

Young Minds, Old Legal Problems: Can Neuroscience fill the Void?

Author: Hannah Wishart*

Abstract

From 10 years of age the criminal law requires a person demonstrate a reasonable degree of normative competence. But what if a young person aged between 10-14 does not possess such mental capacities, cannot do anything about it, and is not capable of holding responsibility? Should the criminal law make allowances for him in these circumstances? I will argue that it should, because neuroscientific studies reveal young adolescents to be incapable of exercising normative competence. For evidence suggests that they are only capable of performing basic mental functions, for instance, self-directed reasoning and appreciating short-term consequences of their actions. In agreement is Lord Dholakia, the principal drafter of the Age of Criminal Responsibility Bill (2015) since the law's idea of what a 10-year-old is mentally capable of is at odds with the degree of maturational development obtained. As a consequence Lord Dholakia proposes that there be an increase the minimum age of criminal responsibility from 10 to 12 years. Though the underlying premise to increase the threshold age is sound, numerous objections will be made, for it will be defended this proposition rests on insufficient neuroscientific evidence.

1. INTRODUCTION

The criminal law does not expect or require that individuals act rationally. [1] It does not expect or require that individual's exhibit self-control or demand that they act for the benefit of others. It neither requires that individual's exercise a normal standard of normative competency. [2] What is required is individuals *are* capable of possessing and exercising normative competence. [3]

Most adults (and older adolescents) are presumed law-abiding citizens, for they are in possession of certain mental capacities - such as, cognitive, volitional and rational capacities. [4] But can the same be said of younger adolescents aged between 10-14 years? In order to answer this question we must consider the possibility that there are adolescents who are responsible for their actions in the cognitive sense, but not responsible in law. Such adolescents have developed a basic degree of mental function to satisfy some of the cognitive mental attributes to be held legal responsible. Nonetheless there is reason to argue that they still lack other important (advanced) abilities to be held responsible. What we should not do in this pursuit is ignore or deny the dualism involved in development change; (1) the adolescent will be in possession of some degree of mental capacity and (2) the adolescent will have not yet reached complete cognitive maturity.

There are several justifiable reasons why the law should not hold adolescents legally responsible. [5] Similarly, there are just as many good reasons for why the law should. [6] This article aims to explore what neuroscientific discoveries on cognitive development change could add to our existing discussion, in

particular, it will consider broadly which standards of normative competence (conditions) ground the responsibility of the agent in English Law.

Perhaps there is a worry that from identifying the basic conditions of responsibility in this way no attention is paid towards the nature of responsibility. Arguments of this kind have been made in the past. [7] However, Lacey asserts that the modern criminal law favours the theory of capacity for "it is only fair to punish someone who has the capacity to understand what they are doing [...] it is only justifiable to punish someone who has the capacity or, in some versions, the fair opportunity to act otherwise than they did." [8] Hence it is the leading theory of responsibility practiced in modern-day law since it explores specific subjective criterion of the offender, in particular, the agent's intentions, beliefs and degree of mental capacity.

But it is fitting to recognise that the law embraces several dominant theories of responsibility. These theories include choice, capacity and character. Moreover, each theory adopts a different approach to responsibility by focusing on different senses of the agent. [9]

First, this article will offer a neuroscientific account of adolescent cognitive development change. The hope is that this section provides the reader with a sufficient understanding of the key stages of cognitive developmental maturation. Secondly, the article is to identify which capacities ground responsibility practice. From doing so it should be possible to investigate, if there is such a claim, that cognitive development and age undermine responsibility. Finally, it will consider Lord Dholakia's proposition of a 2-year increase in the minimum age of criminal responsibility.

