibility between criminal law and psychology**

In the previous section, we listed the cases in which criminal liability is absent or mitigated due to different types of cognitive impairments recognised by the law. Based on this, the scope of the present section is to discuss a positive characterisation of the pre-conditions for criminal liability. Analysing the defences outlined in the previous section, criminal liability emerges as depending upon action control and the joint presence of some cognitive/epistemic abilities. Action control refers to the agent’s capacity to regulate her own physical movements, acting in accordance to her own goals or refraining from acting when needed. From the cognitive/epistemic point of view, an agent acting according to her own goals must also be able to understand the nature of the consequences of her actions. These two components are deeply intertwined to the extent that, to be criminally liable, the individual must be able to prevent herself (control-component) from acting in ways that would be understandably (cognitive-component) against the law: the defendant must be able to violate the law voluntarily.

Taken together, these elements fulfil the requisites of Hart’s definition of “capacity-responsibility”, according to which responsibility for actions is defined by: «Understanding, reasoning, and control of conduct: the ability to understand what conduct legal rules on morality require, to deliberate and reach decisions concerning these requirements, and to conform to decisions when made».⁴⁹ An agent who is responsible in this sense satisfies also Shoemaker’s requirements for responsibility as answerability: «To be answerability-responsible for F is for F to be connected to my evaluative judgments in a way that renders me able (in principle) to cite

the reasons I took to justify F».⁵⁰

In the remaining part of this section, we focus on the concepts of “action control” and “voluntariness” in the law and cognitive science. As will become evident, the distinction between voluntary and involuntary actions in criminal law does not perfectly map onto the distinction between voluntary and involuntary actions in psychology and cognitive neuroscience.

■ *Control and voluntariness in the law*

Voluntariness is a key element both in the full (i.e., insanity, automatism) and in the partial (i.e., diminished responsibility, loss of control) defences previously outlined. For the defendant to be liable to punishment «the accused’s “conduct” [...] must, so it is said, be voluntary and not involuntary»:⁵¹ no criminal offence could be committed without the execution of a voluntary act.⁵² The distinction between voluntary and involuntary actions represents the basic psychological category for evaluating one’s criminal responsibility for an offence. Absence of voluntariness might be produced both by external and internal factors, and corresponds to the agent lacking physical or mental control over the action. Conceptually prior to evaluating the presence and degree of “*mens rea*”, the acknowledgment of an action as voluntary enables the assessment of one’s “strict” or “absolute liability” (i.e., independent of fault, negligence, or intention) to punishment for criminal offences. Thus, the concept of “voluntary” is used to discriminate between actions and mere movements, suggesting the presence of a «minimum link between mind and body, indispensable for any form of criminal responsibility».⁵³ In traditional jurisprudence, a voluntary action is defined as a muscular contraction (physical element) preceded by an act of the will or a volition (mental element).⁵⁴ Sticking to ordinary language, Hart reconstructs this very general picture by saying that involuntary movements (namely «not governed by the will») are

those movements that are not subordinate to the agent’s conscious plans of action: controlling agency – in the absence of which no one should be held criminally responsible – is «the mind of a man bent on some conscious action».⁵⁵ As a result, this requirement that the action was voluntarily executed might seem suspiciously dualistic in its content.

Despite widespread agreement concerning the basic aim of the principle, the correct interpretation of the requirement is contentious. Many legal theorists highlight that, far from having a positive content, the term “voluntary” is no more than an excluder word, i.e., an abstract expression describing the absence of alternative states, such as coercion, sleep, or unconsciousness.⁵⁶ Crucially, such a requirement prevents people from being prosecuted for something they did not do: the defendant must be judged only for an action she has performed. In the absence of an action, there would be no sufficient evidence of the actor’s intention to do something wrong⁵⁷ – this explains the difficulty in addressing cases of attempts, omissions and vicarious liability.⁵⁸

In order to include omissions, some legal theorists define the legally relevant connection between the agent and the outcome in terms of what the agent had the power to do or control, even in the absence of causation. It is worth noting that causation per se is not sufficient from criminal liability or for assessing “*mens rea*”.⁵⁹ In fact, the outcome may depend on oblique intention, negligent or reckless behaviour, and “bad luck” rather than on direct intent. In other cases, the agent might cause the outcome in an accidental way.⁶⁰

Therefore, save cases of strict liability, causation is not sufficient for establishing the agent’s level of criminal responsibility. The voluntary-act requirement fulfils a second task, emphasising that, to be punishable, the wrongful action must be voluntarily performed. The linkage between the agent’s mental states and the action is usually interpreted in causal terms: the wrongdoing would not have existed without the defendant’s decision

to act or to avoid acting. The law cannot prosecute unintentional reflexes resulting from automatism. Acting voluntarily implies goal-directedness, or at least that the wrongful outcome is the unintended outcome of a previous (intended) fault or of a habitual movement.⁶¹ The set of actions that are considered voluntary in the criminal law is thus more inclusive than the set of intentional actions in philosophy whereby, according to mainstream causal theories, the intention (i.e., a consciously accessible mental state) causes the action.⁶² For example, causing harm by acting absent-mindedly may attenuate the degree of “*mens rea*”, without the corresponding action being classified as involuntary.

