Original article

Reforming automatism and insanity: Neuroscience and claims of lack of capacity for control

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Abstract
This paper examines some of the issues raised by the current criminal law defence of automatism and the related defence of insane automatism, and considers what neuroscience may contribute to the reform discussion. It also considers some of the claims made in relation to the impact of neuroimaging in the courtroom. It examines an American medical case report in which an individual's criminal behaviour is linked to a brain tumour, and considers how the reformed law as presented in the Law Commission for England and Wales' Discussion Paper might treat such claims. It concludes by examining what assistance the law may gain from a deeper understanding of how a sense of agency emerges from brain states, and the implications of this scientific knowledge for the reform of the law.

Keywords
criminal Law, defence of automatism, neuroscience and sense of agency

Introduction

This paper examines one of the profound areas of difficulty for the law: identifying when someone's actions are involuntary to the extent of excusing criminal responsibility, which is the basis of the criminal law defence of automatism. The most commonly utilised definition of automatism is that given by Lord Denning: 'No act is punishable if it is done involuntarily; and an involuntary act in this context... means an act which is done by the muscles without any control by the mind such as a spasm, a reflex action or convulsion; or an act done by one who is not conscious of what he is doing such as an act done while suffering from concussion or whilst sleepwalking'.[1] At present, the defence takes two forms. Where the cause of the automatism is said to be external, the defence of sane automatism may be argued. If the cause of the automatism is said to be internal and there is evidence of a legally recognised 'disease of the mind', the plea of insane automatism may be argued.[2]

The number of cases where a claim of automatism arises is very small, and therefore an argument may be made to the effect that this distinction has little practical effect. However, the definitions of insanity and automatism as excusing conditions in the criminal law are profoundly important precisely because they form threshold conditions of criminal liability. If successfully pleaded, the verdict of the court is 'not guilty by reason of insanity' where the cause is internal, or 'not guilty' in the case of a sane automatism plea.

However, as already described,[3] English law has moved to a more limited view of what might be considered involuntary action. Purposive actions by a defendant that are claimed to be involuntary have led to judicial scepticism. In the recent cases of *Coley* and *McGhee*, Hughes LJ made a distinction between 'involuntary' and 'irrational action', identifying 'wholly involuntary action' as the hallmark of the defence of automatism.[4] This distinction is well made. Irrationality is a normative measure of human behaviour, but a claim that action was involuntary most usually appears in criminal case law as a subjective explanation of a lack of capacity to control behaviour, which seeks to excuse responsibility for acts. In a sense, the tag 'irrational' adds nothing to the understanding of a claim of involuntariness. If an action is involuntary, it cannot be reasons responsive, thus in one sense it will be irrational. However, the fact that it is not reasons responsive does not mean it will necessarily appear an irrational act judged from the

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standpoint of an objective observer. Conversely, an action could be voluntary but irrational.

The difficulty inherent in defining the types of involuntary behaviour that may found an automatism plea is compounded by the fact that it is hard to substantiate first-person explanations of such behaviour by accessing conscious memory of actions to explain how movements came about. Actions which may be described as 'truly' involuntary and those actions which are semi-automatic are hard to distinguish. We are not generally aware of how our physical movements occur. This includes even quite complex actions. We simply are not aware of each movement element. It will therefore not be easy for someone to distinguish 'an act which is done by the muscles without any control by the mind such as a spasm, a reflex action or convulsion' from semi-automatic acts.[5] In claims of automatism, assertions are made after the event that the action in the context it occurred was not part of what the actor took him or herself to be doing, and responsibility for the result of the action is therefore refuted.

Blackstone, in his *Commentaries*, wrote of criminal culpability: 'the concurrence of the will when it has its choice either to do or avoid the act in question [is] the only thing that renders action praiseworthy or culpable'.[6] However, in modern parlance, it is rare to talk about 'the will' as having such a defined place in human responsibility for action. Indeed, Dennett has doubted the possibility of accurate explanations of behaviour by first-person subjects. He argues that 'when we claim to be using our powers of inner observation, we are actually engaging in a sort of theorising – and we are remarkably gullible theorisers'.[7] If he is correct, then the law faces an even greater challenge when hearing evidence of involuntary behaviour, particularly because, in the courtroom, the subjective testimony of the defendant is important.