2. BRAIN DEVELOPMENT EXPLAINED

Advancements in neuroimaging technologies (fMRI and MRI) make it possible for neuroscientists to map cortical growth and development change across the lifespan of adolescence. [10] Cognitive development is a process that occurs structurally, functionally and organisationally in the brain. [11]

The structural integrity of the brain and its maturity are important to acquisition of mental competence. [12] Over the course of childhood, children lack the general ability to rationalise, for instance, how to "filter and suppress irrelevant information, thoughts, and actions in favour of relevant ones (i.e. cognitive control)". [13] The reason for this is twofold; first, the child brain is not sufficiently developed enough to have obtained the necessary structural composition to function rationally. Secondly, the child brain is not able to command (take control) of these decision-making abilities because it has not undertaken the process of synaptic pruning. [14] Synaptic pruning is the process of internal refinement of the elimination of surplus synapses. [15]

During adolescence the brain cultivates large and deep structural pathways of white matter (brain tissue). Enabling it to share information in a smooth, quick and efficient manner across its circumference. [16] The purpose of this process is so that a person can acquire the necessary cognitive control over his mental capacities. But it is region-specific and dependent on age. [17]

Studies show that there is a steady increase of white matter volume in early adolescence with overall improvement between 14-21 years of age. [18] This is concurrent with other findings that reveal white matter maturation is a precursor for general maturity of mental function with time. As the brain

becomes communicatively bettered equipped to receive, respond and transfer information. [19]

With a linear increase in white matter a decrease in grey matter volume occurs. [20] Reductions in grey matter density are region-specific, progressive and regressive. An increase in grey matter volume peaks at 12 years in the frontal and parietal lobes; [21] this is then followed by large-scale reductions of grey matter throughout the rest of the brain. [22] Grey matter reduction is integral to the process of brain maturation. It prepares the brain for the next phase of development change - that is, the process of synaptic pruning (cortex maturity). [23] It is also essential for the fine-tuning of functional networks and improving the overall efficiency of synapsis circuitry across the brain. [24]

The central hub of high-order mental functioning - the prefrontal cortex (PFC) - is believed to be why these kinds of mental abilities take a long time to mature. [25] This is because the brain must reach a level of structural and organisational maturity in order to lay the groundwork so-as-to-speak prior to advanced functional maturation taking place. [26] Again, the maturation high-order mental competence is age and sex specific. [27] ;

Research suggests children from a young age are capable of applying logic. That is, (1) coordinating his or her subjective views with the perspectives of others; (2) processing information; (3) making logical inferences and (4) reflecting on mental tasks. [28] Studies reveal that at 11 years of age, they can demonstrate that they are capable of undertaking logic-based mental tasks by determining, irrefutably, whether a hypothesis is correct or incorrect. These studies also show-marked improvements in these abilities during the transition from childhood to early adolescence, previously not exhibited in childhood. [29] However to be the holder of fully matured rational abilities the brain has to undergo advanced developments, which are not likely to be complete until the person reaches 20-30 years of age. [30] Similar trajectories for the amygdala, the region that regulates emotion (self-control) and the hippocampus, which is the region responsible for long and short-term memory recall. Studies reveal that the amygdala has a peak maturation age of 15 years in males and 19.7 years in females. In contrast, the hippocampus has a peak maturation of 17.3 years in both males and females. [31]

According to many legal theorists and criminologists, as stated above, these findings explain why adolescents possess a low degree of mental capacity. Theoretically, it also explains why they are incapable of satisfying capacity standards of legal responsibility. For they *are yet* to develop mental functions the reasonable person in law is expected to possess. [32] Moreover why they would resort to acting impulsively - rather than acting rationally and in control - since they are incapable of satisfying their desires and intentions in any other way.

In order to establish the legitimacy of these kinds of claims, (in section 5, 6 and 7) this article must determine, first and foremost, the standards of normative competency ground legal responsibility and why, before any consideration is given to neuroscience. That way it should be possible to examine whether adolescents by reason of their young age and development cannot satisfy capacity criterion in responsibility-practice.

3. RESPONSIBILITY AND EXCUSE

A person must be in possession of certain mental capacities to be held criminally responsible. [33] This idea that capacity is essentially linked to

responsibility is founded on Hart's basic conception of responsibility. Hart believed that,

"[w]hat is crucial is that those whom we punish should have had, when they acted, the normal capacities, physical and mental, for doing what the law requires and abstaining from what it forbids, and a fair opportunity to exercise; these capacities. Where these capacities and opportunities are absent [...] the moral protest is that it's morally wrong to punish because 'he could not have helped it', or 'he could not have done otherwise' or 'he had no real choice'." [34]

