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STATE OF MICHIGAN
IN THE SUPREME COURT

People of the State of Michigan,
Plaintiff-Appellee,

v.

Andrew Michael Czarnecki,
Defendant-Appellant.

MSC No. 166654
Court of Appeals No. 348732
Circuit Court No. 16-010813-FC

Filed under AO 2019-6

People of the State of Michigan,
Plaintiff-Appellee,

v.

Adonte Marquis Bouie,
Defendant-Appellant.

MSC No. 166232
Court of Appeals No. 351911
Circuit Court No. 2018-267977-FC

Filed under AO 2019-6

Motion of Developmental Science Scholars and Nonprofits for Leave to File Amicus Brief in Support of Appellants; Brief of Amici Curiae

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MOTION OF DEVELOPMENTAL SCIENCE SCHOLARS AND NONPROFITS FOR LEAVE TO FILE AMICUS BRIEF IN SUPPORT OF APPELLANTS

Pursuant to Michigan Court Rule 7.312(H), developmental science scholars and nonprofits ("amici") respectfully seek this Court's leave to file a brief in support of Appellants.[1] As more than thirty of the nation's leading developmental science scholars (including neuroscience, psychology, and juvenile justice), and partner nonprofits, amici are experts in the study of brain development and adolescent behavior. The U.S. Supreme Court, this Court, and other state high courts routinely draw upon the scientific literature in these fields to scrutinize the constitutionality of imposing life without parole ("LWOP") on late adolescents.

In 2022, amici filed a brief in *People v. Parks*, 510 Mich 225 (2022), detailing the "clear consensus that late adolescence . . . is a key stage of development characterized by significant brain, behavioral, and psychological change. This period of late adolescence is a pivotal developmental stage that shares key hallmarks of adolescence. This consensus arises out of a multitude of reliable studies on adolescent brain and behavioral development . . . ." *Id.* at 249. As this Court recognized in *Parks*, the science in amici's earlier brief helped illuminate "the inescapable conclusion that mandatorily condemning 18-year-olds to die in prison, without consideration of the attributes of youth that 18-year-olds and juveniles share, no longer comports with the

[1] Counsel for amici authored the proposed Brief in full. No person or entity, including counsel or amici, made a monetary contribution intended to fund the preparation or submission of the Brief. The identities, titles, and affiliations of amici are detailed in the Appendix.

'evolving standards of decency that mark the progress of a maturing society.'" *Id.* at 244 (quoting *People v. Lorentzen*, 387 Mich 167, 179 (1972)).

Amici respectfully submit this Brief to underscore, and build on, the scientific evidence that amici previously submitted in *Parks*. That powerful evidence, which the Government conceded in *Parks* and here, establishes a "clear consensus" that late adolescents undergo profound "development characterized by significant brain, behavioral, and psychological change" up to age 21. By virtue of their still-developing brains and personalities, and vulnerability to external influences like peer pressure, late adolescents are more likely (even more than adolescents under 18 and neurological adults) to engage in irrational, risky, and impulsive behavior. But as their brains develop and their capacity for reasoned decision-making improves, late adolescents grow beyond these behaviors. As this Court knows, these findings have major implications for late adolescent sentencing and rehabilitation.

Amici have a strong interest in ensuring that Michigan and other states have access to developmental science in reviewing the constitutionality of LWOP sentences for late adolescents. In addition to amici's involvement in *Parks*, amici also filed briefs in the Massachusetts Supreme Judicial Court, which helped inform its holding that the Massachusetts Constitution's ban on cruel or unusual punishment protects all late adolescents aged "eighteen, nineteen, and twenty" from LWOP. *People v. Mattis*, 224 N.E.3d 410 (Mass. 2024); *see People v. Robinson*, 224 N.E.3d 391 (Mass. 2024). Other state high courts, with the benefit of amici's briefing, are actively considering similar constitutional safeguards. *See, e.g.*, *State v. Jones, Roche, &*

Harris, Case No. 089524 (N.J. 2024) (reviewing whether the New Jersey Constitution prohibits functional LWOP for late adolescents aged 18-20).

For the foregoing reasons, amici respectfully request that the Court grant their application. The proposed Brief is attached.

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BRIEF OF AMICI CURIAE DEVELOPMENTAL SCIENCE SCHOLARS AND NONPROFITS

STATEMENT OF QUESTION PRESENTED

Should *People v. Parks*, 510 Mich 225 (2022)—which held that the Michigan Constitution prohibits mandatory life-without-parole ("LWOP") sentences for late adolescents aged 18 due to their incomplete brain and behavioral development—apply equally to late adolescents aged 19 and 20 undergoing identical development?

INTRODUCTION AND SUMMARY OF ARGUMENT

People v. Parks held that Article 1, Section 16 of the Michigan Constitution prohibits the Government from condemning late adolescents aged 18 at the time of their offenses to mandatory LWOP because the "fail[ure] to take into account the mitigating characteristics of youth, specifically late-adolescent brain development" renders those sentences disproportionate and unlawful. 510 Mich at 232.

Parks centered on the modern scientific consensus, detailed in amici's brief filed in *Parks* as well as this Brief, that "the brains of 18-year-olds, just like those of their juvenile counterparts, transform as they age, allowing them to reform into persons who are more likely to be capable of making more thoughtful and rational decisions," such that those "same features that characterize the late-adolescent brain also diminish the culpability of these youthful offenders, rendering them less culpable." *Id.* at 258–59. As amici's earlier brief explained and as *Parks* expressly found, brain and behavioral maturation throughout late adolescence means that late adolescents, "like their juvenile counterparts, are generally capable of significant change and a turn toward rational behavior that conforms to societal expectations as

their cognitive abilities develop further." *Id.* at 258. These findings led this Court to conclude that, given "the dynamic neurological changes that late adolescents undergo as their brains develop over time and essentially rewire themselves, automatic condemnation to die in prison at 18 is beyond severity—it is cruelty." *Id.*

Parks addressed an as-applied challenge, and so this Court only had occasion to extend the Michigan Constitution's protections for late adolescents aged 18 like defendant Kemo Parks at the time of his offense. Yet, there is no question that every ounce of Court's findings and reasoning in *Parks* involving late adolescents aged 18—*i.e.*, the scientific consensus on their ongoing brain and behavioral development during late adolescence; its impact on their propensity for risky, impulsive, and peer-induced behavior; its implications for their remarkable rehabilitative potential; and the constitutional protections guaranteed to them by Article 1, Section 16—"applies in equal force" to all late adolescents aged 18-20. *Id.* at 257–259. Indeed, the leading scholarly publications in developmental science, many authored by amici themselves and cited favorably throughout *Parks*, studied and made findings for late adolescents aged 18-20 as a group, without distinguishing 18-year-olds.

Given all this, the Government's position here, that Michigan's constitutional safeguards against mandatory LWOP for late adolescents applies only to 18-year-olds, is simply irreconcilable with developmental science and with *Parks* itself. The Government's position here also stands in stark tension with its prior concession in *Parks* "that, in terms of neurological development, there is no meaningful distinction" between adolescents under 18 and late adolescents. *Id.* at 252. So just as mandatory

LWOP constitutes a disproportionate sentence for 18-year-olds because it fails to account for their mitigating attributes of late adolescence, such a harsh sentence equally offends Article 1, Section 16 when imposed on late adolescents aged 19-20 who share those exact same mitigating characteristics.

Accordingly, amici respectfully submit that this Court should invalidate Appellants' mandatory LWOP sentences and reverse the judgments below.

ARGUMENT

I. Transformative Neurological and Behavioral Changes During Ages 18-20 Establish Mandatory LWOP as a Disproportionate Sentence for Late Adolescents in Violation of Article 1, Section 16.

A. Scientific Research Shows Profound Maturation in Brain, Behavior, and Personality Throughout Late Adolescence.

In evaluating whether sentencing late adolescents aged 19-20 to mandatory LWOP violates Article 1, Section 16, this Court "must consider the scientific and social-science research regarding the characteristics of the late-adolescent [] brain." *Parks*, 510 Mich at 248. Amici are part of a scientific community that universally recognizes late adolescence—*i.e.*, the period of transformative growth capturing ages 18, 19, and 20—as "a key stage of development characterized by significant brain, behavioral, and psychological change."[2] *Parks*, at 249. "This scientific consensus arises out of a multitude of reliable studies on adolescent brain and behavioral development in the years following *Roper*, *Graham*, *Miller*, and *Montgomery*." *Id*. at 249. Many of these studies assess brain structure and function in large numbers of

[2] *See, e.g.*, Steinberg & Icenogle, *Using Developmental Science to Distinguish Adolescents and Adults Under the Law*, 1 Annu Rev Dev Psychol 21, 34 (2019).

individuals of different ages and over multiple time points, enabling researchers to use averages to measure accurately the age at which changes in specific brain structures and functions show a relative leveling off or stability.

These "multitude of reliable studies" conclusively establish late adolescence as a "pivotal developmental stage that shares key hallmarks of adolescence." *Id.* at 249. Late adolescence is marked by ongoing brain maturation in areas that govern emotional arousal and self-control regulation.[3] The scientific evidence regarding neurocognitive and behavioral maturation *throughout* late adolescence powerfully demonstrates that adolescence undoubtedly extends through at least age 20. *Parks*, at 252 ("[I]n terms of neurological development, there is no meaningful distinction between those who are 17 years old and those who are [late adolescents]."). Brain development during late adolescence does not merely entail minor changes in brain structure or function, but rather "a series of developmental cascades" of neurological transformations across multiple brain networks that, in turn, enable late adolescents to transition to more rational control of behavioral impulses observed in neurological

[3] This brain development emerges in tandem with the unique demands that late adolescents face (*e.g.*, physical, sexual, and social changes). This period also operates as an important sociocultural transition phase, as late adolescents often lose certain family and academic structures and supportive health and social services. *Id.*; *see also* Arnett, *Emerging Adulthood: A Theory of Development From the Late Teens Through the Twenties*, 55 Am Psychologist 469 (2000); Jaworska & MacQueen, *Adolescence as a unique developmental period*, 40 J of Psychiatry & Neuroscience 291 (2015); Teipel, *Developmental Tasks and Attributes of Late Adolescence/Young Adulthood*, State Adolescent Health Resource Center, available at http://www.amchp.org/programsandtopics/AdolescentHealth/projects/Documents/SAHRC%20AYADevelopment%20LateAdolescentYoungAdulthood.pdf (accessed December 20, 2021).

adulthood.[4] Given this, from a scientific perspective, a late adolescent's 19th birthday is simply not a rational dividing line, as the same mitigating attributes of diminished culpability and capacity for rehabilitation persists throughout late adolescence.[5]

1. The late adolescent brain has exceptional neuroplasticity between ages 18-20.

"The key characteristic of the adolescent brain is exceptional neuroplasticity." *Parks*, at 250. While the human brain has capacity for change (known as "plasticity" or "neuroplasticity") throughout a person's life, the brain shows truly remarkable potential for positive transformation throughout late adolescence.[6] Influenced by genetics, cognitive development, and upbringing (including trauma and chronic stress, *see* Section II.C, *infra*), plasticity can radically reshape neural pathways.

