

**COGNITIVE AND MORAL DEVELOPMENT, BRAIN
DEVELOPMENT, AND MENTAL ILLNESS: IMPORTANT
CONSIDERATIONS FOR THE JUVENILE JUSTICE
SYSTEM**

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I. INTRODUCTION

Since Illinois created the nation’s first juvenile court in 1899,¹ the legal system has recognized that juveniles are different than adults in many ways and, consequently, should be treated differently by the courts. Children and adolescents are, by definition, a “work in progress” and early intervention can help reshape detrimental cognition and behavior. It is with this focus that juvenile courts emphasize *rehabilitation* rather than *punishment*. Different theories have been put forth to explain the thought

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1. PRINCIPLES AND PRACTICE OF CHILD AND ADOLESCENT FORENSIC PSYCHIATRY 259 (Diane H. Schetky & Elissa P. Benedek eds., 2002).

processes and behaviors youth exhibit during the first two decades of their lives. Recent research into the development of the human brain has supported these theories and has allowed for an expanded understanding of cognitive and behavioral maturation during childhood.

The purpose of this Article is fourfold: (1) to outline two psychological theories concerning cognitive and moral development in children;² (2) to summarize recent research on juvenile brain development and related implications for understanding juveniles' behaviors;³ (3) to explain how mental illness may impact brain development (and thereby influence cognition and behavior);⁴ and (4) to discuss the integration of psychological theory, brain development, and mental illness with the juvenile justice system.⁵

II. PIAGET AND KOHLBERG: TWO INFLUENTIAL THEORIES OF CHILD DEVELOPMENT

Numerous efforts have been made to describe the maturation processes children undergo. Theories regarding emotional, social, behavioral, moral, and cognitive development have been proposed. One influential model of cognitive development was articulated by Jean Piaget, who theorized that children move sequentially through four stages of cognitive development.⁶ First, in the *sensorimotor stage* (birth to about eighteen to twenty-four months), children receive environmental stimuli and react in stereotyped manners.⁷ Later, in the *pre-operational stage* (age two years to about age five to seven years), children exhibit egocentric thinking (everything is about the child) and magical thinking (reality and fantasy are interwoven). Children in these ages demonstrate early stages of moral thinking, in which things are thought of as either "good" or "bad."⁸ Third, children aged six to eleven years begin to show signs of *concrete operations*, in which they exhibit rational and logical

2. See *infra* Part II.

3. See *infra* Part III.

4. See *infra* Part IV.

5. See *infra* Part V.

6. See MASS. GEN. HOSP., MASSACHUSETTS GENERAL HOSPITAL PSYCHIATRY UPDATE AND BOARD PREPARATION 29-30 (Theodore A. Stern & John B. Herman eds., 2d ed. 2000); see also CHILD AND ADOLESCENT PSYCHIATRY: A COMPREHENSIVE TEXTBOOK 135-38 (Melvin Lewis ed., 2d ed. 1996).

7. CHILD AND ADOLESCENT PSYCHIATRY, *supra* note 6, at 136.

8. *Id.*

thought.⁹ A more conceptual framework for understanding the world develops, and children are able to understand another individual's point of view.¹⁰ Lastly, after age eleven years, children develop the capacity for *formal operations*.¹¹ This stage is marked by enhanced abilities for abstract thinking and deductive reasoning.¹²

Lawrence Kohlberg, a well-known University of Chicago and Harvard University professor and Piaget follower, postulated a system of moral reasoning¹³ based on Piaget's model of cognitive development.¹⁴ Kohlberg was intrigued by responses to moral dilemmas and the reasoning used to rationalize behavior.¹⁵ He proposed that behaviors could be ascribed to each of six stages of moral development.¹⁶ In Kohlberg's model, individuals move linearly through stages, though not all people achieve the highest stage of moral reasoning.¹⁷ *Pre-conventional (pre-moral) reasoning* (stages one and two) is often observed in children up to nine years of age.¹⁸ Individuals in stage one demonstrate deference to authority.¹⁹ Avoidance of punishment helps the child develop beliefs about what is "right" and "wrong."²⁰ In stage two, individuals begin to exhibit behaviors reflecting values of "exchange and reciprocity."²¹ One's own needs and the needs of others are met using a "You scratch my back, and I'll scratch yours" approach.²²

Stages three and four (*conventional reasoning/morality*) are more commonly found in adolescents and adults.²³ They reflect a basic focus on social norms and expectations. Stage three is marked by conformity to rules; approval or disapproval from others

9. *Id.* at 137.