Further elaborating that,

"[t]he capacities in question are those of understanding, reasoning, and control of conduct: the ability to understand what conduct legal rules or morality require, to deliberate and reach decisions concerning these requirements, and to conform to decisions when made." [35]

Hart attempts to develop a coherent theory of responsibility. This theory is based on fairness and hinges on the idea that an agent's lack of 'fair opportunity to act' can be traced back to his lack of cognitive incapability. [36] For it makes sense to infer if an agent has no 'fair opportunity to act' there is a plausible explanation for it. Namely, that the source of his inability to act derives from (1) an absence of basic cognitive abilities or (2) a lack thereof ability to exercise certain capacities to a degree of normal. [37]

If, as suggested, it is important to responsibility whether a person possesses normative competence. That is, as Hart emphasises above, a minimum degree of mental and physical capacities. Intuition insists that an individual incapable of performing actions because he lacks the capacity to do otherwise should be excused from responsibility. This is based on the school of thought that it is unfair to treat an agent lacking in mental capacity as responsible.

As previously stated, there are good reasons to exempt some agents from responsibility. For example, individuals who possess some of the necessary capacity attributes of responsibility; but ultimately lack general mental competence. [38] Young children, in particular, are deemed irresponsible for they lack core rationality. So are those who suffer from a recognised mental condition, [39] which impairs their ability to possess or exercise the requisite cognitive faculties. [40]

Logic therefore should prevail, for the excusing condition (what the agent should be excused for) should be available to those whose degree of mental capacity is questionable. [41] But the problem is a lack of cognitive capacity has had no real bearing on the evaluation of an adolescent's responsibility. [42] The following section will investigate why this maybe the case in light of the neuroscientific account provided in section 3.

4. COGNITIVE DEVELOPMENT AND RESPONSIBILITY IN CONTEXT.

So far, it has been established certain capacities are important to the determination of an agent's responsibility. Capacities, argued by Hart, include the ability to understand the nature of one's actions, practical reason (rationality) and self-control. [43] The question is why should the law be concerned with *these* capacity-based conditions, in particular, in the determination of responsibility?

It is understood an agent may be exempt from criminal responsibility for it is unfair to punish him for not possessing certain capacities. Nevertheless, despite the normative importance of *having* capacity, the law sometimes functions objectively evaluating the reasonableness of the event, instead of the person.[\[44\]](#) Under such circumstances, an agent can be held responsible for acting irrationally; for acting without thought to the consequences of his actions; for his failure to take self-control of his actions. The agent may even lack one or more of the general capacities outlined by Hart due to stunted cognitive development, but still be held responsible.[\[45\]](#)

The standard of reasonableness 'does not purport to be a standard for measuring lack of individual fault or blameworthiness. It is a standard for measuring the acceptability of outcomes, and, as such, it has no place for individual traits'. [\[46\]](#) This means that the criminal law is perfectly within its purview to discarded subjective standards of responsibility for objective standards to secure liability. Could this be why age and development are not taken seriously with regards to the adolescent's evaluation of responsibility? Consider *R v G and another* to place this into context.[\[47\]](#) The case concerned two young boys (11 and 12 years of age) who willfully and unlawfully entered a supermarket backyard in the early hours. Once on the premises, the boys decided to create a fire using a large stack of newspapers located underneath a large plastic wheelie bin. Afterwards, the boys left the vicinity without concern to the consequences of their actions. The result of their inadvertence: the fire destroyed several buildings including the supermarket costing £1 million pounds in damages. [\[48\]](#) Both were charged under s 1(1) of the Criminal Damage Act [1971]. It provides that,

"[a] person who without lawful excuse destroys or damages any property belonging to another intending to destroy or damage any such property or being reckless as to whether any such property would be destroyed or damaged shall be guilty of an offence."

