How to Cite:
Dash, S. S., Padhi, H. C., & Das, B. (2021). Place of neuroscience in Indian juvenile justice. *Linguistics and Culture Review*, *5*(S2), 948-955.
https://doi.org/10.37028/lingcure.v5nS2.1592

Place of Neuroscience in Indian Juvenile Justice

Sidhartha Sekhar Dash
Assistant Professor-II and PhD Scholar, School of Law, KIIT Deemed to be University, Patia, Bhubaneswar, Odisha, India

Harish Ch. Padhi
Guest Faculty, School of Law, KIIT Deemed to be University, Bhubaneswar, Odisha, India

Biswadeep Das
Assistant Professor, School of Biotechnology, KIIT Deemed to be University, Bhubaneswar, Odisha, India

***Abstract*---**Youths are important assets of a country. To realize the full potential of youth, the law is an instrument. Youth delinquency impedes his development. The response of the law is both a carrot and stick approach so far. While a host of disciplines try to understand youths, their behaviors, science, more particularly neuroscience, has its relevance. This paper makes an exploration of normative position and recent scientific advancement to understand a juvenile and his delinquency. The paper adopts the exploratory method on the status of values on juvenile justice in Constitutional and legislative norms in India and cognitive and developmental neuroscience. The paper concludes with a perspective on the scientific orientation of juvenile responsibility and reform.

***Keywords*---**cognitive development and juvenile justice, health law, juvenile justice, neuro-jurisprudence, neurolaw.

Introduction

Juvenile justice and reform are constantly challenging. Laws are enacted, to address the concern of justice as well as not to victimise a youth all the while considering him a delinquent. However, reformation of law is always a felt need of the changing values of society and is continuous. Concerns of the laws are, fixing responsibility, offering reformation to offender or delinquent, and to do justice to the victims. However, it is also important for the law to diagnose the problems

***Corresponding author**: Dash, S. S.; Email: sidharthadash.1981@gmail.com*
Manuscript submitted: 27 June 2021, Manuscript revised: 09 Sept 2021, Accepted for publication: 18 Oct 2021

and understand the challenges posed to social values. The risky delinquent behaviour of youth as well as, resultant negative impact on his growth and development of the nation can be addressed to a great deal by Science and law both working together. Understanding a phenomenon and response to address the challenges posed by it, research on both the disciplines should work in tandem. The exploration into the domains both law and science on the values associated with a juvenile is the first step (Suacana, 2016; Gede Budasi & Wayan Suryasa, 2021).

Approach of science and law

The methodologies and objectives of the science are different to that of normative science of law. On a statement of a truth, while the causation of science is absolute and invariable, where as the normative science, the same association is 'most probable'. That apart, the language of the science for the expression of the truth statement is different to that of the language of law. Both the discipline may at times be referring to the same sets of facts or events however, entirely from the different sets of words, giving rise to a gap of meaning and language. With these limitations in the mind, the relevance of association between science and law must be explored (Manullang, 2021; Davydova et al., 2021).

About neuroscience

Neuroscience is one of the most emerging sciences with fast new horizons of research. Scientists have made significant improvement in understanding the human brain, its functions, and malfunctions. The scientific study of the nervous system, neuroscience, has made a revolution in medical practices. The term neuroscience was coined by Francis O. Schmitt in 1962, which is the year proposed by some historians as the birth of contemporary neuroscience . It is currently an interdisciplinary science that collaborates with other fields. Neuroscience shows an understanding of how the nervous system works. "Neuroscience is the scientific study of the nervous system ." Medical Definition of cognitive neuroscience states as "(n) a branch of neuroscience concerned with the biological processes of the nervous system which form the basis of cognitive functioning" ."Cognitive neuroscience is an interdisciplinary area of study that has stemmed from neuroscience and psychology ". "Developmental neuroscience is that branch of neuroscience that is specifically interested in the development of the nervous system. Developmental neuroscience is devoted to research to further the understanding of how neural systems develop and perform their complex tasks ". Both the cognitive and developmental neurosciences find more relevance these days in the legal jurisprudence to expand its scope (Greenbaum & Javdani, 2017; Lee & Villagrana, 2015).