During adolescence, the brain undergoes substantial synaptic pruning, in which unused excitatory synapses (connections between neurons) are eliminated to

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[4] Arnett, *Emerging Adulthood: A Theory of Development from the Late Teens through the Twenties*, Am. Psych. 469-79 (2000); Jaworska, *Adolescence as a Unique Developmental Period*, J. Psychiatry Neurosci. 291–92 (2015); Masten & Cicchetti, *Developmental Cascades*, 22 Dev. Psychopathology 491–95 (2010); Casey et al., *Development of the Emotional Brain*, 693 Neurosci. Letters 29–34 (2019).

[5] Indeed, in recent years, the Massachusetts and Washington Supreme Courts have reinforced constitutional protections against LWOP for late adolescents aged 18-20 precisely because, much like adolescents under 18, late adolescents "are more impulsive, more concerned with their immediate circumstances, and less able to envision future consequences," so "risky behaviors tend to peak in late adolescence," "due to differences in brain structure." *People v. Mattis*, 224 N.E.3d 410, 421, 423 (Mass. 2024); *In Matter of the Personal Restraint of Monschke*, 482 P.3d 276 (Wash. 2021). Those courts also found that, just like adolescents under 18, late adolescents aged 18-20 also "have greater capacity to change . . . [given] the plasticity of the brain during these years." *Mattis*, 224 N.E. at 423.

[6] Bavelier et al., *Removing brakes on adult brain plasticity: from molecular to behavioral interventions*, 30 J Neurosci 14964–71 (2010).

increase efficiency in communication among the remaining neuronal connections, which supports learning, cognition, and reasoned decision-making.[7] A "hallmark of the brain transformations of adolescence," synaptic pruning during adolescence—which continues through late adolescence—removes approximately half the synaptic connections in certain brain regions.[8] This marked reduction in synapses corresponds with "the 'rewiring' of brain connections into adult-typical patterns."[9] *Parks*, at 250 (observing that the brain "essentially rewires itself" during adolescence). Late adolescents "are at the peak of their risk for criminality because of the neuroplasticity of their brains, causing a general deficiency in the ability to comprehend the full scope of their decisions as compared with older adults." *Id*. at 259.

Adolescent brains simultaneously undergo gradual myelination, in which axons (the parts of nerve cells along which nerve impulses are conducted to other cells) become insulated with fatty, insulative tissue known as myelin. Myelination increases the transmission speed of electrical signals. Myelination thus enables the remaining connected neurons to communicate with greater speed and efficiency, even between distant regions of the brain.[10] Through at least late adolescence, these

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[7] *See* Selemon, *A role for synaptic plasticity in the adolescent development of executive function*, 3 Translational Psychiatry 1 (2013) ("Synaptic pruning of excitatory contacts is the signature morphologic event of late brain maturation during adolescence"); Casey et al., *Structural and Functional Brain Development and its Relation to Cognitive Development*, 54 Biological Psychol 245–46 (2000) (reviewing studies examining prefrontal cortical activity in adolescents and concluding that increased cognitive capacity coincides with a loss of some synapses and strengthening of remaining synapses).

[8] Spear, *Adolescent Neurodevelopment*, 52 J Adolescent Health 7–13 (2013).

[9] *Id*.

[10] *Id*.

developing pathways facilitate greater dialogue among different brain systems that process cognitive, emotional, and social information important for self-control. As shown in Figure 1, these processes together prime the brain for learning and change during late adolescence, especially in pathways involving the prefrontal cortex that supports decision-making and self-control.

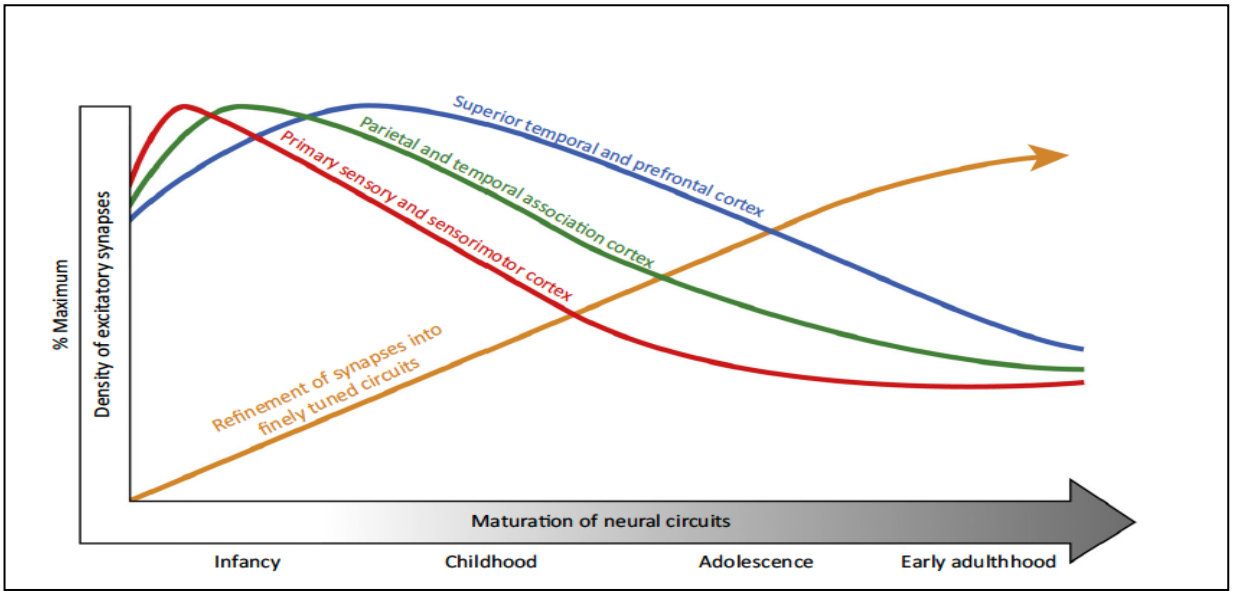

Figure 1 — The density and maturation of various neutral circuitry through early adulthood. Forsyth & Lewis, *Mapping the Consequences of Impaired Synaptic Plasticity in Schizophrenia through Development: An Integrative Model for Diverse Clinical Features*, 21 Trends in Cogn Sci 765 (2017).

2. Brain imaging provides irrefutable evidence of crucial neurological development for late adolescents aged 18-20.

The brain shows dynamic changes in structure and function throughout late adolescence. Imaging tools like functional magnetic resonance imaging ("fMRI") provide researchers with the ability to see structural changes in tissue (gray and white matter) related to processes at the level of the synapse and myelin sheath and functional changes related to neuronal activity.

This increased visibility into brain development shows significant changes in gray and white matter that extend through late adolescence's ages 18-20. Figure 2

below demonstrates findings across key brain metrics related to changes in cognitive abilities (including decision-making, self-control, and social and emotional behavior):

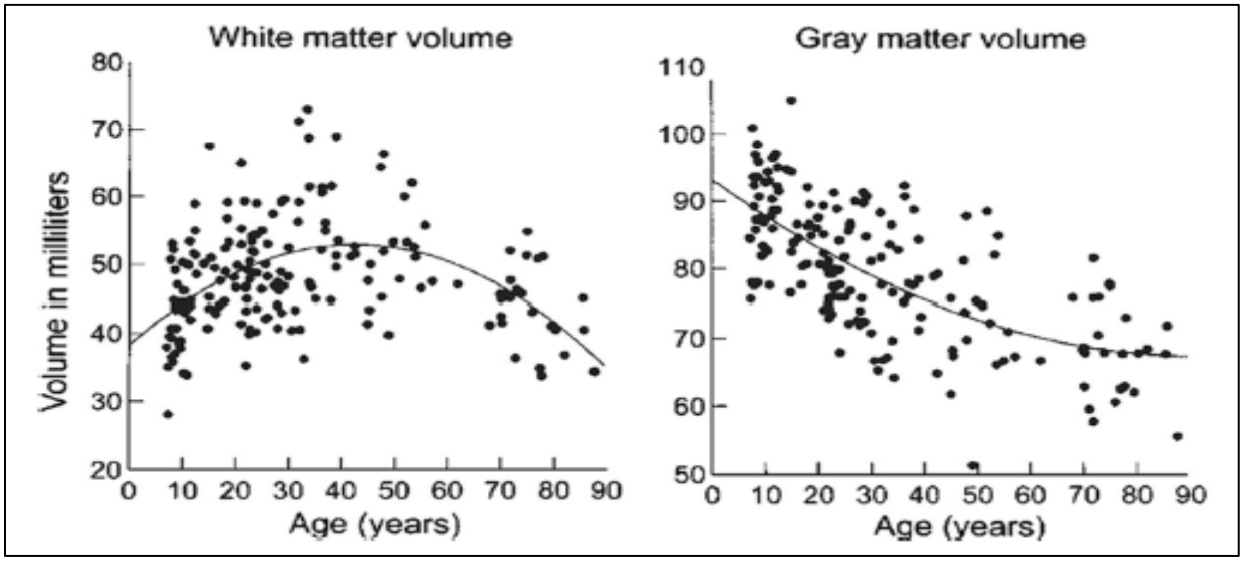

Figure 2 — Changes in white and gray matter volume throughout life. Sowell et al., *Mapping cortical change across the human life span*, 6 *Nature Neuroscience* 314 (2003).