From the onset of the trial, presiding Honourable Judge Maher made it very clear to the jury,

"[t]he ordinary, reasonable bystander is an adult. He does not have expert knowledge. He has got in his mind that stock of everyday information which one acquires in the process of growing up [...] When you answer [...] whether it would have been obvious to an ordinary reasonable bystander watching that the fire, in effect, would spread as I have just explained it, the ages of these defendants are irrelevant. Their good characters are irrelevant. No allowance is made by the law for the youth of these boys or their lack of maturity or their own inability". [\[49\]](#)

Judge Maher, without restraint, claimed he was unwilling to accept; the boys *were mentally incapable* of foreseeing any risk of the fire spreading. Thus implying that there continues to be no place in the criminal law for age and development For,

"[i]t is not necessary for the ordinary reasonable bystander to have foreseen in his mind the full extent of the damage which in fact occurred because, as you will well know, once fire takes hold, it is probably anybody's guess where it is going to end up." [\[50\]](#)

Proclaiming it need not matter in law whether the reasonable bystander could foresee how the fire spread implies specificity of risk is not important to the determination of responsibility. What seems more important is that the boys

foresaw a risk of harm and proceeded to close their minds to risk. [51] But what if they could not do so because they lacked capacity? For an argument of inadvertent thinking to resonate, it must be proven the boys *did in fact* possess the ability of understand, reason and control. In this case the capacity to foresee risks, abstract potential outcomes, and consequences of future possibilities.[52] Presumably it also requires a degree of knowledge on the subject matter of fire for a risk to be contemplated and further abandoned. Knowledge is defined as the "knowing how, knowing who (which, where, etc.), knowing one thing from another". [53]

Presumably, most people possess a basic knowledge of fire and its hazards - for it needs (1) a source of ignition (e.g., matches or cigarettes), (2) oxygen and (3) a fuel source (e.g., wood or paper).[54] It is conceivable that the boys also acquired this knowledge prior to acting. Therefore the argument of inadvertent thinking becomes believable if this knowledge had escaped them prior to leaving the premise.

Intuition suggests that they did have some degree of knowledge. For without it how can you identify what you are doing? But the law requires more than mere knowledge of a subject matter to perceive a risk; it could be submitted that it also requires that they had this knowledge and were stimulated by it, due to their understanding of its particular subject matter.; Studies suggest that the boys may have lacked this capacity.

Early adolescence is a period of significant developmental immaturity structurally, organisationally and functionally. [55] The PFC, at 10-years, is too underdeveloped to have attained rational competence. Schauble suggests that,

"[r]ationality entails more than mere logical validity. To decide which of several potential causes are plausible, people bring to bear both specific knowledge about the target domain and general knowledge based on experience about the mechanisms that usually link causes with effects." [56]

Therefore the necessary insight and reasoning toward these kinds of deduction actually requires more than a sufficient degree of cognitive maturity. A person must be capable of applying a certain degree of counterfactual reasoning, knowledge and working memory to comprehend risks in action. [57] There was no evidence at the time that the boys could command these rational abilities. [58] It is therefore hard to see anything specific that could establish they were considered any unjustifiable risks associated with their actions. Hence capable of utilising any knowledge they possess about fire in that instance.

This is a reason why we should be sceptical in the use of the standards of normative competency in the determination of an agent's responsibility. Even if it were to be concluded that the criminal law works better in approaching the question of whether an agent should be held responsible for a wrongdoing from a capacity-based perspective. The fact that certain mental capacities (lack of capacities) can be abandoned does make a difference to the subjective assessment of an agent's responsibility. This article has made this inexplicably clear.

Whilst it is acceptable to shift between subjective and objective principles, the intuition is that once the concept is chosen for the agent's assessment of responsibility, its basic criterion should be applied to prevent undermining responsibility. It is hypothesised that the relationship between capacity and responsibility would change for the hope is that it will make us question which mental capacities we should care about for the purpose of punishment. The

next section will question if there is also reason to increase in the minimum age of criminal responsibility to 12-years because of the problems identified throughout this article.;

5. LORD DHOLAKIA'S PROPOSAL - IS OUR ONLY WAY FORWARD WITH THE BILL?

Recently, Lord Dholakia took to the floor of the House of Lords, Parliament, to discuss the minimum age of criminal responsibility. He stated the following,

"[c]hildren are deemed to be criminally responsible from the age of 10. That means that children who are too young to attend secondary school can be prosecuted and receive a criminal record. [A 10](#) year-old who commits a "grave crime"-that includes serious violent and sexual crimes but can also include burglary-can be tried in the [Crown Court](#). A child of 10 or 11 who is accused with an adult will also be tried in the adult Crown Court ... Those who oppose increasing the age of criminal responsibility often argue that children of 10 and 11 are capable of telling right from wrong, as though it automatically follows that they should be dealt with in criminal courts. That does not logically follow at all. Most six year-olds have a sense of right and wrong, but no one suggests that they should be subject to criminal proceedings or prosecution."

