

In The
Supreme Court of the United States

CHRISTOPHER PITTMAN,

Petitioner

v.

STATE OF SOUTH CAROLINA

On Petition For A Writ Of Certiorari
To The Supreme Court Of South Carolina

**BRIEF ON BEHALF OF CHILD AND ADOLESCENT
PSYCHOLOGY, CHILD AND ADOLESCENT BRAIN
DEVELOPMENT, AND JUVENILE JUSTICE
RESEARCHERS DONNA BISHOP, ELIZABETH
CAUFFMAN, JEFFREY FAGAN, THOMAS GRISSO,
ELIZABETH SCOTT, LAURENCE STEINBERG,
AND FRANKLIN ZIMRING AS *AMICI CURIAE*
IN SUPPORT OF PETITIONER**

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INTERESTS OF *AMICI CURIAE*¹

Amici curiae are renowned researchers in the fields of child and adolescent psychology, child and adolescent brain development, and juvenile justice. Their work has contributed significantly to important recent advances in the understanding of how behavior is critically shaped by psychological development during adolescence and by corresponding structural and functional changes in the maturing brain. *Amici curiae* have demonstrated a particular interest in the relationship between child development, crime, and the way that criminal and juvenile justice systems treat children.

Dr. Donna Bishop

Dr. Donna Bishop is a professor in the College of Criminal Justice at Northeastern University. Professor Bishop's extensive research on juvenile justice issues, much of it funded by federal and state agencies, has made her a leading expert on the impact of transferring juveniles into adult court and

¹ Letters from the parties consenting to the filing of this brief have been filed with the Clerk of this Court, pursuant to Supreme Court Rule 37.3(a). Counsel of record for all parties received notice at least ten days prior to the due date for the brief of *amici curiae*'s intention to file this brief. No counsel for a party authored this brief in whole or in part, and no person or party, other than the *amici curiae* or their counsel, made a monetary contribution intended to fund the preparation or submission of this brief.

on the effects of transfer on recidivism. She has been the editor of *Justice Quarterly*, a preeminent criminal justice journal, and is a member of the executive board of the American Society of Criminology. Professor Bishop has been a consultant to numerous courts, government agencies, and private research foundations, including, for example, the Supreme Court of Florida and the Office of Juvenile Justice and Delinquency Prevention.

Dr. Elizabeth Cauffman

Dr. Elizabeth Cauffman is a professor in the Department of Psychology and Social Behavior at the University of California, Irvine and has established a national reputation in the field of juvenile justice. Her current work examines the links between adolescent development and juvenile justice issues, focusing on the connection between maturity of judgment and the legal standards regarding competence and amenability to treatment. Over the last decade, Professor Cauffman's work has been conducted in part through her membership in the John D. and Catherine T. MacArthur Foundation Research Network on Adolescent Development and Juvenile Justice ("MacArthur Foundation Network"), which between 1997 and 2006 sponsored rigorous, wide-ranging empirical research into the operation and impact of our juvenile justice system.

Dr. Jeffrey Fagan

Dr. Jeffrey Fagan is a Professor of Law and Public Health at Columbia University, and Director of the Center for Crime, Community and Law at Columbia Law School. He is a Fellow of the American Society of Criminology. From 2000-2006, he served on the Committee on Law and Justice of the National Research Council, and he was the Committee's Vice-Chair for the final two years. Dr. Fagan's extensive research focuses on the intersection of crime, law, and social policy; adolescent criminal behavior has been one of his primary research areas for more than two decades. His scholarship has made important contributions to the ongoing discussion among researchers and policymakers about the effects of trying juveniles as adults.

Dr. Thomas Grisso

Dr. Thomas Grisso is Professor of Psychiatry at the University of Massachusetts Medical School, where he directs the Law-Psychiatry Program. Dr. Grisso is known for his research on legally-relevant capacities of youth, performed with funding by the National Institute for Mental Health and the MacArthur Foundation. He served on the Peer Review Committee of the National Council of Juvenile and Family Court Judges in their drafting of Juvenile Delinquency Guidelines and was a member of the MacArthur Foundation Network. Dr. Grisso's research across several decades has included

investigation of the capacities of juveniles to waive rights and their competence to stand trial, contributing to the development of policy in these areas, as well as research-based clinical evaluations of juveniles' capacities to navigate the legal system.

Professor Elizabeth Scott

Elizabeth Scott is the Harold R. Medina Professor of Law and the Vice Dean for Research at Columbia Law School and was a co-founder of the Center for Children, Families and the Law at the University of Virginia. Her considerable interdisciplinary scholarship on adolescent decision-making and juvenile delinquency is a critical resource for policymakers and scholars nationwide as they consider how the criminal or juvenile justice systems should handle juvenile offenders. Much of Professor Scott's work in this area has been sponsored by the MacArthur Foundation Network.