- **Gray matter development**: Thinning of cortical gray matter (the regions containing most of the brain's neuronal cells, and correlated with improved decision-making, self-control, and other key milestones) continues through an individual's late twenties and beyond—and is associated with continued synaptic pruning during late adolescence.[11] Gray matter changes also demonstrate disparate regional development as shown in Figure 3 below. The prefrontal cortex that modulates cognitive control shows a dramatic 17 percent reduction in gray matter volume between ages 6 to 26. By comparison, over the same period, the subcortical regions implicated in emotional and

[11] Schnack et al., *Changes in Thickness and Surface Area of The Human Cortex and Their Relationship with Intelligence*, 25 Cerebral Cortex 1608 (2015); Fjell et al., *Development and Aging of Cortical Thickness Correspond to Genetic Organization Patterns*, 112 Proc Nat'l Acad. Sci 15462 (2015).

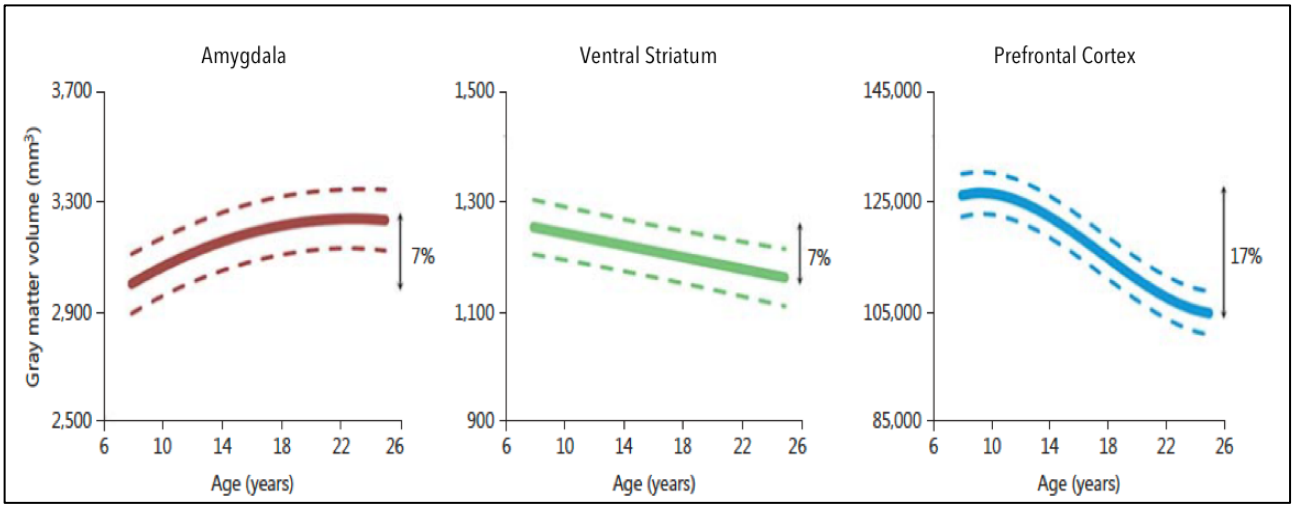

Figure 3 — Gray matter volume in the amygdala, ventral striatum, and prefrontal cortex from childhood to early adulthood. Mills et al., *The Developmental Mismatch in Structural Brain Maturation during Adolescence*, 6 Dev Neuroscience 153 (2014)

motivation processing, the amygdala and ventral striatum, exhibit a 7 percent reduction.[12] These results track a developmental mismatch during late adolescence between (i) the less developed regions controlling foresight, planning, self-control, and risk-aversion, and (ii) the more developed and dominant regions implicated in states of emotional arousal.

- **White matter development**: White matter increases throughout late adolescence, including ages 18-20, and is thought to reflect heightened brain processing, impulse control, and reasoned decision-making.[13] Associated with gradual myelination and the brain's stimuli processing speed, the incomplete development of these connections throughout childhood and late adolescence has been implicated in diminished self-control and increased impulsive and

[12] Mills et al., *The Developmental Mismatch in Structural Brain Maturation During Adolescence*, 36 Dev Neuroscience 147–60 (2014).
[13] Lebel et al., *A Review of Diffusion MRI of Typical White Matter Development from Early Childhood to Young Adulthood*, 32 NMR Biomedicine E3778 (2019).

risky behavior.[14] During late adolescence, white matter connections between the prefrontal cortex and subcortical regions multiply and mature, contributing to improved self-control needed for neurocognitive adulthood.[15]

- **Functional brain development**: Functional brain development is assessed during rest or during a task. Resting-state functional MRI ("fMRI") measures correlations in spontaneous activity between brain regions over time when resting and is referred to as functional connectivity. Task-based fMRI looks at regional changes in brain activity in response to stimuli or performance of a task. Changes in functional connectivity during rest show continued significant changes through at least age 20.[16]

During adolescence, including late adolescence, a transition occurs from a state that features more local connections to one that exhibits strengthened distal connections. Both functional connectivity and task-based prefrontal activity appears less mature under conditions of emotional arousal (*e.g.*, threat anticipation) relative to non-arousing ones. In these conditions, adolescents under 18 and late adolescents aged 18-20 exhibit similar impulsivity and risk preferences unlike neurological adults, suggesting greater susceptibility to situational diminished capacity

[14] Casey, *Beyond simple models of self-control to circuit-based accounts of adolescent behavior*, 66 Annu Rev of Psychol 1 (2015).
[15] Simmonds et al., *Developmental stages and sex differences of white matter and behavioral development through adolescence: a longitudinal diffusion tensor imaging (DTI) study*, 92 Neuroimage 356 (2014).
[16] Dosenbach et al., *Prediction of individual brain maturity using fMRI*, 329 Science 1358–61 (2010).

throughout late adolescence.[17] *Parks*, 510 Mich at 250 ("late adolescence is characterized by impulsivity, recklessness, and risk-taking").

These studies collectively show that late adolescence is a time of substantial ongoing maturation and development in the regions and circuits of the brain that process information associated with rewards and emotional reactivity, especially in those regions such as the prefrontal cortex important for decision-making and impulse control.[18] Thus, *Parks* correctly found that "late adolescents are hampered in their ability to make decisions, exercise self-control, appreciate risks or consequences, feel fear, and plan ahead." *Parks*, at 250.

As the brain matures, particularly from late adolescence into early adulthood, changes in subcortical and cortical pathways are associated with improved cognitive capacity in social and emotional situations and a substantial reduction in a late adolescent's propensity to engage in reckless behaviors.[19] "[T]hese hallmarks of the

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[17] Rudolph et al., *At risk of being risky: the relationship between "brain age" under emotional states and risk preference*, 24 Dev Cogn Neurosci 93–106 (2017); Cohen et al., *When is an adolescent an adult? Assessing cognitive control in emotional and nonemotional contexts*, 27 Psychol Sci 549–62 (2016); Kinscherff et al., *White Paper on the Science of Late Adolescence A Guide for Judges, Attorneys, and Policy Makers*, MGH Center for Law, Brain & Behav., at 2 (2022).

[18] *See* Somerville, *Searching for Signatures of Brain Maturity: What Are We Searching For?*, 92 Neuron 1166–67 (2016) (signs of brain maturity, including structural development and connectivity patterns, continue to change dramatically through late adolescence, such that the "age of 18 as a cut-point for comparison between 'adolescents' and 'adults' . . . could obscure or even mask continued developmental change"); *see also* Cohen, *supra* note 17; Braams et al., *Longitudinal Changes in Adolescent Risk-Taking: A Comprehensive Study of Neural Responses to Rewards, Pubertal Development, and Risk-Taking Behavior*, 35 J Neuroscience 7226 (2015); Insel et al., *Development of corticostriatal connectivity constrains goal-directed behavior during adolescence*, 8 Nat Commun 1605 (2017).

[19] Cohen, *supra* note 17; Rudolph, *supra* note 17.

developing brain render late adolescents less fixed in their characteristics and more susceptible to change as they age." *Parks*, at 251. So while the transformations during late adolescence make them particularly vulnerable to certain forms of transient mistakes and misconduct, those processes do not freeze them in this state permanently. To the contrary, their brains develop into neurological adulthood, at which point they are more mature, more in control, and less likely to engage in wrongdoing.[20] *Parks*, at 258 ("The brains of [late adolescents], just like those of their juvenile counterparts, transform as they age, allowing them to reform into persons who are more likely to be capable of making more thoughtful and rational decisions.").

3. The brain undergoes lopsided development rendering late adolescents aged 18-20 uniquely vulnerable to risk-taking and peer-induced behavior.

Brain development is a dynamic and hierarchical process that occurs throughout life, and especially during late adolescence. Recent scientific findings demonstrate that, due to the uneven timing of certain brain development processes, late adolescents are particularly susceptible to maladaptive behavior, and that their proclivity for such behavior recedes upon reaching adulthood.

Brain systems and the connections between them undergo refinement with age and experience. The timing of these changes, however, varies for different brain regions and networks. Subcortical regions including the ventral striatum and amygdala, which are important in reward and emotional learning and processing,

[20] *See* Hawes et al., *The developmental course of psychopathic features: Investigating stability, change, and long-term outcomes*, 77 J Research in Personality 83–89 (2018).

show earlier structural and functional development than cortical regions.[21] By contrast, the prefrontal cortex, which guides self-control and complex decision-making, continues to mature throughout late adolescence into early adulthood.

This extended window of prefrontal maturation parallels the prolonged social, emotional, and cognitive development that marks late adolescence.[22] Because the prefrontal cortex is more developed during late adolescence than earlier stages of adolescence, late adolescents have somewhat better cognitive control and decision-making skills than they did when they were younger. However, because the brain's motivational and emotional systems are hyper-responsive through late adolescence, late adolescents tend to be more vulnerable than young adults to lapses in self-control or impulsive decision-making—especially when in emotionally heated situations,[23] even if they show mature cognitive appraisal of emotional information.[24]

At the tail-end of late adolescence, the brain's development exhibits a crucial shift. Where the younger brain predominantly relies on emotional, or limbic circuitry, this period facilitates the transition to a neurocognitively adult brain that relies more on the cognitive control, or prefrontal circuitry.[25] While both brain systems play important roles in decision-making, limbic circuitry dominant in adolescence governs

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[21] Mills, *supra* note 12; Braams, *supra* note 18.
[22] Steinberg & Icenogle, *supra* note 2, at 21.
[23] Cohen, *supra* note 17.
[24] Silvers et al., *VlPFC-vmPFC-amygdala interactions underlie age related differences in cognitive regulation of emotion*, 27 Cerebral Cortex 3502–14 (2017).
[25] Casey, *supra* note 14, at 295-319; *see also* Cohen, *supra* note 17; Casey, *supra* note 4.

short-term reward/pleasure (through the ventral striatum and orbitofrontal cortex)[26] and emotional arousal (through the amygdala, hippocampus, and ventromedial prefrontal cortex).[27] By contrast, the prefrontal circuitry (lateral prefrontal cortex and posterior parietal cortex) dominant in adulthood regulates cognitive control responses such as reasoning, attention, planning, and memory retrieval. When fully developed, this brain system facilitates a person's ability to efficiently engage in complex decision-making by weighing alternative choices and actions based on future objectives and consequences.