Overall, the principle suggests that the defendant can be held responsible only for things that depend on factors under her control. An intuitive corollary is that criminal liability is unjust if imposed for a state of affairs over which the defendant lacks significant control. Criminal law requires that the agent is able to control the actual outcome of her action, but also that she is able to foresee potential or expected outcomes that may derive from the action. For criminal liability to apply, the wrongful result must be a predictable, avoidable, consequence of a given behaviour. To give an example, the actual presence of a pedestrian is a factual element that is beyond the reckless driver’s control, but it is a possibility that a rational agent is supposed to be able to take into account.

Control and voluntariness in cognitive science

The law admits differences in degrees for given psychological categories (including “*mens rea*” or diminished responsibility), but draws a thick line between voluntary and involuntary actions. In the case of the defences outlined in the previous section, the involuntary character of the act traces back to different types of cognitive impairments. In the absence of a condition of cognitive impairment, the law assumes that the act was will-

ingly executed, without referring to any specific brain function and relying on classic desire-belief psychology. Defending such a strong dichotomy between voluntary and involuntary actions may lead to implicitly assume a dualistic view of human behaviour. By contrast, the cognitive neuroscience of volition and action recognises voluntary actions as equally dependent upon specific brain circuits.

In the neuroscience of volition and action, the distinction between voluntary and involuntary actions is recognised.⁶³ Passingham and colleagues define voluntary (internally or self-generated) actions as those actions that are not driven by an external trigger.⁶⁴ However, the distinction is not grounded in different types of explanations about how human behaviour unfolds.

According to neuroscientific evidence, even the more nuanced and complex voluntary actions, and goal-directed agency in general, are not independent of the neural circuits enabling them. By contrast, complex voluntary actions represent the highest point of a “continuum” starting from very simple stimulus-driven motor responses. The execution of all voluntary movements depends on the primary motor cortex (M1), with a major contribution of the premotor cortex. Specific areas of the brain – including the pre-supplementary motor area, the anterior prefrontal cortex and the parietal cortex – support many of the characteristics usually associated with conscious behaviour, such as planning, inhibiting inappropriate actions,⁶⁵ or selecting the option to pursue.⁶⁶ Prefrontal regions are involved in action selection and maintenance of the goal, and other structures, such as the basal ganglia and the cerebellum, participate in the coordination of movement and in cognitive behaviour, including planning or reward-based learning.⁶⁷

How is this relevant for the law? In order to properly exercise its functions, the law must resort to some coarse-grained distinctions regarding acceptable and unacceptable behaviour, which seems to have little in

common with a neuroscientific understanding of the fine-grained differences between types of bodily actions. The reason why the law targets only intentional harmful behaviour and not reflexes is that the former includes the actions that are susceptible to modification by exercising one's individual control and cognitive abilities.

For practical purposes, the law must therefore incorporate a scientifically plausible understanding of how voluntary behaviour unfolds. Our suggestion is that the neuroscience of volition and action can and should contribute more and more to the framing and understanding of justifications and excuses to criminal liability. This can be done, for example, by improving understanding of the conditions under which people lack control over their bodily movements. Along a continuum that rejects strong dichotomies, individuals can be distinguished depending on their capacities, which translate into the ability to understand the law's requirements, act upon them, and learn from previous mistakes. The neuroscience of action and volition can help to elucidate what brain structures and functions enable or undermine those capacities. As a result, psychology and neuroscience are more likely to explain the mechanisms that make our responsible actions possible rather than to revolutionise our concept of responsibility.

To give a more concrete suggestion, a specific area where the contribution of the neuroscience of action and volition can be relevant concerns the subjective experience, i.e., the sense of agency, tied to the performance of voluntary actions. Conscious experiences such as choosing, deciding, or initiating a movement are in fact accompanied by a specific phenomenology that is absent in reflex actions and less intense in the habitual ones. The sense of agency naturally accompanies people's voluntary actions and is recognised as a key feature of human mental life.⁶⁸ It can be defined as people's subjective feeling to control their actions and, through them, their consequences in the external

world. The sense of agency and the sense of responsibility for one's own actions are seemingly tightly integrated. It has been shown that factors that contribute to reducing the sense of agency are also involved in reducing the sense of responsibility for action.⁶⁹

But is the extent to which people feel they are in control of their actions, considering also standard inter-individual variations, relevant for the law? Overall, this seems to be the case. Only an agent who is able to perceive herself as the cause of her own actions, tracking the linkage between a voluntary bodily movement and its effect, could be susceptible to the law's requirements, e.g. could learn the contingency between actions and outcomes in order to repeat or not to repeat similar behaviours in the future. This experience of authorship extends from the pre-reflective sense of agency to the feeling of regret for the negative outcomes of the actions people felt in control of.⁷⁰ In the absence of this constellation of feelings, people would perceive legal requirements as hardly acceptable constrictions. Correspondingly, it might be unfair to hold them liable to punishment.