10. *Id.*

11. *Id.*

12. *Id.*; see also MASS. GEN. HOSP., *supra* note 6, at 27.

13. CHILD AND ADOLESCENT PSYCHIATRY, *supra* note 6, at 215; see also PSYCHOLOGY FOR PSYCHIATRISTS 93-95 (Deepa S. Gupta & Rajinder M. Gupta eds., 2000); Kohlberg's Stages of Moral Development, WIKIPEDIA, THE FREE ENCYCLOPEDIA, http://en.wikipedia.org/w/index.php?title=Kohlberg's_stages_of_moral_development&oldid=36957739 (last visited Feb. 3, 2006) [hereinafter *Kohlberg's Stages of Moral Development*].

14. ROBERT A. BARON, ESSENTIALS OF PSYCHOLOGY 307 (2d ed. 1999).

15. CHILD AND ADOLESCENT PSYCHIATRY, *supra* note 6, at 215.

16. *Id.*

17. *Id.*

18. *Kohlberg's Stages of Moral Development*, *supra* note 13.

19. CHILD AND ADOLESCENT PSYCHIATRY, *supra* note 6, at 215.

20. PSYCHOLOGY FOR PSYCHIATRISTS, *supra* note 13, at 93.

21. CHILD AND ADOLESCENT PSYCHIATRY, *supra* note 6, at 215.

22. *Kohlberg's Stages of Moral Development*, *supra* note 13.

23. *Id.*

influences the individual's perception of "right" and "wrong."²⁴ In stage four, individuals focus less on approval or disapproval, instead reasoning that a system of rules is essential to ensuring order in society. Behavior that upholds the social order is seen as being "right."²⁵ *Post-conventional reasoning* (stages five and six) is typically found only in adults and reflects attainment of self-accepted moral principles and a struggle to go beyond simple "law and order."²⁶ Stage five reasoning includes behaviors that are adherent to laws to the extent that such laws serve a social purpose. Laws are seen less as an "end" but rather as a "means" to achieving a higher purpose (e.g., social justice or human rights).²⁷ Laws are not absolute and are thus viewed as subject to change. In stage six, individuals exhibit abstract thinking and reasoning with a goal of adhering to ethical principles through which "justice" can be achieved.²⁸

These developmental theories of Piaget and Kohlberg provide a framework for understanding how juveniles think and how they interact with the world around them. By extension, such theories can be useful to a juvenile justice system seeking to intervene when a child exhibits behavior inconsistent with societal expectations. In keeping with these and other psychological constructs, a legal theory informally known as the "rule of sevens" proposes degrees of culpability, or criminal responsibility, based on age.²⁹ Specifically, there is a presumption of "no culpability" up to age seven years, a "rebuttable presumption of no culpability" from ages seven to fourteen years, and a presumption of "culpability" for those children older than fourteen years.³⁰ This "rule of sevens" demonstrates the legal system's recognition of the role cognitive and moral development play in understanding juveniles' behavior.

III. UNDERSTANDING NORMAL BRAIN DEVELOPMENT

Until only recently, attempts at comprehensively integrating theories of cognition and behavior with a detailed understanding of brain development have been difficult. Such efforts have relied

24. *Id.*

25. CHILD AND ADOLESCENT PSYCHIATRY, *supra* note 6, at 215.

26. PSYCHOLOGY FOR PSYCHIATRISTS, *supra* note 13, at 95.

27. Kohlberg's *Stages of Moral Development*, *supra* note 13.

28. PSYCHOLOGY FOR PSYCHIATRISTS, *supra* note 13, at 95.

29. *In re Devon T.*, 584 A.2d 1287, 1290 (Md. Ct. Spec. App. 1991) (citing WAYNE R. LAFAYE & AUSTIN W. SCOTT, JR., CRIMINAL LAW 398 (2d ed. 1986)).