"[we] should raise this country's unusually low age of criminal responsibility from 10 to 12. It would be more effective and more humane to deal with offenders under that age in family courts, as other European countries do. A strategy along these lines would help to move this country away from its unenviable position of having the highest prison population in Western Europe. In doing so, it would help to concentrate our limited resources on the measures that are most likely to protect the public by rehabilitating offenders and reducing reoffending." [\[59\]](#)

Compared with mainland European, England and Wales adopts a very low threshold age of criminal responsibility contrary to the enactment of the Children and Young Persons Act (1969). This is telling when one identifies that Belgium implements a threshold of 18 years of age, Norway (15 years of age) and Spain (16 years of age).[\[60\]](#) Therefore, it should come as no surprise that a bill to increase the threshold age has made its way to Parliament. The bill is to some extent a by-product of the collective efforts of those who have pleaded the case for a raise in the threshold age of responsibility. [\[61\]](#) Lord Dholakia tries to capture these reasons in his speech to the House:

"[t]here is now a significant body of research evidence indicating that early adolescence (under 13-14 years of age) is a period of marked neurodevelopmental immaturity, during which children's capacity is not equivalent to that of an older adolescent or adult. Such findings cast doubt on the culpability and competency of early adolescents to participate in the criminal process and this raises the question of whether the current minimum age of criminal responsibility, at ten, is appropriate". [\[62\]](#)

Intuition tells us adolescents lack capacity and neuroscience confirms it. The brain undergoes significant organisational, structural and functional changes. [\[63\]](#) Yet there is still much that we do not know about the nature of the brain development process during adolescence. [\[64\]](#) Neuroscience cannot discern the age in which the adolescent will possess a sufficient degree of mental competence. Nor does it provide us with a reason to mark 12-years consequential to our responsibility-practice (e.g., the threshold age of criminal responsibility). In fact, it could be claimed, 12-years should be of diminutive

developmental consequence to mental competency for capacities such as, short/long term memory recall, self-control and practical reasoning develop in later adolescence.[65]

Even if 12 years was of some developmental significance to us, can a 2-year increase to 12 years of the threshold age remedy the issues outlined in Lord Dholakia's speech? This is hard to hypothesize, for it is impossible to know if increasing the threshold age would result in fewer adolescents being held responsible in law. According to the Ministry of Justice crime statistics in 2012/13 the police arrested 1.07 million offenders in England and Wales with 129,809 of those arrests being attributed to young offenders between 10-17 years. [66] This comprised of 10.5% of the total arresting population. What we do not know is how many 10-12 year olds were arrested during 2012/13 for the annual statistical bulletins do not provide this information. ;Again, whether this would make a difference in practice is something that cannot be ascertained for further investigation is needed.

6. CONCLUSION

The bill's lack of expediency and progress in the House of Lords over the last 2 to 3 years is very troubling. The bill has not surpassed the 2nd reading stage in the House of Lords during this time. Therefore, this author remains unconvinced the bill is to receive royal assent in the near future. For the following reasons, first, the underlying premise for the increase threshold age is unsubstantiated by neuroscience. Neuroscience tells us adolescents lack capacity, as suggested, but these studies do not distinguish 12 years of age as developmentally of important (e.g., as a key stage of the developmental process).; What is even more questionable is questionable whether a 2-year increase could do all what Lord Dholakia says it can do. In this case; 'help to move this country away from its unenviable position of having the highest prison population in Western Europe'. [67] It seems more plausible, if there were to be an increase, that the minimum age of criminal responsibility is raised higher than 12 years to reflect the stages of developmental maturity obtained.

We also must be mindful of the limitations of neuroscience in our pursuance of policy reforms. Arguably, neuroscience is unlikely to tell us what we really want to know about young persons. If applied and interpreted correctly, there should be no reason why it cannot serve as a platform for further inquiry into the mentality of the adolescent offender. More specifically the relationship responsibility practice plays with age and development. Only time can tell us whether this will be the case or not.