However, it is unclear whether the law must take into account people's feelings and subjective reports over their own agency in order to draw evaluative conclusions about the extent to which they are liable to punishment. On the one hand, the law is mainly concerned with practical outcomes: criminal law treats murder differently from attempted murder even where, in the two cases, the agent's mental states and bodily movements do not differ. On the other hand, psychological categories are central to criminal law. Just consider how the evaluation of the different degrees of "*mens rea*" relies entirely on considerations concerning the nature of people's mental states.

The difficulty in dealing with this issue emerges clearly in the discussion about the limits and the applicability of the "loss of control defence", whose interpretation remains controversial to date.⁷¹ One clear ele-

ment of difficulty is that it is problematic to suggest that a diminished subjective sense of control should modulate individual accountability. To the extent that people are nonetheless able to prevent themselves from acting against the law, they seemingly have a duty to act in accordance to the law. What is the threshold (i.e., what counts as a relevant trigger?) for the defence to apply? How much do we actually know about the conscious experience of acting? And to what extent should we consider people's subjective reports a reliable source of information about their sense of agency? For example, should the law take into account the subjective report of someone suggesting that she committed a crime while feeling she lost control over her own actions?

Even assuming that the defendant aims to faithfully report her own inner feelings, it has been suggested that people's ability to introspect upon their mental states is highly fallacious.⁷² Opacity of introspection seems to be one of the obstacles that prevent the law from fully incorporating something like a sense of agency requirement for criminal liability. Furthermore, our sense of agency and control has proven to be subjected to manipulation. Experimental evidence has shown that people are less able to monitor their motor performance than the phenomenology of agency suggests.⁷³

For example, while undergoing laboratory based brain stimulation, people may report having experiences of moving where no real movement occurred (stimulating the right and left inferior parietal regions), or carry out actions without perceiving any sense of agency (stimulating the premotor-region).⁷⁴ By using unconscious priming as a form of external guidance, experimenters are able to consistently modulate people's sense of agency in ways that are then reflected in explicit reports of sense of control, e.g. by triggering overestimation of one's own self-efficacy.⁷⁵ More generally, within the perspective of modern neuroscience, the sense of controlling one's own actions has been frequently considered the result of forms of "*a postero-*

ri" (i.e., following outcome presentation), self-deceptive confabulation.⁷⁶ Along these lines, Libet's experiments on the timing of conscious intentions played a major role in diminishing confidence in the belief that conscious experience is involved in "initiating" people's voluntary actions.⁷⁷

However, once biases, errors and limitations in self-attributions are acknowledged, the neurobiological mechanisms regulating the subjective experience of voluntarily doing something are still in search of a complete explanation. Findings on the neural correlates of the sense of agency suggest that it may represent a default mode of the human brain – differently from the sense of non-agency (or the feeling of reduced control) that produces a specific activation in the angular gyrus.⁷⁸ To explain and quantify the phenomenon, going beyond explicit subjective reports, Haggard and colleagues have introduced the so-called "intentional binding effect", which is interpreted as an implicit marker of the sense of agency.⁷⁹

The intentional binding effect reflects a subjective temporal association between voluntary actions and corresponding outcomes: when participants perform a voluntary action, they tend to subjectively perceive the time between the action and the effect as shorter (i.e., temporal attraction, in mental time, of the action towards the effect and of the effect towards the action) than it was in reality. Crucially, the effect is present only when the subject is engaging in voluntary actions, being absent in cases of involuntary movements. Therefore, it is interpreted as an implicit marker of the sense of agency.

Experimental evidence seemingly shows that the intentional binding effect might be elicited by a combination of predictive (i.e., prediction of the consequences of the action) and retrospective (i.e., outcome evaluation) inferential processes.⁸⁰ In terms of its sources, the intentional binding effect might be produced by the same circuits that enable the performance (in the frontal lobe) and monitoring (in the parietal cortex) of voluntary

action.⁸¹ An important plausible consequence would be that the same circuits underlying the preparation and initiation of voluntary actions also produce a prediction of the expected outcomes: our sense of agency, which is presumably linked to responsibility, might be not just a retrospective confabulation, but a «measurable signal within the motor system».⁸²

More specific findings concerning the intentional binding effect are possibly relevant for how to understand the sense of agency in relation to the law. In particular, it has been suggested that positive and morally relevant outcomes are associated with a stronger sense of agency, with respect to negative and non-morally relevant outcomes.⁸³ Interestingly, the sense of agency, as measured by the intentional binding effect, is attenuated in situations where, in presence of fearful or angry states, participants tend to experience themselves as less in control of the action they performed.⁸⁴

These results could potentially help bridging the gap between the subjective “experience of losing control” and the “loss of control” defence, by providing additional tools to understand the mechanisms underlying action control. Consider, for example, the point that follows. Morse suggests that the law has a requirement for minimal rationality, which most adults are able to fulfil.⁸⁵ If the agent realises that, in given circumstances, she is unable to control herself (i.e., she is victim of a persistent craving or desire which she finds hard to resist) in a way that would potentially lead to law violation, it is her duty to take some appropriate countermeasure in order to prevent herself from actually violating the law (e.g., by taking appropriate medicaments). Assuming the agent has this opportunity, lack of control at the time of the wrongful act does not necessarily count as an excuse.