Dr. Laurence Steinberg

Dr. Laurence Steinberg is the Distinguished University Professor and Laura H. Carnell Professor of Psychology at Temple University. Dr. Steinberg is a fellow of the American Psychological Association and currently the President of its Developmental Division. He has authored over two hundred articles and ten books on a wide range of topics related to adolescent development, and is nationally renowned for his scholarship on trying juveniles as adults. Dr.

Steinberg acted as the Director of the MacArthur Foundation Network from its founding in 1997 through its completion in 2006.

Professor Franklin Zimring

Professor Zimring is the William G. Simon Professor of Law and Wolfen Distinguished Scholar at the University of California, Berkeley's Boalt Hall Law School. Professor Zimring is nationally renowned for the rigorous empirical analysis he employs to investigate the causes of crime and the consequences of crime control policies. He has edited or authored seven books on youth crime and juvenile justice and has used his expertise to help inform the public's understanding, for instance through membership on the National Research Council's panel on "Juvenile Crime: Prevention, Intervention and Control." In 2007, Professor Zimring was awarded one of the American Society of Criminology's highest honors, the Sutherland Award.

INTRODUCTION AND SUMMARY OF ARGUMENT

This case provides the Court with an important opportunity to address the constitutionally permissible scope of criminal sanctions imposed on children outside the context of the death penalty. It presents the weighty issue of sentencing proportionality in the circumstance of a 12-year-old boy who was convicted of an extremely serious offense and sentenced to 30

years' imprisonment without possibility of parole, but who is at the age when a person is only entering the adolescent phase of continuing cognitive and psychosocial development toward adult decision-making ability. Indeed, petitioner is significantly younger than the teenage defendants in the capital cases that have come before the Court, and the constitutional principles recognized there are of great relevance here.

In *Roper v. Simmons*, the Court held that “any conclusion that a juvenile falls among the worst offenders” is rendered “suspect” by the Eighth Amendment. 543 U.S. 551, 570 (2005). The Court relied on the differences between juveniles and adults that have been demonstrated through behavioral and neuropsychological studies. Those studies provide a scientific basis for the “obvious” conclusion that “less culpability should attach to a crime committed by a juvenile than to a comparable crime committed by an adult.” *Thompson v. Oklahoma*, 487 U.S. 815, 835 (1988)(plurality opinion).

Amici curiae explain herein why the same scientific research on which the Court relied in *Roper v. Simmons* applies to non-capital cases and demonstrates that the decades-long imprisonment of a pre-adolescent offender without any possibility of parole is inconsistent with jurisprudential principles of fair punishment. Review is necessary to address the constitutional significance of those principles in the context of the imprisonment of a 12-year-old offender for 30 years without possibility of parole.

A.

A 12-year-old criminal offender's pre-adolescent level of development mitigates his culpability. Recent behavioral and neuropsychological empirical studies demonstrate that the cognitive and psychosocial levels which are necessary for adult decision-making are still developing during adolescence. As compared to adults, adolescents are more prone to take risks; less oriented toward the future; and less able to consider properly the consequences of their actions, understand the perspective of others, or restrain their own impulses. Adolescent decision-making is also greatly affected by peer pressure, which is prevalent among juveniles engaged in delinquent behavior. Significantly, most individuals who engage in risk taking or even criminal behavior as adolescents moderate or desist from such behavior when they reach adulthood.

Moreover, the relatively unformed character of a juvenile, particularly a 12-year-old like petitioner, means that his potential for rehabilitation is profoundly greater than that of an adult who has committed a comparable offense. Behavior by an adolescent that comports with adult psychopathy may be nothing more than a transitory phase for the adolescent. Mental health professionals cannot reliably distinguish the few adolescent offenders who will not be amenable to rehabilitation, from the vast majority of adolescents who will not engage in criminal conduct as adults.

Groundbreaking neuropsychological evidence has recently corroborated these empirical studies. Advances in magnetic resonance imaging (“MRI”) technology provide a biological basis for the psychosocial immaturity of adolescents and their deficient decision-making capacity. MRIs prove that adolescent brains are physically far less developed than previously believed. In particular, the frontal lobes of the brain, which are associated with decision-making, strategic behavior, and impulse control, are not well developed until early adulthood.

B.