* PhD Candidate, University of Manchester
Hannah.wishart@manchester.ac.uk

[1] Morse. S. J, 'Rationality and Responsibility' (2000) 74 *Southern California Law Review* 253.

[2] Ibid.

[3] Hart. H. L. A, *Punishment and Responsibility* (Oxford University Press, 2008) 152.

- [4] Vincent. N. A, 'Blame, Desert and Compatibilist Capacity: A Diachronic Account of Moderateness in Regards to Reasons-Responsiveness' (2013) 16 *Philosophical Explorations* 178.
- [5] See the following for a general discussion of these opinions in Arthur. R, 'Rethinking the Criminal Responsibility of Young People in England and Wales' (2012) 20 *European Journal of Crime, Criminal Law and Criminal Justice* 13; Goldson. B, 'COUNTERBLAST: "Difficult to Understand or Defend": A Reasoned Case for Raising the Age of Criminal Responsibility' (2009) 48 *The Howard Journal of Criminal Justice* 514; C. McDiarmid, 'An Age of Complexity: Children and Criminal Responsibility in Law' (2013) 13 *Youth Justice* 145.
- [6] Again, see also Morse. S. J, 'Immaturity and Irresponsibility' (1997) 88 *Journal of Criminal Law and Criminology* 17; Pincoffs E. L., 'Legal Responsibility and Moral Character' (1972) 19 *Wayne Law Review* 905; Arenella. P, 'Character, Choice and Moral Agency: The Relevance of Character to Our Moral Culpability Judgments' (1990) 7 *Social Philosophy and Policy* 265.
- [7] Lacey. N, 'In Search of the Responsible Subject: History, Philosophy and Criminal Law Theory' (2001) 64 *Modern Law Review* 353
- [8] Ibid.
- [9] Horder. J, 'Criminal Culpability: The Possibility of a General Theory' (1993) 12 *Law and Philosophy* 193-215.
- [10] Casey. B. J, Tottenham. N, et al., 'Imaging the Developing Brain: What Have We Learned about Cognitive Development?' (2005) 9 *Trends in Cognitive Sciences* 104; Spear. L. P, 'Adolescent Neurodevelopment.' (2013) 52 *Journal of Adolescent Health* 7; Blakemore. S. J, Robbins. T. W, 'Decision-Making in the Adolescent Brain.' (2012) 15 *Nature Neuroscience* 1184; J.
- [11] Sowell. E. R, et al., 'Development of Cortical and Subcortical Brain Structures in Childhood and Adolescence: A Structural MRI Study.' (2002) 44 *Developmental Medicine and Child Neurology* 4; Raznahan. A, et al., 'Longitudinal Four-Dimensional Mapping of Subcortical Anatomy in Human Development.' (2014) 111 *Proceedings of the National Academy of Sciences of the United States of America* 1592;
- [12] Sowell (2002).
- [13] Casey. B. J, Galvan. A, Hare. T. A, 'Changes in Cerebral Functional Organization during Cognitive Development.' (2005) 15 *Current Opinion in Neurobiology* 240.
- [14] Paus (2005) 62.
- [15] Ibid.
- [16] Ibid.
- [17] Raznahan and others (2014) 1592-7.
- [18] Ibid.

[19] Casey (2005) at pp. 239-44.

[20] Giedd. J. N, and others, 'Development of the Human Corpus Callosum during Childhood and Adolescence: A Longitudinal MRI Study' (1999) 23 *Progress in Neuro-Psychopharmacology and Biological Psychiatry* 571-588; Giedd. J. N, Snell. J. W, Lange. N, 'Quantitative Magnetic Resonance Imaging of Human Brain Development: Ages 4-18' (1996) 6 *Cerebral Cortex* 551-560.

[21] Giedd (1996) at pp. 571-588.

[22] Ibid.

[23] Thompson. P. M, and others, 'Growth Patterns in the Developing Brain Detected by Using Continuum Mechanical Tensor Maps.' (2000) 404 *Nature* 190-193; Gogtay. N, and others, 'Dynamic Mapping of Human Cortical Development during Childhood through Early Adulthood.' (2004) 101 *Proceedings of the National Academy of Sciences of the United States of America* 8174-8179.