The loss of control defence seemingly challenges this conclusion since the wrongdoer does not necessarily have evidence that the fear or anger trigger will lead her to violate the law (e.g., by killing the victim). A better understanding of the conditions that

may lead the agent to lose control and of their relations with the mechanisms enabling voluntary behaviour would have therefore the potential to refine the discussion about the loss of control defence.

Conclusions

Neuroscience can contribute to further understanding of the cognitive capacities that an agent must display to be a fair target of normative evaluations and practices, including punishment. In this paper, we suggested that the neuroscience of volition and action is specifically relevant to the identification of the enabling conditions (and corresponding impairments) upon which voluntary behaviour depends. In particular, by discussing the loss of control defence as a case study, we suggested that the empirical investigation of the subjective feelings linked to the experience of being an agent could be potentially informative for the law. Thus, we advocate more cross-disciplinary work, aimed to bridge the gap between conceptual boundaries, on the theme of responsibility for actions.

Notes

¹ M.S. GAZZANIGA, *The Ethical Brain: The Science of Our Moral Dilemmas*, Harper Perennial, New York 2006.

² S.J. MORSE, *New Neuroscience, Old Problems: Legal Implications of Brain Science*, in: «Cerebrum: The Dana Forum on Brain Science», vol. VI, n. 1, 2004, pp. 81-90.

³ A. LAVAZZA, L. SAMMICHELI, *Il delitto nel cervello. La mente tra scienza e diritto*, Codice Edizioni, Torino 2012; M. DE CARO, A. LAVAZZA, G. SARTORI (a cura di), *Quanto siamo responsabili? Filosofia, neuroscienze e società*, Codice Edizioni, Torino 2013.

⁴ J.D. GREENE, J. COHEN, *For the Law, Neuroscience Changes Nothing and Everything*, in: «Philosophical Transactions of the Royal Society of London. Series B - Biological Sciences», vol. CCCLIX, n. 1451, 2004, pp. 1775-1785.

⁵ S.J. MORSE, *New Neuroscience, Old Problems: Legal Implications of Brain Science*, cit.

⁶ O.D. JONES, A.D. WAGNER, D.L. FAIGMAN, M.E.

RAICHLÉ. *Neuroscientists in Court*, in: «Nature Reviews Neuroscience», vol. XIV, n. 10, 2013, pp. 730-736.

⁷ See *Homicide Act*, 1957, section 2(1) as amended by CJA 2009, Part 2, Ch. 1, Section 52.

⁸ Y. YANG, A.L. GLENN, A. RAINE, *Brain Abnormalities in Antisocial Individuals: Implications for the Law*, in: «Behavioral Sciences & The Law», vol. XXVI, n. 1, 2008, pp. 65-83.

⁹ W. MISCHEL, E.B. EBBESEN, A.R. ZEISS, *Cognitive and Attentional Mechanisms in Delay of Gratification*, in: «Journal of Personality and Social Psychology», vol. XXI, n. 2, 1972, pp. 204-218.

¹⁰ E. FILEVICH, S. KÜHN, P. HAGGARD, *Intentional Inhibition in Human Action: The Power of “No”*, in: «Neuroscience & Biobehavioral Reviews», vol. XXXVI, n. 4, 2012, pp. 1107-1118; A. GHOSH, J. ROTHWELL, P. HAGGARD, *Using Voluntary Motor Commands to Inhibit Involuntary Arm Movements*, in: «Proceedings of the Royal Society. Section B – Biological Sciences», vol. CCLXXXI, n. 1794, 2014, pp. 20141139.

¹¹ Y. MUNAKATA, S.A. HERD, C.H. CHATHAM, B.E. DEPUE, M.T. BANICH, R.C. O'REILLY, *A Unified Framework for Inhibitory Control*, in: «Trends in Cognitive Sciences», vol. XV, n. 10, 2011, pp. 453-459.

¹² A. DICKINSON, B. BALLEINE, *The Role of Learning in the Operation of Motivational Systems*, in: H. PASHLER (ed.), *Stevens' Handbook of Experimental Psychology: Learning, Memory, and Emotion*, Wiley, Hoboken (NJ) 2002, pp. 497-533.

¹³ D.L. SCHACTER, E.F. LOFTUS, *Memory and Law: What Can Cognitive Neuroscience Contribute?*, in: «Nature Neuroscience», vol. XVI, 2013, pp. 119-123.