Normative position of juvenile justice

Constitutional Position: To understand as to who can be considered a juvenile, the normative position mostly is considered, and all the efforts and resources of the county are used to frame various other principles for the development and protection of a juvenile. "The UN Convention on the Rights of Child, 1989 defines 'child' means a human being below the age of eighteen years unless the law

declaration applicable to child, majority is attained earlier ". In India, the grundnorm position can be found from the context of Art 24 of the Constitution of India, where it is stated that a child below the age of 14 years cannot be employed hazardous employment. Here, though the position of the law has fixed 14 years as the prohibiting age, the rationale for fixing it at 14 was most probably looking the supposed notion around that time when the Article was incorporated. It is also difficult probe as to how the constitution maker reached at the age of 14, except for a notion of interpretation that court adopts that, the wisdom of the legislature must be sound (Ford et al., 2013; Miller, 2014; Mathys, 2017).

On these premises, using the established principles of interpretations, arrived in "M C Mehta v. Union of India that, as construction work being hazardous employment, children below 14 cannot be employed". Article 39(e) prohibits the tender age of the children from being abused. Article 39(f)" ensures that the children are grown healthily and are protected from exploitation (Goldstein et al., 2013; Szmukler et al., 2014). It is the duty of the state under Article 39 of the Constitution to ensure that the tender age of children is not abused and that they are forced by economic necessity to enter into fields of work whereby they are forced to provide labour that is unsuitable to their age and physical strength". Legislative Position India had also made legal requirements that mainly and especially dealing with the rights and security of adolescent wrongdoer those seek to deal with the problem of adolescent wrongdoing. As per "Children Act, 1960, 'child' is a person, if a girl, under 18 years of age and if a boy, under 16 years of age ". As per the "Juvenile (Care and Protection) Act, 2015, a 'child' is a person who has not completed 18 years of age "

Juvenile Justice System in India follows the principles that a young person 'in conflict with law, be separately tried. Opportunities for correction are to be given correct and mend his life. The provisions of the Act of 2015 apply for the intervention of community-based agencies like Observation Homes and Special Homes for the reform of a young offender are given first chance than to impose penal sentence. The paramount interest is the welfare of the child and his rehabilitation. A clear distinction between 'child in conflict with law' and 'child in the need of care and protection' is made under the Act of 2015. Irrespective of gender, if a person commits an offence who at the date of commission is a child, he is considered as 'child in conflict with law'. However, after the infamous Nirbhaya Case an amendment in the Act of 2015, a 'child in conflict with law' in the age group of 16 to 18 years, and is involved in heinous offences, like murder, rape etc., is to be tried like an adult offender (Grisso et al., 2001; Ryan et al., 2007).

Punishment and positivism

In the Court of law, the responsibility of a child follows from the hard positivism, the prohibition is found from the law as it is not law what it ought to be. Indian Penal code recognises the principles of doli incapex, means, harbouring incapacity for the evil. Here, the incapacity is understood not only loosely from the physical capacity to undertake the dastardly crime but more prominently about the knowledge that his deeds are in fact crime and what consequence it may follow. Here the absence of knowledge negates mens rea for the offence. Age

of 7 years to absolve absolutely from punishment and 7 to 12 years depending upon mental development to absolve from punishment are determinant factors under the Indian Penal Code. Reasonable or unreasonable, scientific or unscientific, the age up to 7 years and between 7 to 12 years has been fixed normatively. As per the positivism, for the fixation of the responsibility for the offence, the crime is found from the evidence adduced like any document, school certificate, date of birth certificate. While these documentary facts are very crucial and are so far serving the purpose of the law, however, it is still yet to be scientifically found, if the mind of the juvenile is truly doli-incapex (Steinberg, 2008; Wasserman et al., 2003).

If a person is a day behind or after the age of majority, i.e 18, it becomes very consequential. There may not be a huge difference of a person who is one day behind the age of 18 and one day post the age of 18, as to how he conducts himself and how he thinks, if he's mature enough from the perspective of science, however, it shall be highly consequential on the life and liberty of a person from the perspective law. Considering this high magnitude of impact upon the life and liberty of a person, there can be a good case for the law of crimes and criminology for the appreciation of scientific understanding and perspective on the juvenile.