The mitigated culpability of adolescent offenders as compared to adults substantially undermines retribution as a valid penological justification for extended criminal imprisonment of such offenders without possibility of parole. In addition, imprisonment of a 12-year-old offender, like petitioner in this case, for 30 years without possibility of parole, provides no deterrence because research demonstrates that the threat (or reality) of punishing juveniles as adults does not reduce criminal conduct even among older adolescents. And an extended term of imprisonment without possibility of parole is fundamentally inconsistent with the unformed character of a 12-year-old offender and his much greater potential for rehabilitation.

In light of the scientific evidence, the constitutional principles of proportionality that undergird the fundamental fairness of criminal

punishment are violated when a 12-year-old is irrevocably deprived of liberty for a substantial part of his adulthood. The scientific evidence demonstrates that the diminished culpability and diminished susceptibility to deterrence of such a child, and his greater potential for rehabilitation, require an opportunity to adjust his sentence, as parole would allow, based on assessment of his actual rehabilitation as he matures through and out of adolescence.

ARGUMENT

THE COURT SHOULD GRANT REVIEW BECAUSE RECENT BEHAVIORAL AND NEUROPSYCHOLOGICAL EVIDENCE OF COGNITIVE AND PSYCHOSOCIAL DEVELOPMENT DEMONSTRATES THAT IMPRISONMENT OF A 12-YEAR-OLD CHILD FOR DECADES WITHOUT POSSIBILITY OF PAROLE IS INCONSISTENT WITH CONSTITUTIONAL PRINCIPLES OF PROPORTIONALITY IN CRIMINAL PUNISHMENT

In *Roper v. Simmons*, 543 U.S. 551, 569 (2005), this Court analyzed the constitutional principles of sentencing proportionality in the capital case of a 17-year-old adolescent offender. As *amici* explain below, the behavioral and neuropsychological research on which the Court relied in *Roper* is also relevant in the non-capital context and particularly in the case of a pre-adolescent 12-year-old offender sentenced to 30 years in prison without possibility of parole. This case presents the Court the opportunity to resolve the very important issue of the applicability of the *Roper* principles in such

circumstances. Without such review, lower courts will be left without sufficient guidance to address the validity of sentencing practices that are inconsistent with those principles of fair criminal punishment when considered in the context of the scientific evidence regarding child development.

A. A 12-Year-Old Offender’s Pre-Adolescent Level Of Development Mitigates His Criminal Culpability And Enhances His Prospects For Rehabilitation

This Court in *Roper* identified “three general differences” between adolescents and adults which demonstrate that “juvenile offenders cannot with reliability be classified among the worst offenders.” 543 U.S. at 569. First, adolescents lack maturity, and their sense of responsibility is underdeveloped. *Ibid.* Second, compared to adults, juveniles are more vulnerable and susceptible to negative influences and outside pressures, especially peer pressure. *Id.* at 569-570. And, third, the character of an adolescent is not as well-formed as that of an adult. *Id.* at 570. These differences indicate that it is “the rare juvenile offender whose crime reflects irreparable corruption” with no prospect of rehabilitation. *Id.* at 573.

Behavioral and neuropsychological evidence provided ample scientific support for these conclusions in *Roper*. Continuing research into cognitive, psychosocial, and brain development in adolescence provides yet further support for a policy that does not

hold juveniles to the same standards of criminal responsibility as adults. The principles articulated in *Roper* involving a 17-year-old offender apply with even greater force to a 12-year-old like petitioner.

1. Behavioral studies demonstrate deficient decision-making capacity in adolescents because of their psychosocial immaturity and their special vulnerability to negative influences

Empirical research demonstrates that adolescents and particularly pre-adolescents, such as the 12-year-old petitioner, are less likely than adults to be able to consider alternative courses of action, to understand the perspective of others, or to restrain their own impulses. Although the precise age at which adolescent decision-making capacity begins to approximate that of adults has not yet been conclusively identified, it is clear that the development of psychosocial maturity necessary for adult decision-making continues throughout adolescence. Laurence Steinberg & Elizabeth S. Scott, *Less Guilty by Reason of Adolescence: Developmental Immaturity, Diminished Responsibility, and the Juvenile Death Penalty*, 58 Am. Psychologist 1009, 1011-1012 (2003). And, in any event, it is well-established in the scientific community that pre-adolescents and younger teens differ substantially from adults (and, indeed, from older teens) in their cognitive abilities and psychosocial maturity in ways that substantially impair decision-making capacity. *Id.*

a. In a study of more than 1,000 adolescents and adults, researchers investigated the relationship between antisocial decision-making and the factors of age and maturity. Elizabeth Cauffman & Laurence Steinberg, *(Im)maturity of Judgment in Adolescence: Why Adolescents May Be Less Culpable Than Adults*, 18 Behav. Sci. & L. 741 (2000). Adolescents, on average, were “less responsible, more myopic, and less temperate than the average adult.” *Id.* at 757. In this study, the most dramatic changes in decision-making behavior occurred between 16 and 19 years of age, especially with respect to “perspective” (i.e., the consideration of different viewpoints and broader contexts of decisions), and “temperance” (i.e., the ability to limit impulsivity and evaluate situations before acting). *Id.* at 756. It was not until age 19 that the development of responsible decision-making plateaued. *Id.*