¹⁴ D. DAVIDSON, *Essays on Actions and Events: Philosophical Essays*, Clarendon Press, Oxford 2001.

¹⁵ Intentions are not necessarily malevolent: mercy killing is an example of culpable act originated by non-malevolent intentions. Here we focus on culpable acts resulting from malevolent intentions.

¹⁶ M.S. MOORE, *Act and Crime: The Philosophy of Action and Its Implications for Criminal Law*, Oxford University Press, New York 1993.

¹⁷ J.M. FISCHER, *Desert and the Justification of Punishment*, in: T.A. NADELHOFFER (ed.), *The Future of Punishment*, Oxford University Press, New York 2013, pp. 3-24; P. VAN INWAGEN, *An Essay on Free Will*, Oxford University Press, New

York 1983.

¹⁸ W. FRANKENA, *Ethics*, Prentice-Hall Incorporated, Upper Saddle River (NJ) 1963; M. SCHLICK, *When is a Man Responsible?*, in: B. BEROFSKY (ed.), *Free Will and Determinism*, Harper & Row, New York 1966, pp. 54-63; J.J.C. SMART, *Free-Will, Praise and Blame*, in: «Mind», vol. LXX, n. 279, 1961, pp. 291-306.

¹⁹ Many have also claimed that the law could plausibly accommodate a deterministic conception of responsible agency as long as voluntariness and rationality are preserved (S.J. MORSE, *New Neuroscience, Old Problems: Legal Implications of Brain Science*, cit.), but some scholars disagree. For example, according to Halpin, criminal law cannot accept the deterministic thesis (A. HALPIN, *Definition in the Criminal Law*, Hart Publishing, Portland (OR) 2004, pp. 62-63; P. CANE, *Responsibility in Law and Morality*, Hart Publishing, Portland (OR) 2002, pp. 66).

²⁰ A. ASHWORTH, *Principles of Criminal Law*, Oxford University Press, New York 2009, 6th edition, p. 25.

²¹ H.L.A. HART, *The Ascription of Responsibility and Rights*, in: G. RYLE, A. FLEW (eds.), *Proceedings of the Aristotelian Society*, Blackwell, Hoboken (NJ) 1951, pp. 171-194.

²² J. AUSTIN, *A Plea for Excuses*, in: «Proceedings of the Aristotelian Society», vol. LVII, 1956, pp. 1-30.

²³ N. HUSAK, *Philosophy of Criminal Law*, Rowman & Littlefield, Lanham 1987.

²⁴ Significantly, the truth of nomological determinism by itself is never considered as a justification or an excuse for wrongdoing.

²⁵ See the Law Commission's projects on *Insanity and Automatism* (discussion paper - July 2013) and on *Unfitness to Plead* (discussion paper - October 2015).

²⁶ See s. 2, *Trial of Lunatic Acts*, 1883, c. 38 (Regnal. 46_and_47_Vict).

²⁷ See M'Naghten's Case, 1843, 10 Clark and Finnelly 200, 210, (1843) 8 ER 718, [1843-60] All ER Rep 229.

²⁸ «We think that people should be exempted from criminal responsibility for an offence if they lacked all criminal capacity, which means that they could not have avoided committing the crime they are charged with because of a mental disorder or a physical disorder. In other words, people who totally lacked capacity not to commit the crime charged, because of a medical condition

and through no fault of their own, should have a defence» (*Criminal Liability: Insanity and Automatism*, Art. 70).

²⁹ See *R v Sullivan* [1984].

³⁰ L. CLAYDON, *Are There Lessons to Be Learned from a More Scientific Approach to Mental Condition Defences?*, in: «International Journal of Law and Psychiatry», vol. XXXV, n. 2, 2012, pp. 88-98.

³¹ See *R v Kemp* [1957] 1 QB 399.

³² See *Bratty v A-G for NI* [1963] AC 386.

³³ See *R v Burgess* [1991] 2 WLR 1206.

³⁴ See *R v Hennessy* [1989] 1 WLR 287.

³⁵ J. HALL, *The M'Naghten Rules and Proposed Alternatives*, in: «American Bar Association Journal», vol. XLIX, n. 10, 1963, pp. 960-964; M.S. GUTTMACHER, *The Psychiatrist as an Expert Witness*, in: «The University of Chicago Law Review», vol. XXII, n. 2, 1955, pp. 325-330.

³⁶ See Aristotle's criteria for "involuntariness in action" (ARISTOTLE, *The Ethics of Aristotle: The Nicomachean Ethics*, Penguin Books, London 1955).

³⁷ *R v Windle* [1952] 2QB 826

³⁸ J.M. FISCHER, M. RAVIZZA, *Responsibility and Control: A Theory of Moral Responsibility*, Cambridge University Press, New York 1998; S. WOLF, *Freedom within Reason*, Oxford University Press, New York 1990.