30. *Id.*

on studying patients who have sustained injuries resulting in brain damage as well as utilizing post-mortem (autopsy) analyses. These methods allowed researchers and clinicians to correlate behavioral observations with observable anatomical pathology.

The case of Phineas Gage provided early information about the role of the frontal lobes of the brain.³¹ While working in railroad construction in 1848, an accidental explosion caused a forty-three inch iron bar, one and one quarter inches in diameter at one end and one quarter inch in diameter at the other, to be propelled through Gage's head.³² Amazingly, the injury did not kill the twenty-five-year-old.³³ It did, however, result in significant damage to the left front part of his brain.³⁴ Though he recovered physically from his injury, Gage reportedly exhibited a substantial change in his behavior following the accident:

[B]ecause his personality had changed so much, the contractors who had employed him would not give him his place again. Before the accident he had been their most capable and efficient foreman, one with a well-balanced mind, and who was looked on as a shrewd smart business man. He was now fitful, irreverent, and grossly profane, showing little deference for his fellows. He was also impatient and obstinate, yet capricious and vacillating, unable to settle on any of the plans he devised for future action.³⁵

This account highlights the now well-understood fact that different regions of the brain control different aspects of human behavior. Particularly relevant to the issue of juvenile justice, the right and left frontal lobes (located just behind the forehead), are thought to play a role in "executive functions" such as planning, impulse control, and reasoning.³⁶ Other brain regions, including the cerebellum (located in the back of the head), may assist in these functions as well. Some of Gage's personality changes were likely related to damage to frontal-lobe circuits. By extension, children may exhibit poor impulse control and deficits in planning

31. Malcolm Macmillan, *Phineas Gage's Story*, <http://www.deakin.edu.au/hbs/GAGEPAGE/Pgstory.htm> (last visited Feb. 3, 2006).

32. *Id.*

33. *Id.*

34. *Id.*

35. *Id.*

36. NAT'L INSTITS. OF HEALTH, PUB. NO. 01-4929, *TEENAGE BRAIN: A WORK IN PROGRESS* (2001), *available at* <http://www.nimh.nih.gov/publicat/teenbrain.cfm>.

because of their incompletely developed frontal lobes.

Recent research has helped elucidate the timeline of normal brain development.³⁷ It is now postulated that the human brain develops in a nonlinear fashion, with different regions of the brain developing at different times and at different rates. The human brain contains both gray matter and white matter. Gray matter includes nerve cells (and other structures), whereas white matter describes the portion of the nerve that is covered by myelin. Myelin is a substance that “insulates” the message-conducting part of the neuron, allowing signals to travel more quickly and efficiently.

Though total brain size does not change substantially after age five years,³⁸ it does undergo dramatic changes over the lifetime. Significant changes occur both before and after birth.³⁹ Gray matter develops in a non-linear manner until puberty, at which time the brain undergoes a wave of gray matter loss (termed “pruning”). This loss is essentially a “use it or lose it” phenomenon that allows the brain to trim unused connections in an effort to enhance the function of the remaining nerves. White matter—the myelin sheathing around nerves that allows for enhanced communications between the cells—increases throughout life. In a study by Jay Giedd and colleagues, frontal lobe gray matter increased over childhood, reaching a maximum size at 12.1 years for males and 11.0 years for females.⁴⁰ Temporal lobe gray matter did not reach its maximum until 16.5 years for males and 16.7 years for females.⁴¹ Occipital lobe gray matter increased throughout the age range studied (four to twenty-two years) without evidence of decrease.⁴²

The implications of this research are dramatic when considered in the context of the functional maturation process. As Nitin Gogtay and colleagues explain in describing the results of their study:

37. Nitin Gogtay et al., *Dynamic Mapping of Human Cortical Development During Childhood Through Early Adulthood*, 101 PROCEEDINGS NAT'L ACADS. SCI. 8174, 8174-79 (2004).