Other research is in accord that adolescents are less competent decision-makers than adults. Bonnie L. Halpern-Felsher & Elizabeth Cauffman, *Costs and Benefits of a Decision: Decision-Making Competence in Adolescents and Adults*, 22 J. Applied Developmental Psychol. 257, 268 (2001). Researchers have found “that important progress in the development of decision-making competence occurs sometime during late adolescence” and that “these changes have a profound effect on [the subjects’] ability to make consistently mature decisions.” *Id.* at 271. Adults were better able, for example, to weigh the options available to resolve an issue. *Id.* at 268; *see also* Lita

Furby & Ruth Beyth-Marom, *Risk Taking in Adolescence: A Decision-Making Perspective*, 12 *Developmental Rev.* 1, 1 (1992)(highlighting how adolescents seek different outcomes from decision-making than do adults). Significantly, the younger adolescents had the greatest decision-making deficiencies when compared to adults. Halpern-Felsher & Cauffman, *supra*, at 271.

b. Behavioral research also demonstrates that, on average, adolescents take risks to a far greater degree than adults. Adolescents value impulsivity, fun-seeking, and peer approval more than adults do. See Laurence Steinberg, *Adolescence* 88 (6th ed. 2002).

Numerous rigorously conducted self-report studies document that it is statistically normative for adolescents to engage in some form of illegal activity. See Terrie E. Moffitt, *Natural Histories of Delinquency, in Cross-National Longitudinal Research on Human Development and Criminal Behavior* 3, 29 (Elmar G.M. Weitekamp & Hans-Jurgen Kerner eds., 1994). “[I]n laboratory experiments and studies across a wide range of adolescent populations, developmental psychologists [have shown] that adolescents are risk takers who inflate the benefits of crime and sharply discount its consequences, even when they know the law.” Jeffrey Fagan, *Why Science and Development Matter in Juvenile Justice*, *The American Prospect*, Aug. 14, 2005, at 2.

Empirical research explains that adolescent risk taking occurs because, among other reasons, adolescents tend to have greater difficulty anticipating the consequences of their actions. Mary Beckman, *Crime, Culpability, and the Adolescent Brain*, 305 *Science* 596 (2004). Researchers have determined that the ability to “‘generat[e] hypotheses of what might happen’” emerges between 15 and 18 years of age, *id.* at 599, and planning and thinking about the future increase as adolescents grow older, see Jari-Erik Nurmi, *How Do Adolescents See Their Future? A Review of the Development of Future Orientation and Planning*, 11 *Developmental Rev.* 1, 29 (1991). Accordingly, “[b]etween adolescence and adulthood there is a significant decline in both risk taking and risky decision making.” Margo Gardner & Laurence Steinberg, *Peer Influence on Risk Taking, Risk Preference and Risky Decision Making in Adolescence and Adulthood: An Experimental Study*, 41 *Developmental Psychol.* 625, 632 (2005).

c. The social context also significantly affects adolescent behavior, because peer behaviors are a very important aspect of delinquent involvement. See Dana L. Haynie, *Friendship Networks and Delinquency: The Relative Nature of Peer Delinquency*, 18 *J. Quantitative Criminology* 99, 123 (2002). Delinquent behavior, peer associations, and delinquent beliefs together influence each other. See Terence P. Thornberry et al., *Delinquent Peers, Beliefs, and Delinquent Behavior: A Longitudinal Test of Interactional Theory*, 32 *Criminology* 47, 74-75 (1994). Research shows that

the likelihood of being influenced by peers declines, however, after individuals reach adulthood. Peggy C. Giordano et al., *Changes in Friendship Relations Over the Life Course: Implications for Desistance from Crime*, 41 *Criminology* 293, 319 (2003). Indeed, the decreasing role of peer influence, which varies as a function of age, also contributes to a decline in risk taking. Gardner & Steinberg, *supra*, at 632.