³⁹ See *R v Quick* [1973] 3 WLR 26; *R v Bingham* [1991] Crim LR 43; *R v T* [1990] Crim LR 256.

⁴⁰ See *Coley v R*; *McGhee v R*; *Harris v R*.

⁴¹ In Lord Denning's words (*Bratty v Attorney-General for Northern Ireland* (1963) AC 386): «No act is punishable if it is done involuntarily: and an involuntary act in this context – some people nowadays prefer to speak of it as "automatism" – means an act which is done by the muscles without any control by the mind, such as a spasm, a reflex action or a convulsion; or an act done by a person who is not conscious of what he is doing, such as an act done whilst suffering from a concussion or whilst sleepwalking».

⁴² See *R v Martin John Bunch* [2013].

⁴³ See *R v Golds* [2014].

⁴⁴ See *R v Brennan* [2014].

⁴⁵ See *R v Stephen Andrew Dowds* [2012].

⁴⁶ See CJA 2009, Part 2, Ch. 1, Section 52.

⁴⁷ Usually the defence is available when, in extremely grave circumstances (see *R v Hatter* [2013]), the defendant has a sense of being seriously wronged that can be determined *objectively* (see *R v Dawes*, [2013]; *R v Clinton* [2012]; *R v*

Bowyer [2013]). The trigger can be related to the fear of serious violence (fear), a justifiable sense of being wronged (anger), or both in cases where these feelings were not self-induced (S. PARSONS, *The Loss of Control Defence-Fit for Purpose?*, in: «The Journal of Criminal Law», vol. LXXIX, n. 2, 2015, pp. 94-101).

⁴⁸ See *Homicide Act*, cit., Ch. 11, Part 1, Section 3.

⁴⁹ H.L.A. HART, *The Ascription of Responsibility and Rights*, cit., p. 227.

⁵⁰ D. SHOEMAKER, *Attributability, Answerability, and Accountability: Toward a Wider Theory of Moral Responsibility*, in: «Ethics», vol. CXXI, n. 3, 2011, pp. 602-632, here p. 616.

⁵¹ H.L.A. HART, *Punishment and Responsibility: Essays in the Philosophy of Law*, Oxford University Press, Oxford 2008, p. 90.

⁵² M.S. MOORE, *Act and Crime: The Philosophy of Action and Its Implications for Criminal Law*, cit., pp. 4-5; J.L.J. EDWARDS, *Automatism and Criminal Responsibility*, in: «The Modern Law Review», vol. XXI, n. 4, 1958, pp. 375-386.

⁵³ H.L.A. HART, *Punishment and Responsibility: Essays in the Philosophy of Law*, cit., p. 92; J. AUSTIN, *A Plea for Excuses*, cit.

⁵⁴ J. AUSTIN, R. CAMPBELL, *Lectures on Jurisprudence, Or, The Philosophy of Positive Law*, Murray, London 1885.

⁵⁵ H.L.A. HART, *Punishment and Responsibility: Essays in the Philosophy of Law*, cit., p. 106.

⁵⁶ J. AUSTIN, *A Plea for Excuses*, cit.; H.L.A. HART, *The Ascription of Responsibility and Rights*, cit.

⁵⁷ G. YAFFE, *Attempts: In the Philosophy of Action and the Criminal Law*, Oxford University Press, Oxford 2012, p. 215.

⁵⁸ To appreciate the complexity of assessing omissions, consider *Fagan v MPC* [1969] 1 QB 439 – a case where the acquittal is due to the lack of "*actus reus*" (the defendant, who accidentally drove onto a policeman's foot, "did nothing").

⁵⁹ N. HUSAK, *Philosophy of Criminal Law*, cit., p. 170.

⁶⁰ A much discussed topic in theory of action, deviant causal chains offer an example of an intentional result obtained in a non-intentional way. In particular, deviant causal chains identify those processes in which one does not act intentionally, despite one's action being caused by the very same motivational states elicited by the intention to act (D. DAVIDSON, *Essays on Actions and Events: Philosophical Essays*, cit., p. 73). Here is Chisholm's example: «Suppose, for example, (i) a certain man desires to inherit a fortune; (ii) he believes that, if

he kills his uncle, then he will inherit a fortune; and (iii) this belief and this desire agitate him so severely that he drives excessively fast, with the result that he accidentally runs over and kills a pedestrian who, unknown to the nephew, was none other than the uncle. The proposed definition of purpose would require us to say, incorrectly, that the nephew killed the uncle in order to inherit the fortune» (R. CHISHOLM, *Freedom and Action*, in: K. LEHRER (ed.), *Freedom and Determinism*, Random House, New York 1966, pp. 11-44).

⁶¹ G. YAFFE, *Attempts: In the Philosophy of Action and the Criminal Law*, cit.

⁶² D. DAVIDSON, *Essays on Actions and Events: Philosophical Essays*, cit.

⁶³ C.D. FRITH, *The Psychology of Volition*, in: «Experimental Brain Research», vol. CCXXIX, n. 3, 2013, pp. 289–299.