38. Sarah Durston et al., *Anatomical MRI of the Developing Human Brain: What Have We Learned?*, 40 J. AM. ACAD. CHILD & ADOLESCENT PSYCHIATRY 1012, 1014 (2001).

39. In utero (pre-birth) brain changes are beyond the scope of this article.

40. Jay N. Giedd et al., *Brain Development During Childhood and Adolescence: A Longitudinal MRI Study*, 2 NATURE NEUROSCIENCE 861, 861-63 (1999).

41. *Id.* at 862.

42. *Id.*

[P]arts of the brain associated with more basic functions matured early: motor and sensory brain areas matured first, followed by areas involved in spatial orientation, speech and language development, and attention (upper and lower parietal lobes). Later to mature were areas involved in executive function, attention, and motor coordination (frontal lobes).⁴³

Recognition that the process of human brain development is ongoing throughout childhood and adolescence provides anatomical evidence to support the psychological theories put forth by Piaget, Kohlberg, and others.

IV. BRAIN DEVELOPMENT AND MENTAL ILLNESS

As the case of Phineas Gage and similar cases involving other patients demonstrate, damage to a specific brain region can have dramatic implications for alterations in cognition and behavior. As the medical and scientific communities are gaining a deeper understanding of the process of normal brain development, other researchers have sought to determine if abnormalities in the development or function of specific brain regions can be linked to or implicated in certain mental illnesses. A 1996 study by F. Xavier Castellanos and colleagues demonstrated that males aged five to eighteen years suffering from attention-deficit hyperactivity disorder (ADHD) exhibited a 4.7% smaller total cerebral volume than matched healthy controls (comparison subjects).⁴⁴ Additionally, the same research showed that boys with ADHD typically had a smaller right caudate nucleus,⁴⁵ a smaller right globus pallidus, a smaller right anterior frontal region, and a smaller cerebellum.⁴⁶ A similar study demonstrated that girls with ADHD had a smaller total brain volume, as well as a smaller posterior-inferior cerebellar vermis (a part of the cerebellum) than matched healthy controls.⁴⁷

Imaging studies have revealed anatomical differences in

43. See Gogtay et al., *supra* note 37 and accompanying text.

44. F. Xavier Castellanos et al., *Quantitative Brain Magnetic Resonance Imaging in Attention-Deficit Hyperactivity Disorder*, 53 ARCHIVES GEN. PSYCHIATRY 607, 607 (1996).

45. *Id.* at 611.

46. *Id.* at 607.

47. F. Xavier Castellanos et al., *Quantitative Brain Magnetic Resonance Imaging in Girls with Attention-Deficit/Hyperactivity Disorder*, 58 ARCHIVES GEN. PSYCHIATRY 289, 289 (2001).

patients suffering from depression, as well. Isabelle Rosso and colleagues recently found that a group of children with depression had significant reductions in amygdala volumes compared to healthy controls.⁴⁸ A study by Ronald Steingard and colleagues found that children with depression had smaller whole brain volumes, as well as smaller frontal white matter volumes and larger frontal gray matter volumes.⁴⁹ An earlier study revealed that children and adolescents with depression had larger ventricles (the space in which cerebrospinal fluid flows).⁵⁰ Additionally, a study of adolescents thirteen to eighteen years of age revealed smaller left hippocampus volumes (by seventeen percent) in those suffering from a major depressive disorder as compared to healthy controls.⁵¹

Other studies have demonstrated significant differences in children and adolescents suffering from psychotic disorders.⁵² Judith Rapoport and colleagues showed that children suffering from schizophrenia had a fourfold greater decrease in gray matter volume during adolescence,⁵³ while Leslie Jacobsen and colleagues found that children with schizophrenia had a smaller cerebellar vermis than healthy controls.⁵⁴ This and other research supports the notion that psychiatric illness is often marked by specific, measurable abnormalities in brain development.