That part of Lord Denning's definition of involuntariness which refers to 'an act done by one who is not conscious of what he is doing such as an act done while suffering from concussion or whilst sleepwalking' implies a subjective lack of understanding of how the act came about. However, it is clear from the driving cases where automatism has been claimed that someone may lack the sense of ownership for their acts but still be held legally responsible for their failure to react appropriately, even where a sense of authorship is lacking. The English criminal courts when considering claims of involuntariness in relation to driving cases have largely discounted excuses based upon a lack of a sense of ownership of the act of driving. In the driving cases, it has been held that the destruction of voluntariness has to be total for the defence of automatism to be put to the jury. Thus, if the accused is in some way driving – that is, she has some, albeit limited, control over the vehicle – then she is still driving the vehicle and cannot claim sane automatism.

This was confirmed by the Court of Appeal in Attorney General's Reference (No 2 of 1992).[8] The relevant legal issue considered by the Court of Appeal was: 'Whether the state described as ''driving without awareness'' should, as a matter of law, be capable of founding a defence of automatism'.[9]

Lord Taylor, having reviewed the authorities argued before him, stated that the appeal fell at the first hurdle because: 'the ''proper evidential foundation''' for the defence of automatism 'was not laid in this case by Professor Brown's evidence of ''driving without awareness''... the defence of automatism requires that there was a total destruction of voluntary control on the defendant's part. Impaired, reduced or partial control is not enough'.[10] The Professor's evidence had, in Lord Taylor's view, shown that the defendant had retained some control of the lorry he was driving, albeit very limited control. This was sufficient to mean that the 'learned recorder ought not to have left the issue of automatism to the jury in this case'.[11] The Court of Appeal's decision was in line with earlier authorities. In Hill v Baxter, Pearson J considering the defence's case that their client could not be said to be driving because he was in a state of automatism said, 'In any ordinary case, when once it has been proved that the accused was in the driving seat of a moving car, there is, prima facie, an obvious and irresistible inference that he was driving it'.[12]

May a better understanding of how our brains work assist our legal understanding?

In Sense of Agency,[13] Haggard and Chambon explore the possibility of finding neurocognitive explanations for the subjective sense of agency when an individual experiences the feeling of controlling their actions. In exploring why this is an important area to research, they state, 'In many countries the law requires that a person be aware of the consequences of their actions if they are to be found guilty of a crime'. Exploring earlier research by Wenke et al.,[14] they suggest that the 'sense of agency' is dependent 'on volitional processes that necessarily precede action'. They also accept that the sense of agency is, on occasions, solely affected by retrospective information received by the brain.

The article then examines whether it is possible to examine the phenomenon of agency scientifically. Looked at from one perspective, they suggest that the individual has a strong sense of agency over the performance of an action when the result of the act is what was intended by the actor. But note that no brain imaging studies have found 'any clear positive correlate of agency, but routinely show activation of the angular gyrus in the parietal cortex in situations of non agency'. These situations of non-agency are identified as occurring when there is an outcome of action

which is not what was predicted. There is no doubt that neuroscience is advancing our knowledge of how we behave and adding more nuanced explanations to our understanding of human behaviour. If it does lead to a clearer understanding of why human actors claim responsibility for some acts but not for others, then it will clearly inform our understanding of how subjective explanations of responsibility for actions are formed. This may lead to clearer understandings of both how action occurs and why we claim responsibility for some of our actions but not others.[15] Difficult questions therefore remain to be answered. The first is to identify why voluntary actions feel so distinctive: what may give rise to our sense of personal agency? The second is to find an *objective* criterion, suitable for use as evidence in a court of law, for describing whether any particular action is voluntary or involuntary.