⁶⁴ R.E. PASSINGHAM, S.L. BENGTSSON, H.C. LAU, *Medial Frontal Cortex: From Self-Generated Action to Reflection on One's Own Performance*, in: «Trends in Cognitive Sciences», vol. XIV, n. 1, 2010, pp. 16-21; F. SCHÜÜR, P. HAGGARD, *What Are Self-Generated Actions?*, in: «Consciousness and Cognition», vol. XX, n. 4, 2011, pp. 1697-1704.

⁶⁵ E. FILEVICH, S. KÜHN, P. HAGGARD, *Intentional Inhibition in Human Action: The Power of "No"*, cit.

⁶⁶ I.H. JENKINS, M. JAHANSAHI, M. JUEPTNER, R.E. PASSINGHAM, D.J. BROOKS, *Self-Initiated versus Externally Triggered Movements*, in: «Brain», vol. CXXVI, n. 6, 2000, pp. 1216-1228.

⁶⁷ B. BENJAMIN PASQUEREAU, R.S. TURNER, *Dopamine Neurons Encode Errors in Predicting Movement Trigger Occurrence*, in: «Journal of Neurophysiology», vol. CXIII, n. 4, 2015, pp. 1110-1123; J. DIEDRICHSEN, A. BASTIAN, *Cerebellar Function*, in: M.S. GAZZANIGA, G.R. MANGUN (eds.), *The Cognitive Neurosciences*, MIT Press, Cambridge (MA) 2014, 5th edition, pp. 451-460; R.P. DUM, A.C. BOSTAN, P.L. STRICK, *Basal Ganglia and Cerebellar Circuits with the Cerebral Cortex*, in: M.S. GAZZANIGA, G.R. MANGUN (eds.), *The Cognitive Neurosciences*, cit., pp. 419-434.

⁶⁸ P. HAGGARD, *Intention and Agency*, in: M.S. GAZZANIGA, G.R. MANGUN (eds.), *The Cognitive Neurosciences*, cit., pp. 875-885.

⁶⁹ E.A. CASPAR, J.F. CHRISTENSEN, A. CLEEREMANS, P. HAGGARD, *Coercion Changes the Sense of Agency in the Human Brain*, in: «Current Biology», vol. XXVI, n. 5, 2016, pp. 585-592; F. BEYER, N. SIDARUS, S. BONICALZI, P. HAGGARD, *Beyond Self-Serving Biases: Diffusion of Responsibility Reduces Sense of Agency*

and Outcome Monitoring, in: «Social Cognitive and Affective Neuroscience», vol. XII, n. 1, 2017, pp. 138-145; M. YOSHIE, P. HAGGARD, *Effects of Emotional Valence on Sense of Agency Require a Predictive Model*, in: «Scientific Reports», vol. VII, Art.Nr. 8733, 2017 – doi: 10.1038/s41598-017-08803-3.

⁷⁰ C.D. FRITH, *The Psychology of Volition*, cit.; P. HAGGARD, V. CHAMBON, *Sense of Agency*, in: «Current Biology», vol. XXII, n. 10, 2012, pp. R390-392.

⁷¹ S. PARSONS, *The Loss of Control Defence-Fit for Purpose?*, cit.

⁷² R.E., NISBETT, T.D. WILSON, *Telling More than We Can Know: Verbal Reports on Mental Processes*, in: «Psychological Review», vol. LXXXIV, n. 3, 1977, pp. 231-259.

⁷³ P. FOURNERET, M. JEANNEROD, *Limited Conscious Monitoring of Motor Performance in Normal Subjects*, in: «Neuropsychologia», vol. XXXVI, n. 11, 1998, pp. 1133-1140.

⁷⁴ M. DESMURGET, K.T. REILLY, N. RICHARD, A. SZATHMARI, C. MOTTOLESE, A. SIRIGU, *Movement Intention After Parietal Cortex Stimulation in Humans*, in: «Science», vol. CCCXXIV, n. 5928, 2009, pp. 811-813.

⁷⁵ K. LINSER, T. GOSCHKE, *Unconscious Modulation of the Conscious Experience of Voluntary Control*, in: «Cognition», vol. CIV, n. 3, 2007, pp. 459-75; J. MOORE, P. HAGGARD, *Awareness of Action: Inference and Prediction*, in: «Consciousness and Cognition», vol. XVII, n. 1, 2008, pp. 136-144.

⁷⁶ W.P. BANKS, E.A. ISHAM, *We Infer rather than Perceive the Moment We Decided to Act*, in: «Psychological Science», vol. XX, n. 1, 2009, pp. 17-21; K. LINSER, T. GOSCHKE, *Unconscious Modulation of the Conscious Experience of Voluntary Control*, cit.; D.M. WEGNER, *The Illusion of Conscious Will*, MIT Press, Cambridge (MA) 2002. See also M. MARRAFFA, A. PATERNOSTER, *Sentirsi esistere. Inconscio, coscienza, autocoscienza*, Laterza, Roma-Bari 2013.