Prior to this transition, late adolescents aged 18-20 are uniquely vulnerable to impulsive and risky behavior because their more developed emotional circuitry induces outsized receptiveness to short-term rewards and overreaction to perceived threats. *Parks*, at 251 (Late adolescents "have yet to reach full social and emotional maturity, given that the prefrontal cortex—the last region of the brain to develop, and the region responsible for risk-weighing and understanding consequences—is not fully developed until age 25."). For late adolescents, dramatic changes are believed to occur in the prevalence and distribution of dopamine receptors across the brain.[28] These neurological changes favor fleeting rewards and pleasure and correlate with a spike in risk-taking and peer-influenced behaviors.

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[26] Galván et al., *Earlier development of the accumbens relative to orbitofrontal cortex might underlie risk-taking behavior in adolescents*, 26 J Neurosci 6885–92 (2006).
[27] Casey et al., *Healthy development as a human right: insights from developmental neuroscience for youth justice*, 16 Annu Rev Law Soc Sci 203–22 (2020); Somerville, *supra* note 21, at 1164–67.
[28] Braams, *supra* note 18 (measuring changes to dopamine receptors in animals).

When faced with acute stress or emotional arousal, late adolescents' supercharged threat and stress response and eagerness for short-term rewards are more likely to culminate in poor decision-making, weak impulse control, and limited regard for future consequences. *Parks*, at 251 (Late adolescents "are more sensitive to the potential rewards as opposed to the potential consequences or costs of a decision" and are "more susceptible to negative outside influences, including peer pressure."). Thus, for adolescents and late adolescents alike, the conflicting interactions within and between their more developed limbic system and their less developed prefrontal system contributes to a heightened propensity to engage in irresponsible conduct.[29] The cognitive control system begins to develop in infancy through at least late adolescence via a slow process that requires multiple systemic changes, and only by neurological adulthood better moderates such impulses.[30]

As brain imaging studies suggest, the ability to engage in mature decision-making through effective impulse control, risk avoidance, and coordination of emotion and cognition is not fully developed until after late adolescence is complete.[31]

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[29] *See* Dreyfuss et al., *Teens Impulsively React rather than Retreat from Threat*, 36 Dev Neurosci 225-26 (2014); Arain et al., *Maturation of the adolescent brain,* 9 Neuropsychiatric Disease and Treatment 453–55 (2013) (describing "adolescence" as "ages 10–24 years"); Tyler, *Understanding the Adolescent Brain and Legal Culpability*, American Bar Association (Aug. 1, 2015), available at https://www.americanbar.org/groups/public_interest/child_law/resources/child_law_practiceonline/child_law_practice/vol-34/august-2015/understanding-the-adolescent-brain-and-legal-culpability/ (accessed January 17, 2022).

[30] Arain, *supra* note 29, at 451.

[31] Icenogle et al., *Adolescents' cognitive capacity reaches adult levels prior to their psychosocial maturity: evidence for a "maturity gap" in a multinational, crosssectional sample*, 43 Law Hum Behav 69–85 (2019); Hawes et al.,

After that point, the brain systems are more evenly developed, such that the systems and the neural pathways linking them can interact to enable suitable regulation of perceived incentives, threats, and consequences. *Parks*, at 258 (Late adolescents, "as they age, are likely to begin to take fewer risks, further understand consequences, become less susceptible to peer pressure, and have decreased aggressive tendencies."). This understanding from contemporary neuroscience offers a powerful explanation not only as to why late adolescents aged 18-20 are uniquely vulnerable to engaging in risky and irresponsible behaviors, but also as to why their proclivity for doing so naturally recedes upon reaching neurocognitive adulthood.[32]

4. Late adolescent brains, especially under stress, resemble under-18 adolescent brains.

Neuroscientists have discerned age brackets for which brain imaging data indicates greater neurological similarities than differences, notwithstanding marginal differences in physical or neurocognitive ages. For example, although it is easy to distinguish between brain images of young adolescents compared to young adults, it is exceedingly difficult to differentiate the brain images of adolescents and late adolescents aged 18-20.[33] *Parks*, at 252 ("[L]ate-adolescent brains are far more similar to [under-18 adolescent] brains . . . than to the brains of fully matured

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Modulation of Reward-Related Neural Activation on Sensation Seeking Across Development, 146 NeuroImage 763–771 (2017) (from the ages of 17 to 25 heightened reward-related reactivity in the brain was linked to increased sensation seeking); Braams, *supra* note 18 (finding neural responses activity in the context of risk-taking does not stabilize until past age 25).

[32] Casey et al., *Making the Sentencing Case: Psychological and Neuroscientific Evidence for Expanding the Age of Youthful Offenders*, 5 Annu Rev of Criminology 7.1 (2022).

[33] Cohen, *supra* note 17.

adults."). This is due to strong similarities in brain immaturity as well as changes in functional connectivity between brain systems that prevail throughout this developmental period.[34] Other studies demonstrate that late adolescents not only exhibit the highest risk preferences among all age groups, but their brain images also reveal indistinguishable levels of underdeveloped functional connections, especially under emotional arousal and stressful states in which serious offenses may be committed.[35]

These findings suggest that, in emotionally-charged and peer-influenced situations, the late-adolescent brain manifests as less mature than in calm, controlled environments, and that this immaturity is linked to risky behaviors.[36] "This results in a late adolescent often behaving more similarly to a 14- or 15-year-old, as opposed to an older adult, when in the presence of their peers." *Parks*, at 251. Together, the neuroscientific evidence demonstrates that brain function and cognitive capacity vary as a function of emotional and social contexts and that full adult capacity in these contexts is not generally observed until after late adolescence—even though late adolescents may appear, from external appearances, to be fully mature.

5. Psychological Capacity Matures Throughout Late Adolescence.

The brain's transformative development during late adolescence is intertwined with changes in psychological and cognitive abilities, as well as social and emotional

[34] Cohen, *supra* note 17; Dosenbach, *supra* note 16.
[35] Rudolph, *supra* note 20; Cohen, *supra* note 17.
[36] Rudolph, *supra* note 20.

responses, which, in turn, impact sentencing considerations such as culpability and capacity for change. *See Parks*, at 251; *Graham*, 560 US at 68 (citations omitted).

The scientific literature makes clear that different psychological abilities develop at different times, in keeping with gradual biological changes in the brain. Strategic behaviors involving planning and decision-making under demanding and emotionally arousing conditions show steady improvements beyond 18 years.[37] Adolescents, including late adolescents aged 18-20, still show diminished capacity in such scenarios, exhibiting heightened sensitivity to rewards, threats,[38] social cues,[39] and peer influences[40]—combined with an underappreciation of risks, consequences,

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[37] Steinberg et al., *Age differences in future orientation and delay discounting*, 80 Child Dev 28-44 (2009) (concluding that brain "remodeling" affecting planning ahead, temporal orientation, anticipation of future consequences, and delay discounting continues to occur throughout early and late adolescence); Steinberg et al., *Are adolescents less mature than adults?: minors' access to abortion, the juvenile death penalty, and the alleged APA "flip-flop,"* 64 Am Psychol 592 (2009) (finding that "in situations that elicit impulsivity" and are "characterized by high levels of emotional arousal," adolescent decision-making is likely "less mature than adults'"); Gardner & Steinberg, *Peer influence on risk taking, risk preference, and risky decision making in adolescence and adulthood: an experimental study*, 41 Dev Psychol 625–35 (2005) (concluding that adolescents are "more inclined toward risky behavior" in the face of peer influence).

[38] Cohen, *supra* note 17.

[39] *See, e.g.*, Hare et al., *Biological substrates of emotional reactivity and regulation in adolescence during an emotional go-nogo task*, 63 Biological Psychiatry 927–34 (2008) (finding that adolescent brains' weaker top-down regulation of emotional centers, such as the amygdala, affects ability to control behavior in highly emotional contexts); Somerville et al., *Frontostriatal maturation predicts cognitive control failure to appetitive cues in adolescents*, 23 J Cogn Neurosci 2129 (2011) (concluding that adolescents are "biased to engage in risky behavior at the service of approaching potential rewards").