Involuntariness as a legal concept has become enmeshed with the defence of insanity through the case law determining pleas that the defendant's acts were not his own. The interpretation and application of the M'Naghten Rules by the English courts, where a plea of automatism has been advanced, has meant that insanity and automatism are two concepts whose definitions have evolved and become interwoven. This permits the criminal courts to retain disposal over someone who may not be to blame but nonetheless poses an unacceptable risk of harm to those around them. The criminal law has evolved to provide an extremely narrow defence of sane automatism which will allow a jury to reach a not guilty verdict only in circumstances when it may be established by the defence to the satisfaction of the jury that the defendant, as a result of an external cause, lacked conscious voluntary control.

An example of a successful automatism plea made on this basis is the case of Brian Thomas. The case was not formally recorded in a law report but was covered by the national newspapers and the BBC website.

> Jurors were told at the start of the trial that they could reach only two verdicts for the murder charge – not guilty, or not guilty by reason of insanity. The court heard that tests commissioned by both the prosecution and the defence were carried out on Mr Thomas as he slept following his claims of a sleep disorder. Both sleep experts agreed his behaviour was consistent with automatism, which meant at the time he killed his wife, his mind had no control over what his body was doing. But the jury has been told there are two types of automatism: insane automatism and non-insane automatism, which they will have to decide between for their verdict. In court on Friday morning, however, the prosecution told the jury that it was no longer seeking a special verdict of not guilty by reason of insanity and that there would be no purpose in sending Mr Thomas to a psychiatric hospital.[16]

As a result, Brian Thomas was found not guilty.

Claims of lack of or impaired capacity to control actions

At present, the law does not include within either the automatism or insanity defences claims of poor impulse control. As Hughes LJ stated in *McGhee* when considering the disinhibiting effect of taking temazepam and alcohol together: 'Disinhibition is exactly *not* automatism'.[17] In its proposals for the reform of the law, the Law Commission suggests that there should still be a defence of where 'the accused raises evidence that at the time of the alleged offence he or she wholly lacked the capacity to control his or her conduct, and the loss of capacity was not the result of a recognised medical condition'. The reform proposal aims to avoid an area of potential difficulty; that is, the case of a defendant with an impaired capacity to control his or her actions, but not a total loss of that capacity.

One area that should be considered when reforming the law of insanity and automatism is the impact that neuroscience may have in the courtroom when evaluating claims that behaviour was involuntary. These claims may be based upon expert evidence related to behaviour which the defendant is said to be unable to control. Brain imaging may show a physical defect in the brain, whose presence supports a claim that a defendant was not wholly responsible for her criminal acts.[18] In the USA, an example of an unusual medical case, using brain imaging, was documented by two neurologists, Burns and Swerdlow. Their report concerns the behaviour of a patient who, over a period of time, began to take an increasing interest in pornography. The changes in his behaviour included viewing child pornography, and soliciting sexual services in massage parlours. He had previously not indulged in this behaviour, and when subsequently questioned after making 'subtle sexual advances to his prepubescent step daughter', he explained that although he knew such behaviour was unacceptable, 'the pleasure principle overrode his urge restraint'.[19]

He was convicted of child molestation, and in the course of a treatment programme, his soliciting of sexual favours from staff and others on the programme became so unrestrained, he was expelled from the programme. Following this, he began to show clear signs of a neurological problem. A magnetic resonance imaging (MRI) scan showed the presence of a tumour displacing the right frontal orbital lobe. After surgery to remove the tumour, he successfully completed the 'Sexaholics Anonymous Programme'.[20] Seven months later, he was believed not to pose a threat to his stepdaughter and returned home. The neurologists

then documented the regrowth of the tumour following the return of the desire to view pornography. Once the tumour was again removed, the patient's behaviour returned to normal.