⁷⁷ Libet's main experiment featured a number of participants who were required to spontaneously flex their right wrist or the fingers of their right hand whenever they felt a wish or an urge to do so. At the same time, participants were asked to watch a clock with a dot circling around it, checking the time when they decided to flex their wrist or their fingers. The electrical readings (EEGs) from the scalp indicated the presence of a readiness potential (RP) – a phenomenon originally reported by Hans Helmut Kornhuber and Lüder Deecke as

Bereitschaftspotential (see H.H. KORNHUBER, L. DEECKE, *Hirnpotentialänderungen bei Willkürbewegungen und passiven Bewegungen des Menschen: Bereitschaftspotential und reafferente Potentiale*, in: «Pflügers Archive», vol. CCLXXXIV, 1965, pp. 1-17), and indicating an activity in the motor cortex and in the supplementary motor area of the brain–, located 550 milliseconds (Type II) before the onset of the correspondent action, and 350 milliseconds before participants' awareness of having made that decision. The onset of the action was measured by an electromyogram (EMG), showing muscular motion to begin. When the required action was pre-planned, the readiness potential (Type I) was located even earlier, approximately 1000 milliseconds before the motor activity was registered (see B. LIBET, E.W. WRIGHT JR., C.A. GLEASON, *Readiness-Potentials Preceding Unrestricted "Spontaneous" vs. Pre-Planned Voluntary Acts*, in: «Electroencephalography and Clinical Neurophysiology», vol. LIV, n. 3, 1982, pp. 322-335; B. LIBET, C.A. GLEASON, E.W. WRIGHT, D.K. PEARL, *Time of Conscious Intention to Act in Relation to Onset of Cerebral Activity (Readiness-Potential)*, in: «Brain», vol. CVI, n. 3, 1983, pp. 623-642).

⁷⁸ V. CHAMBON, D. WENKE, S. M. FLEMING, W. PRINZ, P. HAGGARD, *An Online Neural Substrate for Sense of Agency*, in: «Cerebral Cortex», vol. XXIII, n. 5, 2013, pp. 1031-1037; A. SIRIGU, E. DAPRATI, P. PRADAT-DIEHL, N. FRANCK, M. JEANNEROD, *Perception of Self-Generated Movement Following Left Parietal Lesion*, in: «Brain», vol. CXXII, n. 10, 1999, pp. 1867-1874.

⁷⁹ K. ENGBERT, A. WOHLISCHLÄGER, P. HAGGARD, *Who Is Causing What? The Sense of Agency Is Relational and Efferent-Triggered*, in: «Cognition»,

vol. CVII, n. 2, 2008, pp. 693-704; P. HAGGARD, S. CLARK, *Intentional Action: Conscious Experience and Neural Prediction*, in: «Consciousness and Cognition», vol. XII, n. 4, 2003, pp. 695-707; P. HAGGARD, S. CLARK, J. KALOGERAS, *Voluntary Action and Conscious Awareness*, in: «Nature Neuroscience», vol. V, n. 4, 2002, pp. 382-385.

⁸⁰ J.M. MOORE, D.M. WEGNER, P. HAGGARD, *Modulating the Sense of Agency with External Cues*, in: «Consciousness and Cognition», vol. XVIII, n. 4, 2009, pp. 1056-1064.

⁸¹ P. HAGGARD, *Conscious Intention and Motor Cognition*, in: «Trends in Cognitive Sciences», vol. IX, n. 6, 2005, pp. 290-295; N. KHALIGHINEJAD, P. HAGGARD, *Modulating Human Sense of Agency with Non-Invasive Brain Stimulation*, in: «Cortex», vol. LXIX, 2015, pp. 93-103.

⁸² P. HAGGARD, *Intention and Agency*, cit., p. 883.

⁸³ Z. BARLAS, W.E. HOCKLEY, S.S. OBHI, *Effects of Free Choice and Outcome Valence on the Sense of Agency: Evidence from Measures of Intentional Binding and Feelings of Control*, in: «Experimental Brain Research», vol. CCXXXVI, n. 1, 2018, pp. 129-139; M. YOSHIE, P. HAGGARD, *Effects of Emotional Valence on Sense of Agency Require a Predictive Model*, cit.; G. MORETTO, E. WALSH, P. HAGGARD, *Experience of Agency and Sense of Responsibility*, in: «Consciousness and Cognition», vol. XX, n. 4, 2011, pp. 1847-1854.

⁸⁴ J. CHRISTENSEN, S. DI COSTA, B. BECK, P. HAGGARD, *I Just Lost It! Fear and Anger Reduce Sense of Agency: A Study Using Intentional Binding*, in: «Experimental Brain Research», vol. CCXXXVII, n. 5, 2016, pp. 1205-1212.

⁸⁵ S.J. MORSE, *New Neuroscience, Old Problems: Legal Implications of Brain Science*, cit.