[40] *See, e.g.*, Gardner & Steinberg, *supra* note 37, at 625-35.

and self-regulation.[41] Figure 4 below provides a visual representation of these changes in sensation-seeking and self-regulation.[42] This heightened sensitivity can distract individuals and bias decisions in suboptimal ways for late adolescents, such as placing them at a greater risk for criminal activity.[43] Under situations of threat,

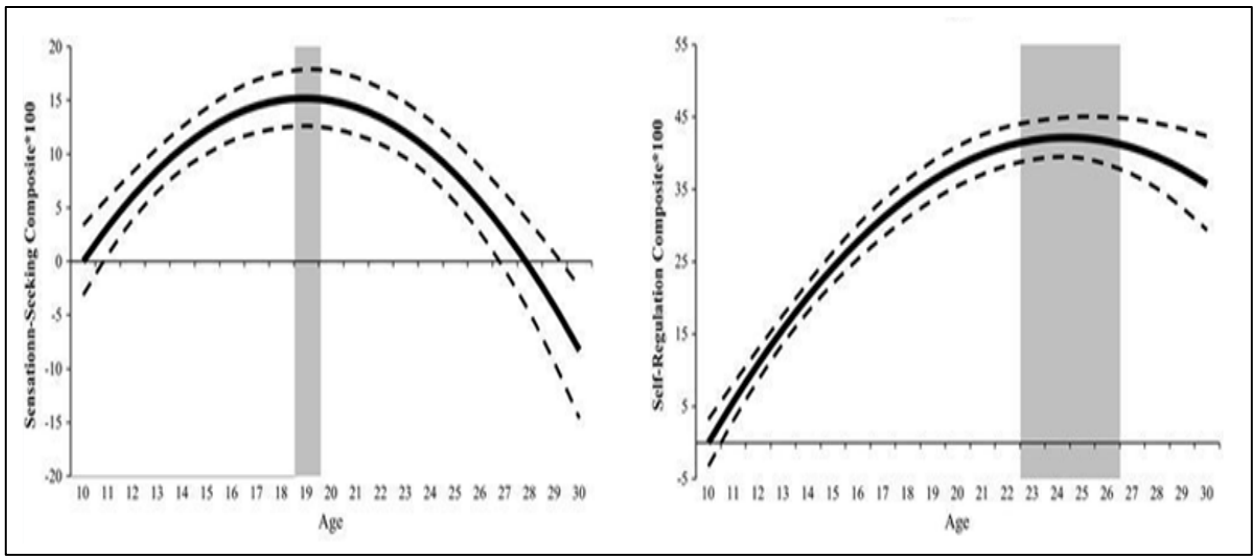

Figure 4 — Sensation-seeking peaks in late adolescence (left). Self-regulation stabilizes in young adulthood (right). Steinberg et al., *supra* note 42.

their cognitive capacity is diminished and does not exhibit mature levels by age 20.[44] Indeed, distinguishing the capacity of a 17-year-old from a late adolescent aged 18-20 in these situations would be functionally impossible.

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[41] Beardslee et al., *An examination of parental and peer influence on substance use and criminal offending during the transition from adolescence to adulthood*, 45 Crim Justice Behav 783–98 (2018); Smith et al., *Peers increase adolescent risk taking even when the probabilities of negative outcomes are known*, 50 Dev Psychol 1564–68 (2014).

[42] Steinberg et al., *Around The World, Adolescence Is a Time of Heightened Sensation Seeking and Immature Self-Regulation* 21 Dev Sci 1111 (2018).

[43] Beardslee, *supra* note 41; Smith; *supra* note 41; McCord et al., *Co-offending and patterns of juvenile crime: Research in brief*, National Institute of Justice, Washington, DC (2005).

[44] Cohen, *supra* note 17.

This Court rightly recognized that "this period of development also explains why a [late adolescent] is more susceptible to negative outside influences, including peer pressure." *Parks*, 510 Mich at 251; *see also Graham*, 560 US at 68 (Vulnerability "to negative influences and outside pressures, including peer pressure" is a mitigating attribute of adolescence). Several studies have found heightened risk-taking by late adolescents in the presence of peers compared to being alone or with neurological adults, whereas peer pressure has little impact on risk-taking among neurological adults.[45] "This susceptibility to peer pressure exacerbates late adolescents' predisposition to risk-taking and deficiencies in decision-making." *Parks*, 510 Mich at 251.[46]

This wealth of literature addressing the development of psychological abilities confirms there is little difference between adolescents under 18 and late adolescents aged 18-20 regarding cognitive capacity in demanding and emotionally-charged situations. Three key findings emerge. First, as a group, late adolescents show immature psychological abilities relative to neurological adults, which justifies their special treatment and protection. Second, cognitive, emotional, and social abilities do not develop on the same timeline. Third, these abilities fully coalesce only after late adolescence during neurological adulthood.[47] As such, late adolescents aged 18-

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[45] Gardner & Steinberg, *supra* note 37, at 625; Silva et al., *Adolescents in Peer Groups Make More Prudent Decisions When a Slightly Older Adult Is Present*, 27 Ass'n Psychological Sci 327–29 (2015).
[46] Zimring, *Penal Proportionality for the Young Offender: Notes on Immaturity, Capacity and Diminished Responsibility*, Youth on Trial 280–81 (2000).
[47] Casey, *supra* note 27.

20 may make rational decisions in some contexts, such as choosing to attend college or voting, but still struggle with mature decision-making in charged scenarios where peer influences, threats, or short-term incentives are acutely felt.

6. Trauma and Chronic Stress Impact Brain and Behavioral Development Through Late Adolescence.

Adversity in adolescent experiences and related traumas can alter standard brain development and cognitive and perceptual processes. Such events increase the risk of neurocognitive immaturity during late adolescence,[48] stunted emotional development, and limited self-control and other regulatory processes—all of which exacerbate poor decision-making and maladaptive behaviors (including criminal conduct).[49] Given this, late adolescents aged 18-20 exposed to significant adversity

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[48] *See* Schilling et al., *Adverse Childhood Experiences and Mental Health in Young Adults: A Longitudinal Survey* (2007) 7 BMC Public Health 2 (finding increased frequency of ACEs was "significantly" associated with increased prevalence of depressive symptoms, drug use, and antisocial behavior); Dunn et al., *Developmental Timing of Child Maltreatment and Symptoms of Depression and Suicidal Ideation in Young Adulthood: Results from the National Longitudinal Study on Adolescent Health* (2014) 30 Depress. Anxiety 955, 961 (finding "high levels of depression" and increased suicidal ideation in young adults who experienced physical or sexual abuse during childhood); McLaughlin, *The Long Shadow of Adverse Childhood Experiences* (2017) American Psychological Association, <https://www.apa.org/science/about/psa/2017/04/adverse-childhood> (accessed December 28, 2021) (summarizing studies showing adverse childhood experiences including physical or sexual abuse, domestic violence, exposure to violence in the community, experiences that involve deprivation such as neglect, the absence of a caregiver, poverty, and food insecurity contribute to anxiety, depression, aggressive behaviors, post-traumatic stress disorder, and substance abuse issues); Rollins & Crandall, *Self-Regulation and Shame as Mediators Between Childhood Experiences and Young Adult Health* (2021) 12 Frontiers in Psychiatry 1 (summarizing a growing number of studies indicating that adverse childhood experiences lead to increased mental health problems throughout young adulthood).

[49] Bick & Nelson, *Early Adverse Experiences and the Developing Brain* (2016) 41 Neuropsychopharmacology Reviews 179–80.

may nonetheless present a much lower neurocognitive age given the resounding impacts of prior trauma on their cognitive maturity.[50] This important evidence highlights the lack of a scientific basis for treating late adolescents aged 18-20 differently from adolescents under 18, especially if they have experienced trauma.

Thankfully, the brain shows remarkable plasticity in its potential to adapt to changing environments, even extreme ones (including chronic stress, neglect, and abuse)[51] throughout the lifespan.[52] Consequently, even with significant prior trauma, studies have shown that sufficient time in healthier environments and exposure to effective rehabilitative interventions can mitigate the past effects of adverse environments[53] and curb impulsive behaviors into neurological adulthood.[54] The brain's long-term capacity to remedy the effects of past adversity when met with

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[50] *See* National Academies of Sciences, *The Neurocognitive and Psychosocial Impacts of Violence and Trauma: Proceedings of a Workshop—In Brief* (2018) 2 ("[T]hreats, abuse, and violence lead to an excessive activation of fear circuitry and stress response systems, which will then compromise normal brain development."); Wade et al., *Associations Between Early Psychosocial Deprivation, Cognitive and Psychiatric Morbidity, and Risk-Taking Behavior in Adolescence* (2021) J. Clinical Child & Adolescent Psychology; Debnath et al., *Long-Term Effects of Institutional Rearing, Foster Care Intervention and Disruptions in care on Brain Electrical Activity in Adolescence* (2020). 23 Developmental Science 1.

[51] Liston et al., *Psychosocial Stress Reversibly Disrupts Prefrontal Processing and Attentional Control* (2009) 106 Proc. Nat'l Acad. Sci. USA 912–17.

[52] Galván, *Adolescent Brain Development and Contextual Influences: A Decade in Review* (2021) 31 J. Research on Adolescence 843–69.

[53] Chetty et al., *The Effects of Exposure to Better Neighborhoods on Children: New Evidence from the Moving to Opportunity Experiment* (2016) 106 American Economic Rev. 855–902.

[54] Baskin-Sommers et al., *Towards Targeted Interventions: Examining the Science Behind Interventions for Youth Who Offend* (2022) 5 Ann. Rev. of Criminology 345–69.

appropriate rehabilitative frameworks is remarkable and reveals potential for redemption for all late adolescents aged 18-20.[55]

7. Personality Matures Throughout Late Adolescence.

Numerous studies have dispelled the once-fashionable idea that personality emerges early and remains stable from age 18 onward. Research now demonstrates that people generally show increased self-control and emotional stability as they age, with dramatic increases throughout late adolescence.[56] *See* Sections II.A & II.B, *supra*. The classic "age-crime" curve illustrated in Figure 5 reflects, among other things, individuals' growing self-control and emotional stability over time. Statistics consistently show that criminal conduct—especially the incidence of violent offenses—peaks during late adolescence and declines significantly after age 21.[57]

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[55] Humphreys et al., *Foster Care Leads to Sustained Cognitive Gains Following Severe Early Deprivation* (2022) 119 PNAS 38.

[56] Roberts & Mroczek, *Personality trait change in adulthood*, 17 Curr Dir Psychol Sci 31–35 (2008).

[57] Most young adolescents show a reduction in problematic traits often related to criminal behavior even without intervention. *See* Hawes, *supra* note 20; Baskin-Sommers et al., *Callous-unemotional traits trajectories interact with earlier conduct problems and executive control to predict violence and substance use among high risk male adolescents*, 43 J Abnormal Child Psychology 1529–41 (2015).