The neurologists' interpretation of the case is that the tumour contributed to his behaviour: 'Orbitofrontal lesion research suggests that sociopathic behaviour results from a loss of impulse control rather than a loss of moral knowledge'. They express the view that: '[o]ur patient could not refrain from acting on his pedophilia despite the awareness that this behaviour was inappropriate'.[21]

The scan evidence supporting the existence of the tumour is compelling. The tumour provides a behavioural explanation for the 'patient's' disinhibited behaviour. However, under the present law, 'the patient', had the offence against the stepdaughter been committed in England, would not have a defence based on a claim that he was driven to act by the pressure exerted on his right prefrontal lobe. Any plea in English law at present would have to be based on insane automatism, as the tumour would be viewed as an internal cause of his disinhibited behaviour, being 'a disease of the mind' under the M'Naghten Rules. The defence of insanity would not be made out, as the neurologists' report makes it clear that 'the patient' knew that his behaviour was wrong and sought to conceal his behaviour.[22]

This case of frontal lobe impairment may point towards the need to understand more clearly the nature and degree of the volitional impairment to ensure the law treats such individuals fairly once the issue of legal responsibility is resolved. Clearly, 'the patient' posed a danger to those around him, particularly towards the end of his illness. He was attempting to procure sexual favours from all those around him in a way which threatened the personal autonomy of those with whom he came into contact. His behaviour placed young children and others at risk of unwanted sexual advances. Until his tumour was treated, he posed an unacceptable risk of harm to those with whom he came into contact. Once the tumour was successfully treated, he posed, on the evidence provided, no threat at all.

If the proposals for reform are adopted, the key to establishing whether the law should excuse liability in such circumstances is unlikely to rest solely on the well-documented existence of the tumour. However, this will have relevance in establishing a medical condition. On the evidence advanced, should the proposal be enacted, the relevant legal question will be: had he totally lost capacity to control his actions at the time of the criminal act, as a result of the medical condition? This will not be easily assessed using purely behavioural evidence but will require an assessment of the context and circumstances surrounding the behaviour. It is possible this would include the efforts, by the patient, to hide the behaviour which he knew was wrong.

The report of the neurologists contains a statement which sheds some light upon this question. 'The patient went to great lengths to conceal his activities because he felt they were unacceptable'.[23] This suggests he retained the capacity to understand the impact of his actions but he did not stop initiating those actions. The moot point at a trial would be, even though he concealed actions, had he totally lost capacity, as a result of the tumour, to resist the drive to sexually assault the child. Arguably, the impairment of capacity, certainly at the time of the sexual advances to the child, was not total.

Total lack of capacity is central to the proposed new defences outlined in The Law Commission for England and Wales' proposals in the Discussion Paper on the reform of the present law of insanity and automatism.[24] It is suggested in the paper that if someone is to receive a 'not criminally responsible' verdict based on the existence of a medical condition, then that verdict should require that they had no capacity to act otherwise.

It is interesting to speculate what type of evidence would be argued under the proposed new law should such a case come before the courts.[25] In such a case as that described by Burns and Swerdlow, if the law is developed in accordance with the recommendations in the discussion paper, it is arguable that the individual would be viewed as 'having a recognised medical condition'. If it was established on the evidence that he was totally 'unable to control his or her physical acts in relation to the relevant conduct or circumstances' as a result of that 'qualifying recognised medical condition', this would allow the jury to find him not criminally responsible by reason of a recognised medical condition. It seems likely that in preparing the defence experts in neurocognition would be asked to explain the effects of such a large tumour on an individual's ability to 'control his or her physical acts'. It is not just the existence of a tumour in this area of the brain which might provide evidence of a qualifying medical condition. Indeed, as we learn more about disease or treat diseases differently, for example Parkinson's disease or depression with deep brain stimulation, more defence arguments based on lack of capacity for control may arise.[26]

Conclusion

The current law is outdated in its definition of insanity and automatism as explained in detail in the paper given by Professor Ormerod.[27] Neuroscience will add depth and breadth to human understanding of the antecedents of behaviour, and of conditions which lead individuals to claim a lack of agency for criminal acts. This may provide a challenge to the courts in terms of the legal definitions if these definitions are not updated. The findings of neuroscience could, where appropriate, aid the courts in understanding how human cognition and action occur.

They may assist in understanding how memories of criminal acts are laid down, retrieved and recounted by defendants and witnesses in court. They are also likely to shed light upon the grey area of how to identify 'involuntary' action. Neuroscience may validate or challenge present diagnostic techniques and thereby may assist in identifying individuals who pose a risk to society, and improve understanding of the veracity of defendant and witness testimony.