2. Juvenile offenders have inherently greater potential for rehabilitation because of their relatively unformed character, and future conduct cannot be accurately predicted in such cases

a. This Court has recognized that an adolescent's potential for rehabilitation is profoundly greater than that of an adult who has committed a comparable offense. *Roper*, 543 U.S. at 573 (It is "the rare juvenile offender whose crime reflects irreparable corruption.")(citing Steinberg & Scott). Adolescent criminal conduct likely results from "normative experimentation with risky behavior and not from deep-seated moral deficiency reflective of 'bad' character." Steinberg & Scott, *supra*, at 1015. Consequently, "the vast majority of adolescents who engage in criminal or delinquent behavior desist from crime as they mature into adulthood." *Id.*; Terrie E. Moffitt, *Adolescence-Limited and Life-Course-Persistent Antisocial Behavior: A Developmental Taxonomy*, 100 *Psychological Review* 674, 675-679 (1993).

b. Yet, there are no reliable means to predict future character formation, dangerousness, or amenability to rehabilitation of a particular individual adolescent. Researchers have consistently concluded that the observable behavior of different adolescents can be identical in adolescents who will persist as criminal offenders through adulthood and those who will not. See John F. Edens et al., *Assessment of "Juvenile Psychopathy" and Its Association with Violence: A Critical Review*, 19 Behav. Sci. & L. 53, 59 (2001); cf. Thomas Grisso, *Double Jeopardy: Adolescent Offenders with Mental Disorders* 64-65 (2005)(discontinuity of disorders in adolescence creates "moving targets" for identification of mental disorders); Edward P. Mulvey & Elizabeth Cauffman, *The Inherent Limits of Predicting School Violence*, 56 Am. Psychologist 797, 799 (2001)("Assessing adolescents, therefore, presents the formidable challenge of trying to capture a rapidly changing process with few trustworthy markers.").

It is due to the high likelihood of error in predicting future behavior of an adolescent, as the *Roper* Court acknowledged, 543 U.S. at 573, that the manual that governs the professional evaluation of psychiatric disorders wisely bars diagnosis of antisocial personality disorder in individuals under the age of 18. American Psychiatric Association, *Diagnostic and Statistical Manual of Mental Disorders* 702, 706 (4th ed. text revision 2000)("DSM").

c. The problem of misdiagnosis of adolescents is particularly acute in the labeling of offenders as

psychopaths. Psychopathy, sometimes referred to as sociopathy, is an adult personality feature defined chiefly by a combination of antisocial behavior, callousness, and emotional detachment. See Robert D. Hare, *Psychopathy: A Clinical Construct Whose Time Has Come*, 23 *Crim. Just. & Behav.* 25, 28 (1996).

Hervey Cleckley, whose description of the psychopathic personality became the foundation for modern diagnostic techniques, explicitly warned that “the child or the adolescent will for a while behave in a way that would seem scarcely possible to anyone but the true psychopath and later change, becoming a normal and useful member of society.” Hervey Cleckley, *The Mask of Sanity* 270 (5th ed. 1976). Indeed, behaviors and traits that are associated with normal immaturity in adolescents are, in adults, indicative of psychopathy. These include proneness to boredom, lack of remorse and guilt, impulsivity, irresponsibility, failure to accept responsibility for one’s actions, and unstable interpersonal relationships. See Robert D. Hare, *The Hare Psychopathy Checklist Revised* (1991)(PCL-R); see also Edens et al., *supra*, at 77 (noting that “most adolescents manifest some ‘traits’ and behaviors * * * that may be phenotypically similar to symptoms of psychopathy”).

Accordingly, although adult measures of psychopathy may allow short-term predictions of violent behavior in adolescence, “they provide little support for the argument that psychopathy during adolescence is a robust predictor of *future* violence, particularly violence that occurs beyond late

adolescence.” Edens et al., *supra*, at 73 (emphasis in original); see also Paul J. Frick et al., *The 4 Year Stability of Psychopathic Traits in Non-Referred Youth*, 21 Behav. Sci. & L. 713, 732 (2003)(“Clearly, there are no data to determine the actual risk for adult diagnoses in children who score high on psychopathic traits.”); Daniel Seagrave & Thomas Grisso, *Adolescent Development and the Measurement of Juvenile Psychopathy*, 26 Law & Hum. Behav. 219, 229 (2002)(expressing concern over “false positive” rate in identifying psychopathic traits in adolescents).

3. Recent brain research has revealed a biological basis for the psychosocial immaturity, deficient decision-making capacity, and unformed character of adolescents

Biological research into brain functions demonstrates that adolescent brains are far less developed than previously believed, and it provides a biological basis for transient adolescent behavior. This research further corroborates the Court’s conclusion in *Roper* that a juvenile cannot be reliably categorized as a “worst offender” or be viewed as having no prospect of rehabilitation.

a. Advances in magnetic resonance imaging (“MRI”) have opened a new window into the differences between adolescent brains and adult brains.