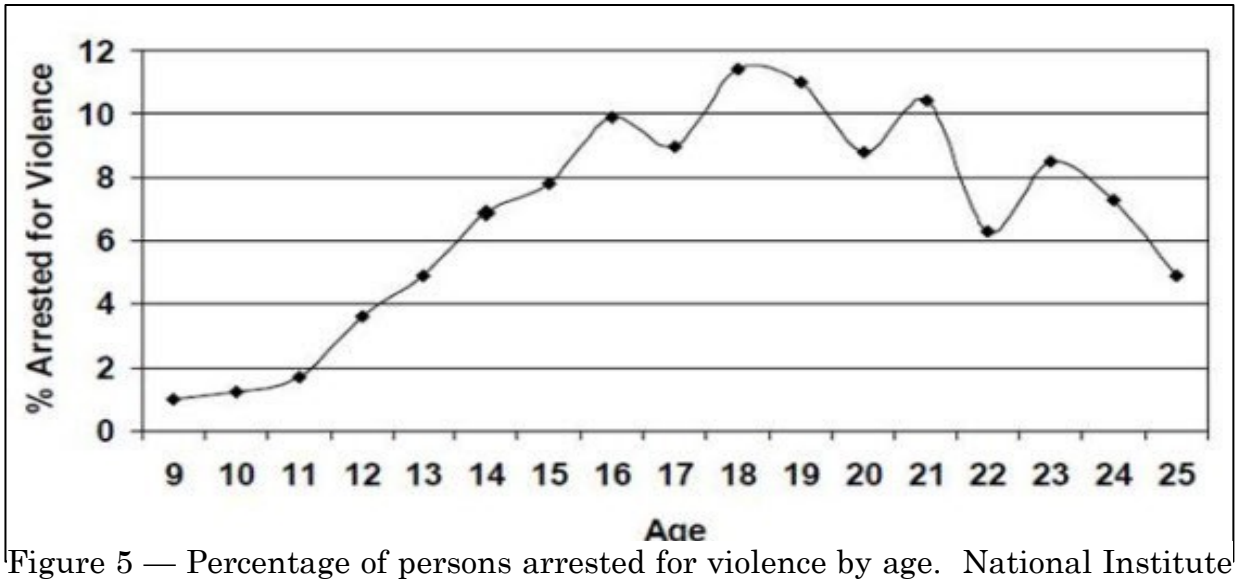

Figure 5 — Percentage of persons arrested for violence by age. National Institute of Justice, *From Youth Justice Involvement to Young Adult Offending* (2014).

Psychological studies track a similar pattern and show that extreme forms of antisocial behavior and pathological personality traits naturally diminish after late adolescence.[58] After late adolescence, antisocial behavior and callous-unemotional and psychopathic traits decrease for the majority of neurological adults.[59] When individuals age out of late adolescence, for many, their psychological and brain development will largely of its own accord reduce the factors that previously contributed to committing criminal acts. As a result, mandatory LWOP sentences for late adolescents are not justified based on the flawed premise of a "pathological" personality or purported need to deter future crimes or protect members of the public.

B. *Parks* Compels the Conclusion that Article 1, Section 16 Shields Late Adolescents Aged 18-20 from Mandatory LWOP Sentences.

For all the reasons stated in Section I.A *supra*, *Parks* leaves no question that Article I, Section 16's protections against mandatory LWOP for late adolescents aged

[58] Baskin-Sommers, *supra* note 57.
[59] Baskin-Sommers, *supra* note 57.

18 apply equally to late adolescents aged 19 and 20. "[T]he same features that characterize the late-adolescent brain also diminish the culpability of these youthful offenders, rendering them less culpable than older adults." 510 Mich at 258–259. That is because late adolescents aged 18–20 "are at the peak of their risk for criminality because of the neuroplasticity of their brains, causing a general deficiency in the ability to comprehend the full scope of their decisions as compared with older adults." *Id*. at 259. Late adolescents "transform as they age, allowing them to reform into persons who are more likely to be capable of making more thoughtful and rational decisions." *Id*.

Despite compelling and irrefutable evidence of ongoing brain and behavioral development and rehabilitative potential for all late adolescents aged 18-20, Michigan's "sentencing structure mandatorily condemns *all* [late adolescents aged 19-20] convicted of certain crimes to [LWOP] without considering whether they are capable of positive change and without any consideration of their lessened culpability, both of which are undeniable neurobiological facts." *Id*. The "current sentencing structure fails to consider whether [late adolescents aged 19-20] are irreparably corrupt, whether they have the capacity to positively reform as they age, and whether they committed their crime at a time in their life when they lacked the capability to fully understand the consequences of their actions." *Id*. This callous sentencing regime, as it stands, squarely contradicts the Michigan Constitution's "important belief that only the rarest individual is wholly bereft of the capacity for redemption." *Bullock*, 440 Mich at 39 n 23 (internal quotations omitted).

So, just as this Court made clear in *Parks* for late adolescents aged 18, amici respectfully submit that, "[b]ecause of the dynamic neurological changes that late adolescents undergo as their brains develop over time and essentially rewire themselves, automatic condemnation to die in prison at [19-20] is beyond severity—it is cruelty." *Id.* at 258. "Such an automatically harsh punishment without consideration of mitigating factors is unconstitutionally excessive and cruel." *Id.* at 259–60; *cf. Graham*, 560 US at 70 (LWOP is "an especially harsh punishment" given the mitigating attributes of adolescence). Under the current regime that mandates LWOP for late adolescents aged 19 and 20, late adolescents must "spend more time behind prison bars than any other adult defendants convicted of the same crime or similarly severe crimes [which is] disproportionate." *Parks*, 510 Mich at 260.

To assess whether a given sentence constitutes cruel or unusual punishment, Michigan courts apply the four-factor test in *People v. Lorentzen*, 387 Mich 167, 170 (1972), scrutinizing: "(1) the severity of the sentence relative to the gravity of the offense; (2) sentences imposed in the same jurisdiction for other offenses; (3) sentences imposed in other jurisdictions for the same offense; and (4) the goal of rehabilitation." *Parks*, at 254–55. As analyzed below, each of these factors applied here "compels the conclusion that mandatorily subjecting [late adolescents aged 19-20] to life in prison, without first considering the attributes of youth, is unusually excessive imprisonment and thus a disproportionate sentence that constitutes 'cruel or unusual punishment'" under Article I, Section 16. *Parks*, at 255.

First, relative to the offense, mandatorily sentencing late adolescents aged 18-20 to LWOP reflects unduly severe punishment. *Parks*, 510 Mich at 256–57. Even for serious offenses, the permanent and unforgiving nature of mandatory LWOP is "particularly acute" for late adolescents aged 18-20 because it (1) condemns them to "a greater percentage of their lives behind prison walls than [neurological] adult offenders"; and (2) wholly disregards their mitigating attributes of late adolescence, despite the scientific consensus on late adolescent brain and behavioral development. *See* Section I *supra*. Starting with the severity of the sentence, "other than the death penalty, [mandatory LWOP] is the most severe sentence still available in the whole country" and means that "late-adolescent defendants [aged 18-20] are faced with a prison sentence to be served for the remainder of their biological lives, with no possible hope of release." *Parks*, at 258 n.11; *see also id.* at 260 (reasoning that mandatory LWOP is only justifiable for "those whose criminal culpability mandates automatic, permanent removal from society.")

Turning to the mitigating attributes of late adolescence, this Court clarified in *People v. Bullock* that all sentences "must be tailored to a defendant's personal responsibility and moral guilt." 440 Mich at 39, 485 N.W.2d 866 (quotation marks and citation omitted). And yet, for late adolescents aged 19-20, the "automatically harsh punishment" of mandatory LWOP precludes courts from taking into account "undeniable neurobiological facts" regarding their incomplete brain and behavioral development. Those neurobiological facts greatly inform their lessened "personal responsibility and moral guilt" in light of their situational diminished capacity,

especially in stressful and peer-influenced situations, and their exceptional "capacity to positively reform as they age." *Id.* at 259. As *Parks* explained, the failure of mandatory LWOP to consider these mitigating attributes of late adolescence renders these sentences "unconstitutionally excessive and cruel." *Id.* at 259–260.

Second, the sentences imposed for other offenses in Michigan further reveal that mandatory LWOP constitutes disproportionate punishment for late adolescents aged 18-20. Under Article I, Section 16, "the length of time an offender will spend in prison is undoubtedly a relevant consideration in determining the constitutionality of mandatory [LWOP]." *Id.* at 257. For individuals who were late adolescents at the time of their offenses, "it is highly probable that [they] will spend more time behind prison bars than any other adult defendants convicted of the same crime or similarly severe crimes. This is disproportionate to other offenders in this state." *Id.* at 260. Since their offenses tend to be "reflective of [] diminished capacity as a late adolescent" as compared to the same offense committed by a neurological adult, "the disproportionality is apparent." *Id.* at 261. Therefore, "[i]t is cruel that our current sentencing scheme requires [late adolescents aged 19-20] to, on average, serve far more severe penalties than equally or more culpable" neurological adults. *Id.* at 261.

The gross disparity between Michigan's bar on mandatory LWOP for late adolescents aged 18, while condoning the punishment for late adolescents aged 19-20, further underscores the untenable nature of those sentences. It is simply "cruel" that those aged 19-20 receiving mandatory LWOP will "spend more time in prison than most of [their] equally culpable" peers, including adolescents under 18 and late

adolescents aged 18, even though the Government has conceded, and this Court has found, that these persons share "equal moral culpability neurologically" based on the mitigating attributes arising out of their incomplete development. *Id.* at 261–62.

Third, the fact that some states have moved further away from LWOP (whether mandatory or permissive) for late adolescents tips the scales even further against mandatory LWOP's proportionality here. As an initial matter, as *Parks* observed, "Washington, with a similarly broad punishment provision in its constitution, judicially found the neurological differences between juveniles and 18-year-olds to be nonexistent and mandated that young adults through the age of 20 also receive the same individualized sentencing protections as juveniles." *Parks*, at 262–63 (citing *In re Monschke*, 482 P.3d 276 (Wash. 2021)). And perhaps more significant, the Massachusetts Supreme Judicial Court earlier this year concluded that its state constitution prohibits both mandatory and permissive LWOP for late adolescents aged 18-20, and it did so by contextualizing the same powerful brain and behavioral science that amici proffered in that case, and here. *People v. Mattis*, 224 N.E.3d 410, 421, 423 (Mass. 2024). And now, the New Jersey Supreme Court remains actively reviewing whether its state constitution embodies protections against both mandatory and permissive LWOP for all late adolescents aged 18-20. *See State v. Jones, Roche, & Harris*, Case No. 089524 (N.J. 2024). So, while the Court in *Parks* characterized the third *Lorentzen* factor as "slightly weigh[ing] in favor of an individualized sentencing" for late adolescents aged 18 at the time of *Parks*, recent

judicial developments since *Parks*, at minimum, move the needle "slightly" more in favor of protecting late adolescents aged 19-20 against mandatory LWOP.

