

Using Adolescent Brain Research to Inform Policy

A GUIDE FOR JUVENILE JUSTICE ADVOCATES

FACT SHEET | SEPTEMBER 2012 UPDATE

Introduction

Adolescence has generally been recognized as a time of growth and change. Research on adolescent development has demonstrated for decades the profound and dramatic changes that occur during the teenage years, and how these changes affect the behavior of adolescents. In recent years, brain imagery such as functional Magnetic Resonance Imaging (fMRI) has enabled researchers to look at the actual physical changes that take place in the brain during adolescence and young adulthood and to see exactly how and when different areas of the brain develop. Newer studies look at brain functioning—which parts of the brain are involved in particular kinds of thinking and activities. This has revealed differences in the ways that adolescents and adults use their brains. Much has been made of this research in policy arenas; however, its use raises questions about respect for our youth allies and implications for alternate policy agendas.

This paper will briefly explore some of these issues and encourage advocates to pause and think about how they use this research to inform their reform efforts.

What Does the Research Say?

- Brain development takes place in stages and is not fully complete in adolescence. The frontal lobe, especially the prefrontal cortex, is one of the last parts of the brain to fully mature, and undergoes dramatic development during the teen years. It is this “executive” part of the brain that regulates decision making, planning, judgment, expression of emotions, and impulse control. This region of the brain may not be fully mature until the mid-20s.¹
- The limbic system, which helps to process and manage emotion, is also developing during adolescence. Despite the fact that the limbic system is not yet fully mature, it stands in for the underdeveloped frontal lobe to process emotions. This causes adolescents to experience more mood swings and impulsive behavior than adults.²

- Levels of dopamine production shift during adolescence. Dopamine is a chemical produced by the brain that helps link actions to sensations of pleasure; its redistribution can raise the threshold needed for stimulation that leads to feelings of pleasure. As a result, activities that once were exciting to youth may not be so as they enter adolescence, and thus they may seek excitement through increasingly risky behavior.³
- During adolescence, gray matter in the brain begins to thin as synapses (links between neurons that transmit and receive information) undergo a process of “pruning.” Unused synapses are pruned away, while those that are used frequently become stronger. Additionally, neurons are strengthened through “myelination,” which improves the connectivity between neurons and thereby speeds up communication between cells. Pruning and myelination demonstrate that changes to the adolescent brain can have long-term consequences: parts of the brain that are used frequently will be strengthened, while other parts that are used less frequently will weaken and die off.⁴
- When adolescents make choices involving risk, they do not engage the higher-thinking, decision-and-reward areas of the brain as much as adults do. This can lead adolescents to actually overstate rewards without fully evaluating the long-term consequences or risks involved in a situation.⁵

How Does this Affect Young People’s Behavior?

- Because of the changes in the emotional and decision-making centers of the brain, adolescents behave differently in circumstances of “hot cognition” (situations of high emotional context) and “cold cognition” (situations of lower emotional context). For example, a teen surrounded by friends in a loud, stimulating environment may make a more emotionally-based decision versus a teen in a calm, quiet environment with her parents, who may make a more intellectual, consequence-based decision.
- The effect of hot cognition is increased by other changes taking place. Hormonal changes related to developing sexual maturity and psycho-social changes manifest themselves in adolescents’ emphasis on the importance of peer groups, need for autonomy from parents and guardians, and development of self identity.
- Youth decision-making is heavily influenced by context. Their intellectual capabilities can be as developed as adults; they are capable of making reasoned decisions and often will make better decisions than adults. However, when youth are placed in environments where they may be susceptible to peer pressure, where there is pressure to make a decision quickly, where there is an opportunity for risk-seeking behavior, and/or where there is high emotionality, they have increased potential for their judgment to be driven by emotion rather than by reason. This may explain why youth are often arrested for violent acts in groups.
- Youth may be more prone to making risky choices because of the shifting levels of dopamine in their brains. This can be exacerbated in a situation involving peer influence.
- Youth who are victims of emotional or physical trauma may suffer from a delay in brain maturation because of the disruption in brain development.⁶

Is it too Early to Use this Research?

Many researchers argue that while we have discovered much in recent years, there is much more that we do not yet know, such as specific evidence of causation. And thus, it is just too early to start using this research to inform policy.

However, juvenile justice advocates have found that this research is nothing short of compelling. It opens the doors to legislators' offices who never before thought about progressive juvenile justice reform. It gives advocates and lawyers working on behalf of juveniles scientific proof for their claims that children are different from adults, are capable of change, and need support and opportunities for healthy development—the principles that initially led to the establishment of the juvenile court and juvenile justice system. And, perhaps even more importantly, brain development research provides heretofore reluctant legislators from “tough-on-crime” districts a basis for a shift from punishment of juveniles to rehabilitation.