Beginning in the 1990s, “functional” MRIs have not only mapped brain anatomy but have also observed brain functioning while an individual performs tasks involving speech, perception, reasoning, and decision-making. *See, e.g.*, Kenneth K. Kwong et al., *Dynamic Magnetic Resonance Imaging of Human Brain Activity During Primary Sensory Stimulation*, 89 Proc. Nat’l Acad. Sci. 5675 (1992).

Moreover, “longitudinal” MRI studies have examined the same subject over time at periodic intervals, thereby allowing researchers to track individual brains as they develop. *See, e.g.*, Jay N. Giedd et al., *Brain Development During Childhood and Adolescence: A Longitudinal MRI Study*, 2 Nature Neurosci. 861, 861 (1999)(study of 145 children and adolescents scanned up to five times over approximately ten years).

These brain imaging studies graphically illustrate that changes in brain structure occur in parallel with age-associated increases in cognitive performance. Sarah Dunston & B.J. Casey, *What Have We Learned About Cognitive Development From Neuroimaging?*, 44 Neuropsychologia 2149, 2152-2154 (2006); *see also* Neir Eshel, et al., *Neural Substrates of Choice Selection in Adults and Adolescents: Development of the Ventrolateral Prefrontal and Anterior Cingulate Cortices*, 45 Neuropsychologia 1270 (2007).

b. Development of the frontal lobes of the human brain plays a critical role with regard to

decision-making and criminal culpability. The frontal lobes, particularly the prefrontal cortex, are critical to the higher functions of the brain. See Elkhonon Goldberg, *The Executive Brain: Frontal Lobes and the Civilized Mind* 23 (2001). This region is involved when an individual plans and implements goal-directed behaviors by selecting, coordinating, and applying the cognitive skills necessary to accomplish a goal. See *id.* at 24.

Impairment of a person's frontal lobes has been associated with greater impulsivity; difficulties in concentration, attention, and self-monitoring; and deficiencies in decision-making. See M. Marsel Mesulam, *Behavioral Neuroanatomy, in Principles of Behavioral and Cognitive Neurology* 1, 42-45 (M. Marsel Mesulam ed., 2d ed. 2000) One "hallmark of frontal lobe dysfunction is difficulty making decisions that are in the long-term best interests of the individual." See Antonio R. Damasio & Steven W. Anderson, *The Frontal Lobes*, in *Clinical Neuropsychology* 404, 434 (Kenneth M. Heilman & Edward Valenstein eds., 4th ed. 2003).

Significantly for current purposes, neurodevelopmental MRI studies indicate that the frontal lobes are one of the last regions of the brain to reach maturity. See Nitin Gogtay et al., *Dynamic Mapping of Human Cortical Development During Childhood Through Early Adulthood*, 101 Proc. Nat'l Acad. Sci. 8174, 8177 (2004). While the proliferation of gray matter peaks in early adolescence, see Giedd et al., *supra*, at 861-862, the composition, consisting

of gray and white brain matter, undergoes dynamic change while cognitive functioning improves throughout adolescence. One important change is that gray matter thins, see 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. Neurosci.* 8819, 8821 (2001)(studying 7-11, 12-16, and 23-30 age groups), which strengthens the connections between the remaining neurons, see Peter R. Huttenlocher, *Neural Plasticity: The Effects of Environment on the Development of the Cerebral Cortex* 41, 46-47, 52-58, 67 (2002).

Another important development in the frontal lobes during adolescence is that white matter significantly increases, which allows the brain to process information more efficiently and reliably. Researchers attribute this result to a process called “myelination” in which a substance called myelin is wrapped around brain cell axons. See Goldberg, *supra*, at 144. In a study of children ages 5 through 17, researchers posited that the advances of myelination increased white matter within the prefrontal area of the frontal lobes steadily with age. Allan L. Reiss et al., *Brain Development, Gender and IQ in Children: A Volumetric Imaging Study*, 119 *Brain* 1763, 1767-1768 (1996); see also Giedd et al., *supra*, at 861-862 (longitudinal MRI study

documenting increase in white matter to at least age 22).²

Similarly, a recent longitudinal MRI study captured common patterns of brain development by rescanning the same children and adolescents ages 4 to 21 every two years over the course of a ten-year period. Gogtay et al., *supra*. The study confirmed that the “[p]arts of the brain associated with more basic functions mature early,” while the “[l]ater to mature were areas involved in executive function, attention, and motor coordination (frontal lobes).” *Id.* at 8177.