Fourth, the fundamental goal of rehabilitation makes abundantly clear that mandatory LWOP for late adolescents aged 18-20 contravenes Article I, Section 16. Rehabilitation is a "criterion rooted in Michigan's legal traditions" and, [w]ithout hope of release, [late adolescents aged 19-20], who are otherwise at a stage of their cognitive development where rehabilitative potential is quite probable, are denied the opportunity to reform while imprisoned." *Id*. at 265 (citing *Bullock*, 440 Mich at 34) (internal quotations omitted). Here, "it cannot be disputed that the goal of rehabilitation is not accomplished by mandatorily sentencing [late adolescents] to life behind prison walls without any hope of release." *Id*. at 264–265. This is because the scientific consensus and *Parks* unequivocally establish that these late adolescents remain uniquely amenable to transformative rehabilitation pursuant to cascading changes to their brain and behavior—including neuroplasticity, prefrontal development, psychological growth, and personality maturation throughout late adolescence. *See* Section I *supra*. In other words, the current sentencing system that deprives late adolescents aged 19-20 of the opportunity for rehabilitation many years down the line, extinguishing any hope for future parole consideration, stands as "antithetical" to the Michigan Constitution's "professed goal of rehabilitative sentences." *Parks*, at 265.

Accordingly, just like this Court found in *Parks*, applying the four *Lorentzen* factors here compels the finding that Michigan's current sentencing scheme—which

categorically condemns all late adolescents aged 19-20 to LWOP without necessary and appropriate acknowledgment of their mitigating attributes and rehabilitative potential—fails to satisfy the constitutional rigors of Article I, Section 16.

C. *Hall* Has No Bearing on Article I, Section 16's Protections for Late Adolescents Aged 19–20.

A holding by this Court that Article I, Section 16 prohibits imposition of mandatory LWOP on late adolescents aged 19–20 would not require reconsideration of *People v. Hall*, 396 Mich 650, 657–58 (1976) for at least three reasons. First, *Hall* "was decided before the United States Supreme Court decided *Miller* and its progeny," which introduced the mitigating attributes of adolescence and underscored the constitutional significance of neuroscience and psychology in informing whether mandatory LWOP constitutes disproportionate punishment. *Id*. Second, when *Hall* was decided nearly 50 years ago, this "Court did not have the benefit of the scientific literature" authored and proffered by amici, and which this Court cited in *Parks*. *Id*. Third, *Hall*'s thread-bare scrutiny of mandatory LWOP, with zero regard for the defendant's age or mitigating attributes of adolescence or late adolescence, firmly establishes *Hall* as inapposite to the constitutional question presented here.

Accordingly, *Hall* "does not preclude" protections against mandatory LWOP for late adolescents aged 18, nor does *Hall* "foreclose future review of [LWOP] sentences for other classes of defendants," including late adolescents aged 19–20. *Parks*, 510 Mich at 255 n.9. However, to the extent that the Court believes it must reconsider *Hall* to issue the protective holding compelled by Article I, Section 16, reconsideration is necessary and amply justified here given the irrefutable neuroscientific evidence

in this Brief concerning the mitigating attributes of late adolescence and the disproportionate nature of mandatory LWOP for late adolescents writ large.

CONCLUSION

For the foregoing reasons, amici respectfully submit that the Court should find, consistent with *Parks*, that imposing mandatory LWOP sentences on late adolescents aged 19-20 constitutes cruel or unusual punishment in violation of the fundamental rights guaranteed by the Michigan Constitution.

Respectfully submitted,

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APPENDIX — LIST OF *AMICI CURIAE*

SCHOLAR AMICI[60]:

Dr. Jeffrey Aaron is a clinical and forensic psychologist who practices independently and teaches in the University of Virginia Medical School. Much of his work focuses on forensic evaluation of adolescents and the influence of adolescents' developmental status on their behavior, capacities, risk, and intervention needs.

Dr. Apryl Alexander is the Metrolina Distinguished Scholar in Health & Public Policy and Associate Professor in the Department of Public Health Sciences at the University of North Carolina at Charlotte. Her research focuses on violence, trauma, and clinical treatment of justice-involved adolescents.

Dr. Jeffrey Arnett is a Senior Research Scholar at Clark University. He has been researching and conceptualizing the age period from 18 to 25, that he termed emerging adulthood, for the past 30 years. He is the originator of the theory of emerging adulthood (human development from age 18-29) and has written many articles and books on this topic. In addition to emerging adulthood, his other scholarly interests include media uses in adolescence, the psychology of globalization, and responses to cigarette advertising.

Dr. Arielle Baskin-Sommers is an Associate Professor of Psychology and Psychiatry at Yale University. Her work focuses on identifying and specifying the cognitive, emotional, and environmental mechanisms that contribute to antisocial

[60] Individual amici have signed this Brief in their personal capacities and not on behalf of their affiliated institutions. Titles and institutional affiliations are for identification purposes only.

behavior (e.g., substance use, criminal activity, aggression). She uses findings from her research to develop novel experimental tasks, assessments, and intervention strategies aimed at developing more humane (and scientific) approaches for addressing mental health and crime.

Dr. Sara Boyd is a licensed clinical psychologist, board-certified forensic psychologist, and associate faculty at the Forensic Clinic of the Institute of Law, Psychiatry, & Public Policy (ILPPP) at the University of Virginia. Her primary specialties include Intellectual and Developmental Disabilities and psychological trauma (particularly interpersonal violence) in children and adults. She also develops and conducts trainings for forensic evaluators, mental health care providers and legal professionals, provided under the auspices of ILPPP.

Dr. B.J. Casey is the Christina L. Williams Professor of Neuroscience in the Department of Neuroscience and Behavior at Barnard College, Columbia University and member of The Justice Collaboratory of Yale Law School. She pioneered the use of fMRI to examine the developing human brain, particularly during adolescence, accelerating the emergence of the field of developmental cognitive neuroscience. Her scientific discoveries have been published in over 250 articles in top journals including *Nature Medicine*, *Nature Neuroscience*, *Neuron*, *PNAS*, and *Science*, cited over 74,000 times, and highlighted by NPR, PBS, NY Times, and National Geographic. She has received numerous honors including the Association for Psychological Science Lifetime Achievement Mentor Award, the American Psychological Association Distinguished Scientific Contribution Award, and is an

elected member of the American Academy of Arts and Science.

Lael E. H. Chester is an attorney and Director of the Emerging Adult Justice Project at Columbia University's Justice Lab. Her work focuses specifically on late adolescents involved in the juvenile and adult criminal justice systems and she has been researching innovations in practices, policies and laws across the country for the past eight years.

Dr. Hayley Cleary is an Associate Professor of Criminal Justice and Public Policy at Virginia Commonwealth University. She holds a Master of Public Policy and Ph.D. in Developmental Psychology from Georgetown University. Her research lies at the intersection of social science, law, and policy. Her work, funded by the National Science Foundation and Annie E. Casey Foundation, examines adolescent behavior and decision-making in legal contexts, including adolescents' contact with law enforcement, courts, and correctional systems.

Dr. Alexandra Cohen is an Assistant Professor of Psychology and Core Faculty in Neuroscience and Behavioral Biology at Emory University. Her research focuses on understanding the neural and cognitive mechanisms underlying how emotion and motivation influence learning, memory, and brain function from childhood to adulthood. She has received funding from the American Psychological Association, the National Science Foundation, and the National Institutes of Health to support her work.

Laura Cohen is a Professor of Law and the Justice Virginia Long Scholar at Rutgers Law School, where she founded and directs the Center for Criminal Justice,

Youth Rights, and Race; the Criminal and Youth Justice Clinic; and the New Jersey Innocence Project at Rutgers University. Her legal scholarship and policy work focus on the intersection of developmental science and adolescent justice policy and practice, particularly with regard to sentencing and parole. She has appeared before this Court as or on behalf of amicus curiae in numerous matters, including *State v. Comer* / *State v. Zarate*, 249 N.J. 359 (2022).

Dr. Tarika Daftary-Kapur is an Associate Professor of Justice Studies at Montclair State University. Her research lies primarily in adolescent decision-making and legal competencies presently focused on plea deal decision making, and jury decision making. Dr. Daftary-Kapur is currently working on a multi-year project examining reentry experiences of adolescents sentenced to life without parole and subsequently released.

Dr. Judith Edersheim is the founding co-director of the Massachusetts General Hospital Center for Law, Brain and Behavior, where she is an attending psychiatrist, as well as an Assistant Professor of Psychiatry at Harvard Medical School. Dr. Edersheim's work at the Center focuses on bringing insights from neuroscience, neurology, and psychiatry into the legal arena in an effort to improve the justice system, and she lectures extensively in state and federal court settings and the teaching programs of Massachusetts General Hospital, Harvard Medical School, and Harvard Law School.

Dr. Jeffrey Fagan is the Isidor and Seville Sulzbacher Professor of Law and Professor of Epidemiology at Columbia University. His scholarship focuses on

fairness and equity in the administration of justice. His research examines race and criminal law, capital punishment, policing and police reform, firearm violence and regulation, and adolescent crime and punishment.

Dr. Adriana Galván is a Professor of Psychology and the Dean of Undergraduate Education at the University of California, Los Angeles. She is also Co-Executive Director of the UCLA Center for the Developing Adolescent. Her scholarship focuses on the adolescent brain and behavior, with a focus on motivation, learning, and risk-taking and with an eye towards informing adolescent-relevant policy. She has received multiple awards, including from the Cognitive Neuroscience Society, American Psychological Association, William T. Grant Foundation, National Academy of Sciences, a Fulbright Award, and the Presidential Early Career Award for Scientists and Engineers.

Dr. Jay N. Giedd is chair of the division of child and adolescent psychiatry at the University of California, San Diego, and a professor at the Johns Hopkins Bloomberg School of Public Health. Since 1991, he has researched the biological basis of cognition, emotion, and behavior with a particular emphasis on adolescent brain maturation and decision-making, and the education science/neuroscience interface. His research has been cited over 100,000 times. Dr. Giedd was previously chief of the section on brain imaging in the Child Psychiatry Branch of the National Institutes of Health and editor-in-chief of *Mind, Brain, and Education*.