The use of brain development research to advocate for juveniles has already proven to be effective. In *Roper v. Simmons*,⁷ the United State Supreme Court cited the significant differences in responsibility and susceptibility to outside pressures between adults and youth as a factor in its reasoning that it is unconstitutional for juveniles to receive the death penalty. Then in 2010, the court more explicitly relied on emerging research in its prohibition of the use of life without parole for youth who commit non-homicide offenses, stating in *Graham v. Florida* that “developments in psychology and brain science continue to show fundamental differences between juvenile and adult minds. For example, parts of the brain involved in behavior control continue to mature through late adolescence.”⁸ Most recently, the court in *Miller v. Alabama* reiterated the findings and significance of brain science when it banned mandatory life without parole sentences for youth under age 18.⁹

Due to its effectiveness, advocates will continue to use brain development research to inform and influence juvenile justice policy reform. But what are the implications of using this research? How can we use this research while still being respectful of our young allies? And how might this research be used for other policy agendas?

How Can We Respectfully Frame this Research?

Sometimes the language used to talk about these new findings makes it sound as though young people are unintelligent, incapable of making good decisions, inevitably led by peer pressure to do risky things, and lack the competence to contribute usefully to the organizations and communities in which they are involved. We know this is not the case at all; youth are quite capable of making good decisions most of the time, and can make valuable contributions to their communities and society as a whole.

Are there better ways to express the concepts the researchers present, which both respect the capabilities of youth and make the case for age-appropriate treatment that recognizes differences between adolescents and adults?

The concepts of opportunity, investment, and education provide a means to frame and use this research respectfully and effectively.

Opportunity

- Adolescence is a time of opportunity to help youth become responsible adults and to lay a foundation for youth that will help them make informed decisions.
- The developing adolescent brain means that youths' personalities and behaviors are not fixed or stagnant; therefore youth are highly amenable to treatment and rehabilitation.

Investment

- As in early childhood, adolescence is a time when important growth and development take place. Just as we now understand the importance of investing in youth from zero to five, we must also invest in them during the teenage years. We must provide teenagers with the right environment and tools to allow and encourage them to reach their full potential.
- Our duty as a society is to enable the responsible development of young people, especially during a time when their brains undergo dramatic growth and change.
- An investment in the creation of environments that allow and encourage youth to make decisions in a context of cold cognition, with the guidance of caring adults, will yield a safer, healthier community for all.
- The best investment is to offer youth who make mistakes guidance and rehabilitation. All adolescents make mistakes, and the vast majority of them learn from these mistakes and grow into responsible adults.

Education

- Youth will likely be in a better position to resist some of the triggers that may drive them to make unhealthy decisions if they are educated about their own development, and that of their peers, and how it can impact their behavior.
- The guidance of supportive adults can help youth to use their positive assets to benefit the community.
- When adults understand more about the brain development that occurs during adolescence, they may interact more effectively with youth and can provide youth with better services.

How Does Brain Research Relate to Positive Youth Development?

Related to the concepts of opportunity, investment, and education is the principle of positive youth development, which is supported by the findings of brain research. Positive youth development emphasizes youths' strengths, connects youth with caring adults, empowers youth to assume leadership roles, promotes positive relationships with peers, challenges youth in ways that build competence, and provides opportunities for youth to learn healthy behaviors. This approach slows down the decision-making process and helps youth make decisions in atmospheres of cold, rather than hot, cognition. It also surrounds youth with peers and adults who will positively influence their decisions, rather than negatively pressure them. Lastly, positive youth development can help to

ensure that synaptic pruning occurs in a healthy manner. Positive relationships with peers and adults, engagement in community and cultural activities, academic enrichment, opportunities for leadership, and individual empowerment will strengthen important synapses, and help to ensure success in these areas as youth mature.

Examples of successful programs that utilize a positive youth development approach are those that build youth academic, vocational and job application/training skills; help youth become community advocates and activists; and take positive inventories of the assets youth have in their identity, expanding skill set and community.

Caution: Brain Development Research Can Be Broadly Applied

When we use brain development research to further juvenile justice reform, we should be aware of and thinking about how others may interpret these findings, both in the juvenile justice arena and in other youth-related policy work. A fundamental tension in the interpretation of this research lies between a positive view of the developing potential in youth and a more negative impulse to contain young people and their sometimes impulsive decision-making processes.

In the juvenile justice field, we see this tension most vividly in policy decisions regarding rehabilitation and community supervision. Advocates argue that the fact that teen brains are going through a phenomenal stage of development requires us to seize the moment when they get in trouble with the law to rehabilitate them and help them grow into responsible citizens. However, others maintain that teens' susceptibility to peer pressure and potentially rash decision-making make them high public safety risks and thus bad candidates for community supervision. This argument, though, rather than undermining the push for rehabilitation in the community, underscores the need for safe environments for youth in the community, where they have the opportunity to make reasoned decisions in an atmosphere of cold cognition while surrounded by caring adults.