Criminology of punishment

Under Indian Jurisprudence, reformists believe prison-stay as means to re-educate to bring the personality of a prisoner in consonance to the values of the society to make him a law-abiding citizen and a useful member of the society. The punishment is not a means to achieve any fruit for any other persons, rather for benefits of the prisoner. For reformists, crime is a pathological phenomenon and hence, can be cured through rehabilitative sentencing just like medicine cures a disease. Hence crime is a disease for the reformists. When a crime is considered as a disease, the diagnosis of the phenomenon can fruitfully be learnt through the discipline of neuroscience. Not only for the reformation but also for the analysis of phenomenon to understand a juvenile, his determination, the effects of his deeds can be understood through neuroscience (Spear & Varlinskaya, 2010; Gogtay et al., 2004).

Neuroscience perspective on the values of juvenile justice

Normative position can be one of the ways to assess the responsibility of a juvenile, whereas criminology helps build a better perspective to reform sentencing policy. Both this branch cannot simply overlook the recent development in the front of neuroscience. Normative position can profitably be contributed from the neuroscience for the formulation of responsibility and sentencing policy shall more orient itself scientifically. Neuroscience primarily considers the understanding of the brain and its development, and host of concepts around it. The understanding about juvenile from the perspective of neuroscience, begins from understanding, as to which area of the brain does which activity, what are the various functions of the brain, how does it perform actions, the age of the brain, and many otherworldly concepts. Questions like how a judgement is arrived at, what are the factor associated with it, how a choice is made by the brain, does a brain make a moral decision, what is the basis of

neuroscientific basis of a moral decision or economic decision, or choice of an offence behaviour, are to a great deal is researched these days in neuroscience. It can inform the policymaking on a host of legal rules, from penal to employment to other civil rights and reforms.

“Globally juvenile justice policies are increasingly informed by developments in brain science that probe questions of culpability and blameworthiness of adolescent offenders ”. “Adolescents and young adults always have presented unique challenges to policy-makers. ” “Higher incidents of criminal activity, substance use disorders, and the emergence of psychopathologies are often reported during this sensitive period amongst a range of potentially co-morbid factors. Prominent aspects include an increase in risky behaviours, higher degrees of sensation seeking and impulsivity, greater sensitivity to rewards, and heightened reactivity to threat and punishment ”. “Capacities relevant to criminal responsibility are still developing when you’re 16 or 17 years old. ” “Legal issues concerning the age of majority beg the question − when should an adolescent be considered an adult?. ” “While juveniles can legally go under trial as adults, their brains are extremely different, from the normal adults. ”

Brain Age: Finding of the Brain Age can be an important perspective to look at the policy of juvenile justice. The neuroscience, now a day, is using various techniques to measure the age of the brain, not just from the physiological shape but by observing its functional features. Now a day, data are taken with the assistance of fMRI, and the data are analysed with various so-called worldly concepts. Understanding the development of an adolescent is challenging both on cognitive as well as emotional aspect. “The cognitive control system includes the dorsolateral part of the frontal lobe. This system provides control over the social-emotional system but takes more time than the social-emotional system to develop. The social-emotional system includes part of the limbic midbrain system and the orbital frontal areas, part of the frontal lobe. It develops way faster than the cognitive control system does. The social-emotional system controls specifically the emotional state of the brain. With the fast development of this system teenagers have: increase in need of a sense of rewards/ increased seeking of sensation more reaction to emotional responses to both negative and positive emotions/ increased being attentive to social cues ”. “As the cognitive control system works and gets mature through adolescence it provides: increase in impulse control of the teen/ better regulation of emotional system/ detection of options and more foresight/ anticipation of outcomes and better planning / more resistance power to handle stress and peer pressure ”. The Impulsivity, Sensation seeking, Susceptibility to peer, problem-solving time decline with age (Cohen & Casey, 2014; Rudolph et al., 2017).

In a scholarly article, Marc D. Rudolph and others putting an effort to make a baseline age and take empirical data to find the association between the ‘brain age’ with ‘emotional state’ and risk ‘preference’. They state “we define brain age as ones predicted age based on brain measurements relative to their true age ”. “Along with the functional data in the neutral state, these data provide evidence for a baseline brain age for a given individual ”. Also, “on average that brain age across the group during the teen years has the propensity to look younger in emotional contexts ”. This type of observable characteristics can be measured. It

is called as phenotypes. Means, the phenotypes, means 'a younger age in emotional context' has a pattern. It has "a pattern exemplified greatest in young-adults (ages 18–21) ". The authors concluded of a "specified functional brain phenotype that relates to being at 'risk to be risky' ".