[24] Huttenlocher. P. R, 'Synaptic Density in Human Frontal Cortex-developmental Changes and Effects of Aging' (1979) 163 *Brain Research* 195.

[25] Blakemore (2012) at

[26] Spear (2013).

[27] Supra note. 23

[28] Scott. S. E, Steinberg. L, *Rethinking Juvenile Justice* (Harvard University Press, Cambridge, Massachusetts, 2008) 36

[29] Ibid.

[30] P. J. Uhlhaas, 'The Adolescent Brain: Implications for the Understanding, Pathophysiology, and Treatment of Schizophrenia.' (2011) 37 *Schizophrenia Bulletin* 480.

[31] Giedd (2011).

[32] See, for instance, Charlotte Walsh's argument that "[the] growing appreciation that the human brain is not fully formed until people are in their twenties contributes to a better understanding of the aspects of adolescent behaviour that most often bring them to the attention of the youth justice system; crucially, it suggests that young people may have limited or impaired capacity to behave otherwise" in Walsh. C, 'Youth Justice And Neuroscience: A Dual-Use Dilemma' (2010) 51 *British Journal of Criminology* 23.

[33] J. Ryberg, 'Responsibility and Capacities: A Note on the Proportionality Assumption' (2014) 74 *Analysis* 393.

[34] Supra n. 3.

[35] Ibid at 227.

[36] Ibid.

[37] Ibid.

[38] Sanford Kadish defends an objective version of capacity excusing condition similar to that of Hart's version, see S. H. Kadish, 'Excusing Crime' (1987) 75 *California Law Review* 257-261.

[39] For example intellectual disabilities like ADHD.

[40] R. A. Duff, *Trials & Punishment*, (Cambridge University Press, New York, 1986) pp. 14-38; A. Loughnan, *Manifest Madness: Mental Incapacity in the Criminal Law* (Oxford University Press, Oxford, 2012) chapter 2.

[41] Tadros. V, *Criminal Responsibility*, (Oxford University Press,

[42] To note, current English law does not support a *doli incapax* styled-defence since the abolition of the two-fold presumption in section 34 of the Crime and Disorder Act (1998). Unless the young offender is a candidate for a recognised medical condition, a English defence cannot be granted solely based on any lack of cognitive capacities brought about by adolescent development.

[43] Supra note. 9.

[44] Westen. P, 'Individualizing the Reasonable Person in Criminal Law' (2008) 2 *Criminal Law and Philosophy* 139.

[45] See the case of *Crown Prosecution Service v P* (2007) EWHC 946

[46] Ibid. at 143.

[47] [2003] UKHL 50

[48] Ibid at [2]-[3].

[49] Ibid at [6].

[50] Supra 47.

[51] AC 341, 358,

[52] Hart (2008) 152.

[53] C. McGinn, "The Concept of Knowledge", (1984) 9 (1) *Midwest Studies in Philosophy* 529.

[54] <http://www.hse.gov.uk/toolbox/fire.htm>

[55] Supra 19.

[56] Schauble. L, 'The development of scientific reasoning in knowledge-rich contexts' (1996) 16 *Developmental Psychology* 103.

[57] Audi. R, 'Reasons, Practical Reason, and Practical Reasoning' (2004) 17 *Ratio* 127.

[58] Supra note 43.

[59] Per Lord Dholakia, House of Lords, HL Debate, 8th of November 2013, C476.

[60] Millet. S. P, 'The Age of Criminal Responsibility in an Era of Violence: Has Great Britain Set a New International Standard' (1995) 28 *Vanderbilt Journal of Transnational Law* at 295.

[61] See generally the works of Goldson, Mcdiarmid, Arthur, Elliott, Crofts, and Maher (Among others).

[62] Supra note 44.

[63] See section 2.

[64] See Frith. C, Frith. U, 'What Can We Learn From Structural and Functional Brain Imaging' in Rutter. M, (ed), *Rutter's Child and Adolescent Psychiatry* (5th edn, Oxford University Press, Blackwell, 2008)

.

[65] See section 2.

[66] Ministry of Justice, *Youth Justice Statistic Bulletin*, (Youth Justice Board, Ministry of Justice, 2012/13).

[67] Supra note 57.