In the child welfare arena, brain research may negatively affect how people view and set policy with regard to teen parents. However, the research specifically shows that adolescents are at a stage where tremendous learning can occur and responsibility can develop and flourish, as synapses are pruned and strengthened through various experiences. And again, this point emphasizes the necessity of providing teen parents with ready access to environments of cold cognition in their communities that can help them make better decisions with the guidance of adults.

There is some concern that this research may lead to a campaign to push back the national age of enfranchisement. First, it is important to note that situations in which enfranchisement is exercised are most often situations of cold cognition. In such situations, youth are able to make rational, reasoned decisions as well as, or even better than, adults. Second, this issue could potentially be helpful to juvenile justice advocates. As society becomes more cautious about investing youth with very serious, adult decision-making power, so should it become more cautious about treating youth who have committed crimes just as it treats their adult counterparts. Youth must be treated as youth, regardless of the issue. This treatment must involve an understanding of the growth potential in

youth, their capacity for learning and changing, and their need for positive supports in all aspects of their lives.

It is also important to emphasize here that brain development is not the only factor that does or should influence public policy. The myriad different values that influence various issues facing society may very well lead to different age cutoffs for varying privileges and responsibilities.¹⁰ The key is to strike a balance between science and other societal values, such as opportunities for youth, ethical treatment of all individuals, education, safety, and investment in the future.

The examples above note that it is important to be aware of the varying agendas that may be supported by adolescent brain research and to develop a response to arguments that can interfere with the work of juvenile justice advocacy organizations. Responses invariably return to the need for increased programs that are designed around the principles of positive youth development. The vast majority of youth make good decisions most of the time, especially in environments of cold cognition. It is the job of policy makers and community leaders to provide all youth with such environments, thereby increasing their opportunities to succeed. Additionally, it is important to recognize that most youth learn from their mistakes and will simply “grow out” of risky behavior. Advocacy organizations must emphasize the tremendous potential of young people and their need for education, autonomy, guidance, nurturing, and responsibility at all stages of the juvenile justice process.

Conclusion

This paper is by no means an exhaustive look at brain development research and its implications for youth. Our goal is to highlight the primary areas of overlap between the research and the field of juvenile justice, and to help advocates better equip themselves to use the research sensibly and effectively. Advocates should be mindful to use brain research as just one of many sources of evidence as to why youth deserve to be treated differently than adults are. We also find it to be of utmost importance that we are respectful of our youth partners and allies, and are continually mindful of their role in our work and the tremendous stake they have in any effort toward juvenile justice reform.

For Further Reading

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¹ See, e.g., Jay N. Giedd et al., “Brain Development During Childhood and Adolescence: A Longitudinal MRI Study,” *Nature Neuroscience* 2, no. 10 (1999): 861; Jay N. Giedd, “Structural Magnetic Resonance Imaging of the Adolescent Brain,” in *Adolescent Brain Development: Vulnerabilities and Opportunities*, ed. Ronald E. Dahl and Linda Patia Spear, *Annals of the New York Academy of Sciences*, Vol. 1021 (2004); Nitin Gogtay et al., “Dynamic Mapping of Human Cortical Development During Childhood Through Early Adulthood,” *Proceedings of the National Academy of Science* 101 (2004): 8174; Arthur W. Toga, Paul M. Thompson, and Elizabeth R. Sowell, “Mapping Brain Maturation,” *Trends in Neurosciences* 29, no. 3 (March 2006):148-59; online publication, Feb. 10, 2006.

² Rebecca L. McNamee, “An Overview of the Science of Brain Development,” (slide presentation, dated May 5, 2006), accessed September 25, 2012 at http://www.juvjustice.org/media/resources/public/resource_108.pdf.

³ Linda Patia Spear, “Neurodevelopment During Adolescence,” in *Neurodevelopmental Mechanisms in Psychopathology*, ed. Dante Cicchetti and Elaine F. Walker (Cambridge University Press, 2003), 62-83.

⁴ Elizabeth R. Sowell et al., “Mapping Continued Brain Growth and Gray Matter Density Reduction in Dorsal Frontal Cortex: Inverse Relationships During Postadolescent Brain Maturation,” *Journal of Neuroscience*, 21 (November 15, 2001): 8819.

⁵ Neir Eshel et al., “Neural Substrates of Choice Selection in Adults and Adolescents,” *Neuropsychologia* 45, no. 6 (2007): 1270–1279.

⁶ Rebecca L. McNamee, *supra*, note 2.

⁷ 543 U.S. 551, 15 (2005).

⁸ 560 U.S. ___, 17 (2010), slip opinion.

⁹ 567 U.S. ___, 9 (2012), slip opinion.

¹⁰ Charisa A. Smith, “Don’t Wait Up—Issues in Juvenile Justice,” *New Jersey Family Lawyer* 28 (April 2008):144, 148.