This clinical result can be used by the court at different stages of a criminal case if the court wants to buttress other circumstantial evidence. The method here can be suggestive of the age of the mind of a person, which has direct bearings with the potentiality of mens rea, both to fix the responsibility as well as absolve the responsibility, so also, at the time of sentencing and penalising with appropriate reformative measures.

The characteristic of a Brain of an adolescent, Spear, L.P. and Varlinskaya state, "The teen-years (transient developmental period) represents a period of struggle between seeking independence from parents while still being dependent on them for many basic needs ". Differing the young brains with that of the adolescents, Alexandra O. Cohen and B.J. Casey state, "One of the key differences between an adult and adolescent brains, is the lack of prefrontal cortex development in young brains as compared to adults (Casper, 2015; Rao & Krishnan, 2015). The prefrontal cortex controls humans' ability in many forms like "Reflect and delay (the lack of capacity for development limits the amount of time juveniles will think before doing any act); taking all options into account (juveniles are extremely impulsive in their acts); contemplate risks of the act the juveniles do and consequences of the said act having social- intelligence about the act they do (juveniles have in some cases difficulty being empathetic to any of the matter and are susceptible to go under peer pressure of the society)" . During the teen period, "cortical development and functional circuits are highly dynamic. Phylogenetically older regions of the brain are fine-tuned first, whereas higher-order association cortices mature later, with areas of the prefrontal cortex important for regulation of behaviour, not reaching maturity until the early twenties. " "Concurrent with these neurobiological changes are marked behavioural changes in risk-taking, judgment, and decision making ". However, Stenberg gives slightly different findings on the subject. He states "while on average the increased prevalence of risky behaviour and irrational decision-making across the adolescent and young adult periods have been shown repeatedly, not all adolescents fit this behavioural profile ".

The above literature shows that, due to lack of capacity for the development, a juvenile can be more impulsive as, this lack of capacity for the development creates a limitation on the time consumed by a juvenile to think before does any action, say a prohibited act. This legally means, whether a juvenile has been influenced by impulse, the origin of impulse or it is a cool calculation, can be ascertained. These findings shall immensely help the court while fixing responsibility or to adopt a therapeutic approach (Steinberg, 2009; Cohen et al., 2016).

Conclusion

Science and law are to go long way, contributing one another. Neuroscience has immense potential to offer the jurisprudence of law. Juvenile justice is an

important area, to begin with. Analysis of various dimensions juvenile justice in the light of development in the field of neuroscience shall make justice more realistic as well as sever the purpose of the law. Fixation of legal responsibility of a juvenile and his reforms can truly achieve its desired ends if we shape the law, its underlying values including its objectives nearer to the new scientific developments.

References

Casper, S. T. (2015). Nikolas Rose and Joelle M. Abi-Rached. Neuro: The New Brain Sciences and the Management of the Mind. Princeton, NJ: Princeton University Press, 2013. 335 pp.+ xii. 24.95/£16.95(paper).ISBN:9780691149615. 70.00/£ 48.95 (cloth). ISBN: 9780691149608.

Cohen, A. O., & Casey, B. J. (2014). Rewiring juvenile justice: the intersection of developmental neuroscience and legal policy. *Trends in cognitive sciences*, *18*(2), 63-65.

Cohen, A. O., Breiner, K., Steinberg, L., Bonnie, R. J., Scott, E. S., Taylor-Thompson, K., ... & Casey, B. J. (2016). When is an adolescent an adult? Assessing cognitive control in emotional and nonemotional contexts. *Psychological Science*, *27*(4), 549-562.

Davydova, N. O., Shatilo, V. A., Babiuk, A. M., & Levchuk, M. V. (2021). History of legal regulation of relations in the field of education in Ukraine. *Linguistics and Culture Review*, *5*(S2), 328-341. https://doi.org/10.37028/lingcure.v5nS2.1356

Ford, J. D., Grasso, D. J., Hawke, J., & Chapman, J. F. (2013). Poly-victimization among juvenile justice-involved youths. *Child abuse & neglect*, *37*(10), 788-800. https://doi.org/10.1016/j.chiabu.2013.01.005

Gede Budasi, I. & Wayan Suryasa, I. (2021). The cultural view of North Bali community towards Ngidih marriage reflected from its lexicons. *Journal of Language and Linguistic Studies*, *17*(3), 1484–1497

Gogtay, N., Giedd, J. N., Lusk, L., Hayashi, K. M., Greenstein, D., Vaituzis, A. C., ... & Thompson, P. M. (2004). Dynamic mapping of human cortical development during childhood through early adulthood. *Proceedings of the National Academy of Sciences*, *101*(21), 8174-8179.