48. Isabelle M. Rosso et al., *Amygdala and Hippocampus Volumes in Pediatric Major Depression*, 57 *BIOLOGICAL PSYCHIATRY* 21, 21 (2005).

49. Ronald J. Steingard et al., *Smaller Frontal Lobe White Matter Volumes in Depressed Adolescents*, 52 *BIOLOGICAL PSYCHIATRY* 413, 413 (2002).

50. Ronald J. Steingard et al., *Structural Abnormalities in Brain Magnetic Resonance Images of Depressed Children*, 35 *J. AM. ACAD. CHILD & ADOLESCENT PSYCHIATRY* 307, 310 (1996).

51. Frank P. MacMaster & Vivek Kusumakar, *Hippocampal Volume in Early Onset Depression*, *BMC MEDICINE* (2004), <http://www.biomedcentral.com/1741-7015/2/2>.

52. Briefly, psychotic disorders are those in which the patient experiences a loss of reality testing. Psychosis is often marked by experiencing auditory hallucinations, delusional thinking, and other impairing symptoms.

53. Judith L. Rapoport et al., *Progressive Cortical Change During Adolescence in Childhood-Onset Schizophrenia*, 56 *ARCHIVES GEN. PSYCHIATRY* 649, 649 (1999).

54. Leslie K. Jacobsen et al., *Quantitative Morphology of the Cerebellum and Fourth Ventricle in Childhood-Onset Schizophrenia*, 154 *AM. J. PSYCHIATRY* 1663, 1663 (1997).

V. FORENSIC IMPLICATIONS OF THE PROCESS OF BRAIN DEVELOPMENT AND MENTAL ILLNESS

The current state of scientific knowledge about the process of normal brain development suggests that full cognitive maturity may not occur until late in adolescence or perhaps not even until the early twenties. Recognition of this fact is critical when considering that juveniles may not possess many of the cognitive abilities assumed present in adults entering the criminal justice system. For example, the Minnesota criminal justice system currently holds that the level of competence necessary to permit a child's participation in juvenile proceedings is the same as the competence level necessary for an adult to stand trial in an adult proceeding.⁵⁵ This competence level may be lacking in juveniles, however, as was demonstrated by Thomas Grisso and colleagues in their assessment of adjudicative competence in a group of 927 adolescents (ages eleven to seventeen years) in juvenile detention and community settings.⁵⁶ They compared these youth to 466 young adults (ages eighteen to twenty-four years) in jails and in the community.⁵⁷ Their assessment included the MacArthur Competence Assessment Tool-Criminal Adjudication (MacCAT-CA) as well as the MacArthur Judgment Evaluation (MacJEN).⁵⁸ The MacCAT-CA is "a 22-item structured interview for the pretrial assessment of adjudicative competence. This instrument uses a vignette format and objectively scored questions to standardize the measurement of three competence-related abilities."⁵⁹ The MacJEN was designed specifically for the study as a research tool to examine immaturity of judgment.⁶⁰

Grisso and colleagues showed that "youths aged fifteen and younger performed more poorly than young adults, with a greater proportion manifesting a level of impairment consistent with that

55. *In re Welfare of D.D.N.*, 582 N.W.2d 278, 282 (Minn. Ct. App. 1998) (citing MINN. R. JUV. DEL. PROC. 20.01, subd. 1(B)).

56. Thomas Grisso et al., *Juveniles' Competence to Stand Trial: A Comparison of Adolescents' and Adults' Capacities as Trial Defendants*, 27 LAW & HUM. BEHAVIOR 333, 333-63 (2003).

57. *Id.*

58. *Id.*

59. See generally STEVEN K. HOGE ET AL., MACARTHUR COMPETENCE ASSESSMENT TOOL-CRIMINAL ADJUDICATION (MACCAT-CA™). For a description of the MacCAT-CA, see <http://www3.parinc.com/products/product.aspx?Productid=MACCAT-CA>.