But the assessment of whether a defendant had sufficient capacity to be responsible for their acts remains at its core a legal question. Whether capacity is fully present or totally absent will presumably need to be assessed in terms of all the evidence presented to the court. There is no doubt that advances in our understanding of human cognition may greatly aid this assessment, necessitating, where appropriate, the use of expert evidence.

In its Discussion Paper proposals, the Law Commission states the concepts the law ought to employ to define the threshold conditions of criminal responsibility. The Discussion Paper argues that the reformed law should be based on a prerequisite that those who successfully plead sane automatism be required to prove that they had no capacity to control their actions. This is subject to the law's normal caveats with regard to prior fault: that is, that no one should be able to claim that they committed a crime when they have chosen to induce the state which is the basis for claiming their actions are involuntary. The point is made in the Discussion Paper that where there is clear evidence that the perpetrator of a crime totally lacked capacity to make their behaviour conform to the requirements of the law then there is no point or moral justification in inflicting punishment.

In the Discussion Paper, there is an illuminating discussion of the relationship between expert evidence and the verdict: 'This brings us to the relationship between the expert evidence and the verdict. It is obvious that a verdict contains a judgment which is not a physical fact about a person: ''Discovering and identifying a state of responsibility is not like discovering and identifying a brain tumour. Rather, it is a moral judgment about a person's motives and behaviour''. The question whether a person is criminally responsible is, in our view, a moral one rather than a scientific one, because it is about the relationship of the individual to the state, about public condemnation, and the attribution of blame'.[28]

If the proposal is enacted and interpreted in this manner, such an approach could create an interesting tension. The first three sentences of the quotation set out above are manifestly true. It is the claim that 'whether a person is criminally responsible is... a moral one rather than a scientific one' which is more open to question. If a defendant has a particular type of brain tumour that could clearly be shown to affect his capacity to control his actions, then that must feed into the moral judgment concerning 'public condemnation and the attribution of blame'. The relationship between the individual and the state is a delicate one to adjudicate in these circumstances.

In the future, cognitive neuroscience may provide a convincing behavioural explanation of why human actors develop a sense of agency. Neuroscience could then provide expert evidence to support an assertion that a defendant subjectively lacked a sense of agency. This would assist in answering the question of whether the defendant wholly lacked capacity to control his or her acts. This is not to suggest that scientific evidence will measure a particular defendant's capacity to control action but rather that the evidence may assist the jury in reaching a decision as to whether a defendant lacked capacity. The assessment of capacity as expressed in the Discussion Paper remains at its core a legal and not a scientific issue.

However, the relationship between an informed moral stance and science is not straightforward. New scientific understandings of how a sense of agency comes about may inform our morality, and assist our moral judgments with regard to responsibility for action. If the science is valid, moral judgement will in those circumstances be better informed. It will, however, not be determinative of the issue which remains at the heart of this paper, which is how to treat those whose behaviour is affected by a medical or other condition over which they have little or no control. This remains a political not a scientific question.

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Notes

1. *Bratty* v *Attorney General for Northern Ireland* [1963] AC 386, 409.
2. *R* v *Quick* [1973] 3 WLR 26; *R* v *Burgess* [1991] 2 All ER 769.
3. Mackay RD. An anatomy of automatism. *Med Sci Law* 2015; 55(3).
4. *R* v *Coley*, *R* v *McGhee* [2013] EWCA Crim 223 [22].
5. A neurocognitive explanation for this is given in Ghosh A, and Haggard P, The spinal reflex cannot be perceptually separated from voluntary movements, *J Physiol* 2014; 592 (1), 141–152.
6. *Commentaries*, Book IV, Ch. 11.
7. Dennett D, *Consciousness Explained*, London: Penguin, 1991, 67/8.