Other recent studies that used brain imaging technology provide further evidence that heightened propensity for risk-taking and poor decision-making in adolescents correlates with immature cortical brain function. One study compared differences in brain activity between 12-17 year-olds and 23-33 year-olds while engaged in a monetary game of “chicken.” The researchers found that when subjects were also confronted with the risk of a penalty, brain functions associated with decision-making were more active for the early adult group compared to the

² MRI researchers have linked the functional maturity of the brain and the process of myelination. See Reiss, *supra*, at 1770; Elizabeth R. Sowell et al., *Localizing Age-Related Changes in Brain Structure Between Childhood and Adolescence Using Statistical Parametric Mapping*, 9 *NeuroImage* 587, 593 (1999); Elizabeth R. Sowell et al., *In Vivo Evidence for Post-Adolescent Brain Maturation in Frontal and Striatal Regions*, 2 *Nature Neurosci.* 859, 860 (1999).

adolescent group. James Bjork, et al., *Developmental Differences in Posterior Mesofrontal Cortex Recruitment By Risky Rewards*, 27 J. Neurosci. 4839 (2007). Another study compared adults with adolescents (mean age of 13.3) as they engaged in a monetary decision-making task, and likewise concluded that adolescents engage in less prefrontal brain activity associated with higher thinking and decision-making when making choices involving risk. Eshel, et al., *supra*, at 1278.

c. These findings from recent MRI research converge with pre-existing post-mortem studies and other research exploring the maturation process of the human brain. Close correlations had previously been noted between myelination and acquisition of brain functions. See Paul I. Yakovlev & Andre-Roch Lecours, *The Myelogenetic Cycles of Regional Maturation of the Brain, in Regional Development of the Brain in Early Life* 3, 63-64 (Alexandre Minkowski ed., 1967).

These MRI studies of the frontal lobes are also consistent with electroencephalogram (“EEG”) research showing that the frontal executive region matures from ages 17 to 21—after maturation appears to cease in other brain regions. William J. Hudspeth & Karl H. Pribram, *Psychophysiological Indices of Cerebral Maturation*, 21 Int’l J. Psychophysiology 19, 26-27 (1990); see also R.W. Thatcher et al., *Human Cerebral Hemispheres Develop at Different Rates and Ages*, 236 Science 1110, 1113 (1987)(EEG study revealed that, between age 15 and adulthood, fiber networks focused primarily in the frontal lobes grew,

allowing for greater functional associations among the regions of the brain).

Recent advances in neuropsychological research provide a strikingly graphic view of the brain and its gradual maturation. Although the precise underlying mechanisms continue to be explored, it is now established that important aspects of brain maturation remain incomplete even in late adolescence, particularly those involved in the brain's executive functions. Robert Shepherd, *The Relevance of Brain Research to Juvenile Justice*, 19 Crim. J. 51, 52 (2005) (“[T]here are clear neurological explanations for the difficulties adolescents have in cognitive functioning, in exercising mature judgment, in controlling impulses, in weighing the consequences of actions, in resisting the influence of peers, and in generally becoming more responsible.”). While research demonstrates that these conclusions apply even to older adolescents, they are unquestionably true for a 12-year-old child who is only beginning the adolescent phase of continuing brain development.

B. Imprisonment Of A 12-Year-Old Offender For 30 Years Without Possibility of Parole Is Inconsistent With Constitutional Principles Of Proportionality In Criminal Punishment Because Of The Nature Of Pre-Adolescent Development

Constitutional principles of fairness require proportionality between criminal punishment and the purposes that justify such punishment, which include

retribution and deterrence. See *Weems v. United States*, 217 U.S. 349, 366-367 (1910); *Enmund v. Florida*, 458 U.S. 782, 798 (1982); *Roper*, 543 U.S. at 569-572.

1. Lengthy mandatory imprisonment terms without possibility of parole may meet standards of proportionality when applied to adults. But when they are applied to adolescents, the retribution and deterrence purposes of criminal punishment are negated by the behavioral studies and psychoneurological evidence discussed above. Those studies and scientific evidence establish that there is both a developmental and a biological basis for the lesser abilities of juveniles to engage in rational decision-making and to control their impulses. Cf. *Atkins v. Virginia*, 536 U.S. 304, 318 (2002) (“diminished capacities to understand and process information, to communicate, to abstract from mistakes and learn from experience, to engage in logical reasoning, to control impulses, and to understand the reactions of others” diminish personal culpability of mentally retarded).

Moreover, the fact that adolescents demonstrate a lesser capacity for future orientation and proper consideration of the consequences of their actions, means that they are less likely to be deterred from criminal conduct by the possibility of a long prison term without possibility of parole. As this Court recognized in *Roper*, “the same characteristics that render juveniles less culpable than adults suggest as well that juveniles will be less susceptible to deterrence.” 543 U.S. at 571; cf. *Atkins*, 536 U.S. at

320 (“cognitive and behavioral impairments” of the mentally retarded “make it less likely that they can process the information of the possibility of execution as a penalty”).