60. Grisso et al., *supra* note 56, at 333-63.

of persons found incompetent to stand trial.”⁶¹ The study further suggested that “adolescents also tended more often than young adults to make choices (e.g., about plea agreements) that reflected compliance with authority, as well as influences of psychosocial immaturity.”⁶² These results make sense when viewed in the context of theories put forth by Piaget and Kohlberg⁶³ and when considered with the recognition that fifteen-year-olds are still undergoing the complex process of brain development.

While the process of normal brain development itself puts juveniles at risk for behaviors that may be at odds with societal expectations, juveniles with mental illness may be at added risk of running afoul of the legal system. Indeed, a study of 1829 children (1179 boys and 650 girls) in a Chicago detention center demonstrated that nearly 75% of the girls and more than 66% of the boys had one or more psychiatric disorders.⁶⁴ The Colorado Supreme Court recognized as early as 1975 that mental illness can play an important role in the juvenile justice system.⁶⁵ The court found that when a juvenile is mentally ill and not competent to proceed in trial, the juvenile is protected under Colorado law from having to answer to the charges against him or her.⁶⁶ In making this finding, the court concluded that the child need only meet the lesser burden of proof for mental illness rather than the stricter burden required for an insanity defense.⁶⁷

Many jurisdictions have recognized the complexities inherent in working with juveniles suffering from mental illnesses. Wraparound programs in Wisconsin

provide treatment and service coordination for delinquent and nondelinquent youth with mental health disorders, with the goal of keeping youth in the community and with their families when possible. Using blended funding from the juvenile justice and child welfare systems, Wraparound Milwaukee allows families to select from among an array of services and providers, and

61. *Id.*

62. *Id.*

63. *See supra* Part II.

64. DEP'T OF HEALTH & HUM. SERVS., REPORT OF THE SURGEON GENERAL'S CONFERENCE ON CHILDREN'S MENTAL HEALTH: A NATIONAL ACTION AGENDA (2000), available at <http://www.surgeongeneral.gov/topics/cmh/childreport.htm>.

65. *See generally* *Briones v. Juvenile Court for Denver*, 534 P.2d 624 (Colo. 1975).

66. *Id.* at 625.

67. *Id.* at 626.

provides “care coordination” to ensure the best use of resources.⁶⁸

Additionally, the creation and use of juvenile mental health courts, such as those in California and Ohio,⁶⁹ is a cost-effective means of reestablishing the rehabilitative mandate of a juvenile justice system established over 100 years ago that strove to treat, not punish, youth offenders in our society.⁷⁰

VI. CONCLUSION

The psychological theories put forth by Piaget and Kohlberg, along with an ever-expanding understanding of normal brain maturation and brain development in the context of mental illness, provide a solid foundation for concluding that children and adolescents really are different than adults. Children truly are “works in progress” in terms of their cognitive capacity and moral reasoning. Behaviors resulting in the juvenile coming into contact with the legal system, as well as the juvenile’s capacity to function within that system, must be weighed in that context.

68. STEPHEN SMALL ET AL., WHAT WORKS, WISCONSIN: WHAT SCIENCE TELLS US ABOUT COST-EFFECTIVE PROGRAMS FOR JUVENILE DELINQUENCY PREVENTION (2005), available at <http://www.uwex.edu/ces/flp/families/whatworkswisconsin.pdf> (citing Bruce Kamradt, *Wraparound Milwaukee: Aiding Youth with Mental Health Needs*, 7 JUV. JUST. J. 14, 32 (2000)).

69. ELLEN HARRIS & TAMMY SELTZER, JUDGE DAVID L. BAZELON CTR. FOR MENTAL HEALTH LAW, THE ROLE OF SPECIALTY MENTAL HEALTH COURTS IN MEETING THE NEEDS OF JUVENILE OFFENDERS (2004), available at <http://www.bazelon.org/issues/criminalization/publications/mentalhealthcourt/juvenilemhcourts.htm>.

70. See generally Patrick Geary, *Juvenile Mental Health Courts and Therapeutic Jurisprudence: Facing the Challenges Posed by Youth with Mental Disabilities in the Juvenile Justice System*, 5 YALE J. HEALTH POL’Y L. & ETHICS 671, 671-72 (2005).