

Introduction

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On March 10 and 11, 2005, the Justice for Children Project at The Ohio State University Michael E. Moritz College of Law, in conjunction with the *Ohio State Journal of Criminal Law* and the Center for Interdisciplinary Law and Public Policy, sponsored a groundbreaking conference on the science of brain development and functioning and the implications of that research for the legal concepts of *mens rea* and juvenile accountability and culpability. The timing of the interdisciplinary symposium was extraordinary, because nine days before the conference began, the United States Supreme Court in *Roper v. Simmons*¹ held that it is cruel and unusual punishment to execute those convicted of committing a capital offense before the age of eighteen. Noting that evolving standards of decency, as embodied in legislative enactments, determine which punishments are so disproportionate as to be cruel and unusual,² the Court found that because the majority of states had rejected the juvenile death penalty, “our society views juveniles . . . as ‘categorically less culpable than the average criminal.’”³ Juveniles are more immature and thus more prone to impetuosity and irresponsibility, “more vulnerable or susceptible to negative influences and outside pressures, including peer pressure,” and lack a well-formed character.⁴

The susceptibility of juveniles to immature and irresponsible behavior means ‘their irresponsible conduct is not as morally reprehensible as that of an adult.’ Their own vulnerability and comparative lack of control over their immediate surroundings mean juveniles have a greater claim than adults to be forgiven for failing to escape negative influences in their whole environment.⁵

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¹ 543 U.S. 551, 578 (2005).

² *Id.* at 560–61.

³ *Id.* at 567 (quoting *Atkins v. Virginia*, 536 U.S. 304, 316 (2002)).

⁴ *Id.* at 569.

⁵ *Id.* at 570 (internal citations omitted).

Although in its opinion the Court never mentions the recent advances in brain research,⁶ it is clear that the Court knew and was curious about these scientific developments.⁷ The brain research itself is extraordinarily compelling.⁸ Recent brain mapping studies indicate that the brain grows very little over the course of childhood. By the time a child is six, the brain is roughly 95% of its adult size.⁹ Moreover, a child is born with most of the neurons her brain will ever have. Humans achieve their maximum brain-cell density between the third and sixth month of gestation—the culmination of an explosive period of prenatal neural growth. During the final months before birth, our brains undergo a dramatic pruning in which unnecessary brain cells are eliminated. There is a second wave of proliferation and pruning that occurs later in childhood, and the final, critical part of this second wave, affecting some of our highest mental functions, occurs in the late teens. In fact, even though the brain of a typical teenager is maturing, it nevertheless is losing gray matter during its maturation.¹⁰

It also has become clear that brain development proceeds in stages, generally from back to front.¹¹ Some of the brain regions that reach maturity earliest—through proliferation and pruning—are those in the back of the brain. These regions control vision, hearing, touch, and spatial processing.¹² The very last part of the brain to mature is the prefrontal cortex, the part of the brain involved in planning, setting priorities, organizing thoughts, suppressing impulses, and weighing the consequences of one's actions.¹³ Thus, there is strong evidence to suggest that when it comes to maturity, organization and control, key parts of the brain related to emotions, judgment, and “thinking ahead” are the last to arrive. For teens, this means that their brains are not yet built.¹⁴

⁶ See Deborah W. Denno, *The Scientific Shortcomings of Roper v. Simmons*, 3 OHIO ST. J. CRIM. L. 379 (2006).

⁷ See Aliya Haider, *Roper v. Simmons: The Role of the Science Brief*, 3 OHIO ST. J. CRIM. L. 369 (2006).

⁸ For a more comprehensive discussion of these recent developments, see James H. Fallon, *Neuroanatomical Background to Understanding the Brain of the Young Psychopath*, 3 OHIO ST. J. CRIM. L. 341 (2006); Staci A. Gruber & Deborah A. Yurgelun-Todd, *Neurobiology and the Law: A Role in Juvenile Justice?*, 3 OHIO ST. J. CRIM. L. 321 (2006).

⁹ *Frontline: Inside the Teenage Brain: Adolescent Brains are Works in Progress* (PBS television broadcast Jan. 31, 2002), available at <http://www.pbs.org/wgbh/pages/frontline/shows/teenbrain/work/adolescent.html> [hereinafter *Frontline*].

¹⁰ ABA JUVENILE JUSTICE CENTER, *ADOLESCENCE, BRAIN DEVELOPMENT AND LEGAL CULPABILITY* 2 (2004), <http://www.abanet.org/crimjust/juvjus/Adolescence.pdf>.

¹¹ Claudia Wallis & Kristin Dell, *What Makes Teens Tick*, TIME, May 10, 2004, at 56.

¹² See Elizabeth R. Sowell et al., *Mapping Cortical Change Across the Human Life Span*, 6 NATURE NEUROSCIENCE 309, 309–15 (2003); Elizabeth R. Sowell et al., *Mapping Continued Brain Growth and Gray Matter Density Reduction in Dorsal Frontal Cortex: Inverse Relationships During Postadolescent Brain Maturation*, 21 J. NEUROSCIENCE 8819 (2001).

¹³ Sowell et al., *supra* note 12; Wallis & Dell, *supra* note 11.

¹⁴ *Frontline*, *supra* note 9.

In fact, the maturation process extends well past eighteen.

The evidence now is strong that the brain does not cease to mature until the early 20s in those relevant parts that govern impulsivity, judgment, planning for the future, foresight of consequences and other characteristics that make people morally culpable. . . . Indeed, age 21 or 22 would be closer to the 'biological' age of maturity.¹⁵

Consequently, if juvenile brains are not fully developed, then mental processes, particularly those which utilize immature regions like the frontal lobe, would be more difficult. This necessarily raises interesting questions about the culpability of juveniles and may suggest that children should not be held accountable for their actions. It is, of course, possible to argue that the research tells us nothing at all about culpability and accountability.¹⁶ On the other hand, the research might help to inform us about the ways in which we not only fail to respect, but actually take advantage of this immaturity.¹⁷

The Mind of a Child Symposium was an incredible opportunity for professionals from around the country who are working on the science of brain development and the culpability of adolescents to come together to debate publicly and personally, for the first time, the implications of this new medical research. While no consensus was reached, it is clear that as our knowledge about the brain expands, so too, will the debate surrounding our decision to hold juvenile offenders culpable for their actions.

¹⁵ ABA JUVENILE JUSTICE CENTER, *supra* note 10, at 2 (quoting Petition for Writ of Certiorari, *Patterson v. Texas*, 528 U.S. 120 (1999) (No. 98-8907)).

¹⁶ See Stephen J. Morse, *Brian Overclaim Syndrome and Criminal Responsibility: A Diagnostic Note*, 3 OHIO ST. J. CRIM. L. 397 (2006).

¹⁷ See Naomi Cahn, *Poor Children: Child "Witches" and Child Soldiers in Sub-Saharan Africa*, 3 OHIO ST. J. CRIM. L. 413 (2006).