8. [1993] 4 All ER 683.
9. [1993] 4 All ER 685.
10. [1993] 4 All ER 689j.
11. [1993] 4 All ER 690 a.
12. *Hill* v *Baxter* WLR [1957] 76, 83.
13. Haggard P and Chambon V, Sense of Agency, *Curr Biol* 2012; 22 (10), 390–392.
14. Wenke D, Fleming SM, Prinz W and Haggard P, Subliminal priming of actions influences sense of control over effects of action. *Cognition* 2010; 115, 26–38.
15. For discussion of the issue, see Filevich E, Vanneste P, Brass M, Fias W, Haggard P and Kühn S, Brain correlates of subjective freedom of choice, *Conscious Cogn* 2013; 22, 1271–1284.
16. http://news.bbc.co.uk/1/hi/wales/8370237.stm (2014, accessed 21 December 2014).
17. [2013] EWCA Crim 223, Para 46, emphasis in original. McGhee had taken a prescription dose of temazapan, medication prescribed to assist with tinnitus, but had subsequently drunk a substantial amount of alcohol, which it is reported in the case he took to help him overcome the tinnitus, even though he was aware that he should not mix the medication with alcohol. It is also stated that he drank to gain relief from the tinnitus in sleep. In an intoxicated condition, he stabbed someone with a knife. His behaviour prior to the attack was complex, and the argument put by the defence was that the prescribed medication and the alcohol had caused a disinhibited state.
18. '[T]here is increasing expectation that brain scientists aided by coloured brain images loved by the media, can reveal whether or not the accused was responsible for his actions'. Talmi D and Frith CD, Neuroscience, free will and responsibility, in Sinott-Armstrong W and Nadel L, *Conscious Will and Responsibility*, 2011, 124.
19. Right orbitofrontal tumor with pedophilia symptom and constructional apraxia sign, *Arch Neurol* 2003; 60 (3): 437–440.
20. Right orbitofrontal tumor with pedophilia symptom and constructional apraxia sign, *Arch Neurol* 2003; 60 (3): 438.
21. Right orbitofrontal tumor with pedophilia symptom and constructional apraxia sign, *Arch Neurol* 2003; 60 (3): 440.
22. In *Windle*, the court held that the M'Naghten Rules could not apply to a defendant who knew that his act was legally wrong, *R* v *Windle* [1952] 2 All ER 1.
23. Fn 17, 439.
24. http://lawcommission.justice.gov.uk/areas/insanity.htm downloadable in pdf format accessed 21 July 2014. Proposal 13 is set out as follows and proposes a reformed sane automatism defence: 'We provisionally propose that where the magistrates or jury find that the accused raises evidence that at the time of the alleged offence he or she wholly lacked the capacity to control his or her conduct, and the loss of capacity was not the result of a recognised medical condition (whether qualifying or non-qualifying), he or she shall be acquitted unless the prosecution disprove this plea to the criminal standard'. (10.18) Proposals 2 and 3 set out the reformed insanity defence which would allow a verdict of not criminally responsible by reason of a recognised medical condition:
    Proposal 2 'We provisionally propose the creation of a new statutory defence of not criminally responsible by reason of recognised medical condition'. (10.7)
    Proposal 3 'The party seeking to raise the new defence must adduce expert evidence that at the time of the alleged offence the defendant wholly lacked the capacity:
    (i)rationally to form a judgment about the relevant conduct or circumstances;
    (ii)to understand the wrongfulness of what he or she is charged with having done; or
    (iii)to control his or her physical acts in relation to the relevant conduct or circumstances as a result of a qualifying recognised medical condition'. (10.8)
25. Indeed, just such a case came before the courts in *R* v *Hayes (Trevor)* [2013] EWCA Crim 897. The evidence of brain tumour affecting the frontal lobe was instrumental in a reduction in sentencing.
26. There is no space to explore this argument further, but for more information on possible side effects of treatment, see, for example, Sensi M, et al., Explosive-aggressive behavior related to bilateral subthalamic stimulation, *Parkinsonism Relat Disord* 2004; 10 (4), 247–261.
27. Ormerod D. The Law commission's proposals for the reform of the defences of insanity and automatism. *Med Sci Law* 2015; 55(3)
28. (4.119) discussing the quotation taken from EP Trager, The insanity defence revisited, *Medico-Legal J Ireland* 1998; 4 (1), 15, 18.