Goldstein, N. E., Serico, J. M., Romaine, C. L. R., Zelechoski, A. D., Kalbeitzer, R., Kemp, K., & Lane, C. (2013). Development of the juvenile justice anger management treatment for girls. *Cognitive and behavioral practice*, *20*(2), 171-188. https://doi.org/10.1016/j.cbpra.2012.06.003

Greenbaum, C. A., & Javdani, S. (2017). Expressive writing intervention promotes resilience among juvenile justice-involved youth. *Children and Youth Services Review*, *73*, 220-229. https://doi.org/10.1016/j.childyouth.2016.11.034

Grisso, T., Barnum, R., Fletcher, K. E., Cauffman, E., & Peuschold, D. (2001). Massachusetts Youth Screening Instrument for mental health needs of juvenile justice youths. *Journal of the American Academy of Child & Adolescent Psychiatry*, *40*(5), 541-548. https://doi.org/10.1097/00004583-200105000-00013

Lee, S. Y., & Villagrana, M. (2015). Differences in risk and protective factors between crossover and non-crossover youth in juvenile justice. *Children and*

Youth Services Review, *58*, 18-27. https://doi.org/10.1016/j.childyouth.2015.09.001

Manullang, S. O. (2021). Understanding the sociology of customary law in the reformation era: complexity and diversity of society in Indonesia. *Linguistics and Culture Review*, *5*(S3), 16-26. https://doi.org/10.37028/lingcure.v5nS3.1352

Mathys, C. (2017). Effective components of interventions in juvenile justice facilities: How to take care of delinquent youths?. *Children and Youth Services Review*, *73*, 319-327. https://doi.org/10.1016/j.childyouth.2017.01.007

Miller, L. (2014). Juvenile crime and juvenile justice: Patterns, models, and implications for clinical and legal practice. *Aggression and violent behavior*, *19*(2), 122-137. https://doi.org/10.1016/j.avb.2014.01.005

Rao, M. M., & Krishnan, V. (2015). Neuroscience and the Juvenile Legislation. The Hindu.

Rudolph, M. D., Miranda-Domínguez, O., Cohen, A. O., Breiner, K., Steinberg, L., Bonnie, R. J., ... & Fair, D. A. (2017). At risk of being risky: The relationship between "brain age" under emotional states and risk preference. *Developmental cognitive neuroscience*, *24*, 93-106.

Ryan, J. P., Herz, D., Hernandez, P. M., & Marshall, J. M. (2007). Maltreatment and delinquency: Investigating child welfare bias in juvenile justice processing. *Children and Youth Services Review*, *29*(8), 1035-1050. https://doi.org/10.1016/j.childyouth.2007.04.002

Spear, L. P., & Varlinskaya, E. I. (2010). Sensitivity to ethanol and other hedonic stimuli in an animal model of adolescence: implications for prevention science?. *Developmental Psychobiology: The Journal of the International Society for Developmental Psychobiology*, *52*(3), 236-243.

Steinberg, L. (2008). A social neuroscience perspective on adolescent risk-taking. *Developmental review*, *28*(1), 78-106.

Steinberg, L. (2009). Adolescent development and juvenile justice. *Annual review of clinical psychology*, *5*, 459-485.

Suacana, I. W. G. (2016). The gender equality and justice of Balinese women in traditional life. *International Journal of Linguistics, Literature and Culture*, *2*(3), 45-55.

Szmukler, G., Daw, R., & Callard, F. (2014). Mental health law and the UN Convention on the rights of persons with disabilities. *International journal of law and psychiatry*, *37*(3), 245-252. https://doi.org/10.1016/j.ijlp.2013.11.024

Wasserman, G. A., Jensen, P. S., Ko, S. J., Cocozza, J., Trupin, E., Angold, A., ... & Grisso, T. (2003). Mental health assessments in juvenile justice: report on the consensus conference. *Journal of the American Academy of Child & Adolescent Psychiatry*, *42*(7), 752-761. https://doi.org/10.1097/01.CHI.0000046873.56865.4B

Yogasari, I. A. M., & Budiasih, I. G. A. N. (2019). Impact of organizational justice perceptions and transformational leadership role on counter productive work behavior. *International research journal of management, IT and social sciences*, *6*(6), 239-243.