Scientific studies support this conclusion and contradict the value of deterrence in imprisoning a 12-year-old offender for 30 years without possibility of parole. Research demonstrates the absence of a connection between the threat or reality of adult criminal punishment and teen offender conduct. See Center for Disease Control Task Force on Community Preventive Services, *Effects on Violence of Laws and Policies Facilitating the Transfer of Youth from the Juvenile to the Adult Justice System* (2007)(reviewing research on effects of transferring juveniles to adult justice system and finding no evidence of general or specific deterrence);³ Simon I. Singer & David McDowall, *Criminalizing Delinquency: The Deterrent Effects of the New York Juvenile Offender Law*, 22 L. & Soc’y Rev. 521, 529-532 (1988)(measuring New York arrest rates before and after a change required prosecution of certain adolescents in criminal court as opposed to juvenile proceedings); Eric L. Jensen & Linda K. Metsger, *A Test of the Deterrent Effect of Legislative Waiver on Violent Juvenile Crime*, 40 Crime & Delinq. 96, 100-102 (1994)(evaluating deterrent effect of Idaho statute mandating criminal

³ Available at: <http://www.cdc.gov/mmwr/preview/mmwrhtml/rr5609a1.htm>.

processing as adults of adolescents charged with serious offenses).⁴ These studies have considered homicide offenders as young as 13 and other major felony offenders as young as 14-15. Singer & McDowall, *supra*. Because no general deterrent effect was found among these early teen offenders, there is no basis to conclude that lengthy criminal punishment as adults will have a deterrent effect on even younger, pre-teen offenders.

2. Lengthy terms of imprisonment without possibility of parole for adult offenders assume that criminal choices by adults are indicative of bad character and criminal behavior that are likely to persist. But, as discussed above (*see* pages 15-18 *supra*), that same assumption is inaccurate for most adolescents because of the relatively unformed nature of their characters. Steinberg & Scott, *supra*, at 1014.

⁴ Studies comparing recidivism rates between comparable groups of adolescents processed by the criminal justice system as opposed to the juvenile justice system have shown no significant specific deterrent effect from exposure to the adult criminal justice system. *See* Jeffrey Fagan, *The Comparative Advantage of Juvenile Versus Criminal Court Sanctions On Recidivist Adolescent Felony Offenders*, 18 L. & Pol'y 77 (1996); Jeffrey Fagan et al., *Be Careful What You Wish for: Legal Sanctions and Public Safety Among Adolescent Offenders in Juvenile and Criminal Court*, Presented at Second Annual Conference on Empirical Legal Studies, New York University, November 2007, available at SSRN: <http://ssrn.com/abstract=491202>; Lawrence Winner et al., *The Transfer of Juveniles to Criminal Court: Reexamining Recidivism Over the Long Term*, 43 Crime & Delinq. 548, 551-562 (1997).

Moreover, attempts to predict at sentencing an adolescent offender's character formation and dangerousness in adulthood are inherently prone to error. See pages 16-18, *supra*; see also Shawn D. Bushway & Anne Morrison Piehl, *The Inextricable Link Between Age and Criminal History in Sentencing*, 53 *Crime & Delinq.* 156, 178 (2007) (“[A]t young ages, those who are highly criminal cannot be reliably discerned from those who were simply unlucky or acted inconsistently with their general character.”). And, it follows that the younger the offender, the greater will be the difficulty in predicting whether he will engage in criminal conduct in the future and, if so, for how long into the future.

Thirty years' imprisonment of a child offender forecloses, of course, reentry to society for a substantial portion of that child's adult life, regardless of his lack of dangerousness. The unavailability of parole means that there is no means to adjust the length of imprisonment based on a reassessment of the child's actual rehabilitation over the course of those 30 years.

Such an irrevocable deprivation of liberty for a 12-year-old child is contrary to the scientific evidence of the diminished culpability, lesser susceptibility to deterrence, and greater potential for rehabilitation of adolescents. As this Court observed in *Roper*:

The reality that juveniles still struggle to define their identity means it is less supportable to conclude that even a heinous

crime committed by a juvenile is evidence of irretrievably depraved character. From a moral standpoint it would be misguided to equate the failings of a minor with those of an adult, for a greater possibility exists that a minor's character deficiencies will be reformed.

543 U.S. at 570.

CONCLUSION

For the reasons set forth above and in the petition for a writ of *certiorari*, the petition should be granted.

Respectfully submitted,

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