Dr. Catherine Hartley is an Associate Professor of Psychology and Neural Science and is Co-Director of the Institute for the Study of Decision Making at New

York University. Her scholarly work focuses on understanding developmental changes in learning and decision-making from childhood to adulthood at both the cognitive and neural levels, with a focus on understanding mechanisms of vulnerability or resilience to psychopathology. She has received multiple awards for her work, including a National Science Foundation CAREER Award, the National Institute of Mental Health Biobehavioral Research Award for Innovative New Scientists, the Association for Psychological Science Janet Taylor Spence Award for Transformative Early Career Contributions, and the Cognitive Neuroscience Society Young Investigator Award.

Dr. Luke Hyde is a Professor of Psychology and Chair of the Clinical Psychology Area of Psychology with appointments at the Institute for Social Research and the Poverty Solutions Center at the University of Michigan. He is a licensed clinical psychologist in the State of Michigan. He is an expert in neuroscience and the development of aggression, violence, and criminal behavior. His research focuses on the development of high-risk behavior, the interplay of nature and nurture, and factors that promote resilience and desistance from delinquent behavior.

Dr. Catherine Insel is a postdoctoral research scientist at the Zuckerman Mind Brain and Behavior Institute at Columbia University. She received her Ph.D. from Harvard University and is an expert on adolescent brain development. Her research, funded by the National Science Foundation and National Institutes of Health, examines the neurocognitive development of motivation, learning, memory, and cognitive control.

Dr. Daniel Keating is a Professor of Psychology, Psychiatry, and Pediatrics at the University of Michigan. His research and publications (over 200) have focused on adolescent development and neurodevelopment, with a recent specific focus on the role of brain development on risk behavior, funded by the National Institutes of Health. His book on the impact of early life adversity on later development, *Born Anxious* (2017), received the annual award in developmental psychology from the American Psychological Association.

Dr. Robert Kinscherff is a clinical, forensic psychologist and attorney serving as Executive Director of the Center for Law, Brain & Behavior at Massachusetts General Hospital. Over a career of more than three decades, he has filled key forensic positions for the Massachusetts Trial Court, Massachusetts Department of Mental Health, Massachusetts Parole Board, and clinical and forensic mental health systems. He teaches and consults nationally and internationally in practice areas including juvenile and criminal justice, violent and sexual offenders, and professional practice and policy at the nexus of neuroscience, developmental psychology, adversity and trauma, and addictions.

Dr. Robert J. McCaffrey is an emeritus professor of psychology at the University at Albany. Dr. McCaffrey is a board-certified clinical neuropsychologist with specializations across the life-span. Dr. McCaffrey is past President of the National Academy of Neuropsychology, the American Board of Professional Neuropsychology, the Past President of the American Academy of Pediatric Neuropsychology. He is a fellow of the National Academy of Neuropsychology, the

American Psychological Association, the Association of Psychological Science, the American College of Professional Neuropsychology, and the American Academy of Pediatric Neuropsychology. Dr. McCaffrey was Editor-in-Chief of *Archives of Clinical Neuropsychology*, the official journal of the National Academy of Neuropsychology, and is Editor-in-Chief of *Developmental Neuropsychology: An International Journal of Life-Span Issues in Neuropsychology*.

Tracey Meares is the Walton Hale Hamilton Professor and a Founding Director of the Justice Collaboratory at Yale Law School that brings together an interdisciplinary group of scholars and researchers at Yale and beyond to cooperatively work toward a theory-driven, evidence-informed justice system. She has worked extensively with the federal government by serving on the National Academy of Sciences Committee on Law and Justice, a National Research Council standing committee, and the U.S. Department of Justice's Office of Justice Programs Science Advisory Board.

Dr. Grace Mucci is an Associate Clinical (Volunteer) Professor in the Department of Pediatrics at the University of California, Irvine, and licensed clinical psychologist and pediatric neuropsychologist currently practicing in hospital and private practice settings. Board-certified in Pediatric Neuropsychology through the American Board of Pediatric Neuropsychology, she also serves as the Executive Director of the American Academy of Pediatric Neuropsychology.

Dr. Ashley Nellis is a life imprisonment scholar and Co-Director of Research at The Sentencing Project. Her research documents the prevalence of life sentences

in America. Her research has been used to inform policies and practices of imposing life sentences on various segments of society including: adolescents, late adolescents, victims of domestic violence, and the elderly.

Dr. Cecil Reynolds is Editor-in-Chief of the peer-reviewed *Journal of Pediatric Neuropsychology*, Emeritus Professor of Neuroscience and Educational Psychology and distinguished research scholar at Texas A&M University, and a clinical neuropsychologist who also had a clinical practice for more than 25 years treating children, adolescents, and late adolescents. He is in the top quarter of the Stanford list of the top 2% of scientists worldwide and the *Oxford Handbook of the History of Clinical Neuropsychology* ranks him as the 7th most influential person in the history of the field based on the impact of his published works.

Dr. Joseph Ryan is Professor and Associate Dean in the School of Social Work at the University of Michigan. He is also the Director of the Child and Adolescent Data Lab, an applied research center focused on using data to drive policy and practice decisions. His research and teaching build on his direct practice experiences with child welfare and juvenile justice populations.

Dr. Jennifer Silvers is the Bernice Wenzel and Wendell Jeffrey Term Chair in Developmental Neuroscience at the University of California, Los Angeles. She has published over 60 articles on the brain and behavioral bases of emotion, decision-making, and adolescent development. Dr. Silvers has received funding from the National Science Foundation and National Institutes of Health, as well as awards from the American Psychological Association, Association for Psychological Science,

and the International Society for Developmental Psychobiology.

Dr. Leah Somerville is the Grafstein Family Professor of Psychology at Harvard University and faculty in the Center for Brain Science. Her research focuses on characterizing adolescent brain development, and the consequences of brain development on psychological functioning and well-being. This work integrates behavioral, computational, and brain imaging approaches, including the Human Connectome Project in Development, a large NIH-funded study on brain connectivity development.

Dr. Elizabeth Sowell is a Professor of Pediatrics at the Keck School of Medicine at the University of Southern California. She has been a leader in developmental cognitive neuroimaging for over 20 years and has published over 150 peer review manuscripts in leading journals, including *Nature Neuroscience*, *Nature Medicine*, and the *Lancet*, among others. Her research focuses on adolescent brain and cognitive development as well as the impact of pre- and post-natal exposures to drugs of abuse, environmental toxins (i.e., lead exposure), and family and neighborhood level socioeconomic adversity. Dr. Sowell has been continuously funded by the National Institutes of Health for over 20 years, and she is currently a principal investigator in the Adolescent Brain Cognitive Development study at Children's Hospital Los Angeles.

Dr. Laurence Steinberg is a Distinguished University Professor and the Laura H. Carnell Professor of Psychology and Neuroscience at Temple University. He is a Fellow of the American Academy of Arts and Sciences and was the lead

scientist for the American Psychological Association on its U.S. Supreme Court amicus briefs in *Roper v. Simmons*, *Graham v. Florida*, and *Miller v. Alabama*. With Elizabeth Scott, he is co-author of *Rethinking Juvenile Justice*.

Dr. Jennifer Woolard is a professor of psychology and Vice Dean for Faculty Affairs in the College of Arts & Sciences at Georgetown University. Her research and action laboratory, the Georgetown Community Research Group, studies individual and family experiences with systems of care and control in order to create fair, effective, and just legal processes. Dr. Woolard testifies as an expert in adolescent and criminal cases and has presented her research findings to a wide variety of academic, legal, and policy audiences.

Dr. Tina Zottoli is an Associate Professor of Psychology and Director of the Legal Decision Making Lab at Montclair State University. She holds a Ph.D. in Psychology from the City University of New York, John Jay College of Criminal Justice and is a licensed clinical psychologist in the state of New York. Her scholarship centers on decision making in legal contexts, with a focus on outcomes for system-involved adolescents, including late adolescents. Her work on recidivism risk in persons released from life sentences for crimes committed during adolescence has garnered national attention, and she has testified before the legislatures of several states with respect to proposed second-chance legislation for adolescents.

NONPROFIT AMICI:

The **American Academy of Pediatric Neuropsychology** ("AAPdN") is a

nationwide nonprofit that advocates, educates, and supports collaboration between individuals and professional specialties focused on children, adolescents, and late adolescents. Affiliated with AAPdN, the American Board of Pediatric Neuropsychology develops specific academy-organized competency in pediatric neuropsychology. AAPdN fosters a community of neuropsychologists who meet standards of advanced competency and are committed to advocacy for the neuropsychological health of children, adolescents, and late adolescents.

The Gault Center, formerly the National Juvenile Defender Center, was created to promote justice for all children by ensuring excellence in the defense of youth in delinquency proceedings. Through systemic reform efforts, training, and technical assistance, the Gault Center seeks to ensure all young people enjoy full constitutional protections and recognition of their status as still-developing adolescents. The Gault Center (as the National Juvenile Defender Center) has participated as an amicus in high court matters across the country.

The **Juvenile Law Center**, the first nonprofit public interest law firm for children in the country, works to reduce the harm of the child welfare and justice systems, limit their reach, and ultimately abolish them so all young people can thrive. Juvenile Law Center's legal and policy agenda is informed by—and often conducted in collaboration with—youth, family members, and grassroots partners. Since its founding, Juvenile Law Center has filed amicus briefs in state and federal courts across the country to ensure that laws, policies, and practices affecting young people advance racial and economic equity and are consistent with their unique

developmental characteristics and human dignity.

The **Pacific Juvenile Defender Center** ("PJDC") is a statewide public interest nonprofit that works to improve the quality of legal representation for youth in the justice system and to address important juvenile policy issues. PJDC supports more than 1,600 juvenile court lawyers, appellate counsel, law school clinical programs, and nonprofit lawyers to ensure quality representation for late adolescents throughout California and around the country. Collectively, PJDC and its members have served as counsel in thousands of juvenile court cases and amicus briefs.

The Sentencing Project is a nationwide nonprofit established in 1986 to engage in public policy research, education, and advocacy to promote effective and humane responses to crime. The Sentencing Project has produced a broad range of scholarship assessing extreme sentences in jurisdictions throughout the United States and has a specific interest in constitutional sentences for late adolescents.