The Neuroscience of Adolescence

Cristina Post, EdM, ET
cristina@affectacademics.com
www.affectacademics.com

Resources

- Steinberg, L. Age of Opportunity. Houghton Mifflin Harcourt: 2015. (Parents of all ages)
- Steinberg, L. You and Your Adolescent: The Essential Guide for Ages 10 to 25. (Parents of Olders)
- Bertin, M. How Children Thrive. Highbridge: 2018. (Parents of Youngers)
- Bertin, M. Mindful Parenting for ADHD: A Guide to Cultivating Calm, Reducing Stress, and Helping Children Thrive. New Harbinger Publications: 2015. (Parents of all ages)
- AffectAcademics.com: Free half hour consults

The Biology of Adolescence

- Neuroplasticity: adolescence is a window of brain growth and change, comparable to the birth-3 window
  - The frontal lobes and limbic system are extraordinarily active
- Developing self-control is the central task of adolescence (and it can be taught)
- The age of frontal lobe growth has not changed (13-14), so we develop self-control around the same age, but the age when hormones take over the body is happening ever younger

Puberty

- The overall trend is for a much, much longer adolescence, with shifts on both ends
  - mid-1800s, adolescence was about 5 years
  - 1900-1950, about 7 years
  - 2010, about 15 years, with an expected rise to 20
  - Cause is multidetermined
  - Has been decreasing by about 3 months every decade
- Begins in biology and ends in culture
  - Leptin in fat cells stimulates it and melatonin suppresses it. Cortisol is also a factor, suppressing in large amounts and stimulating in lesser amounts
  - Getting a job, getting married, having kids are all window-closers

Adolescence as Opportunity

- Early onset of puberty is negative. Self-regulatory abilities do not yet exist.
  - Gender differences are important to take into account
- Late end of puberty is extremely positive. The opportunity to keep growing your brain, given appropriate challenge, should be nurtured
  - College and graduate school, gap years, internships, travel (preferably structured)
  - Huge, huge potential for nurturing the minds that will reinvent our planet

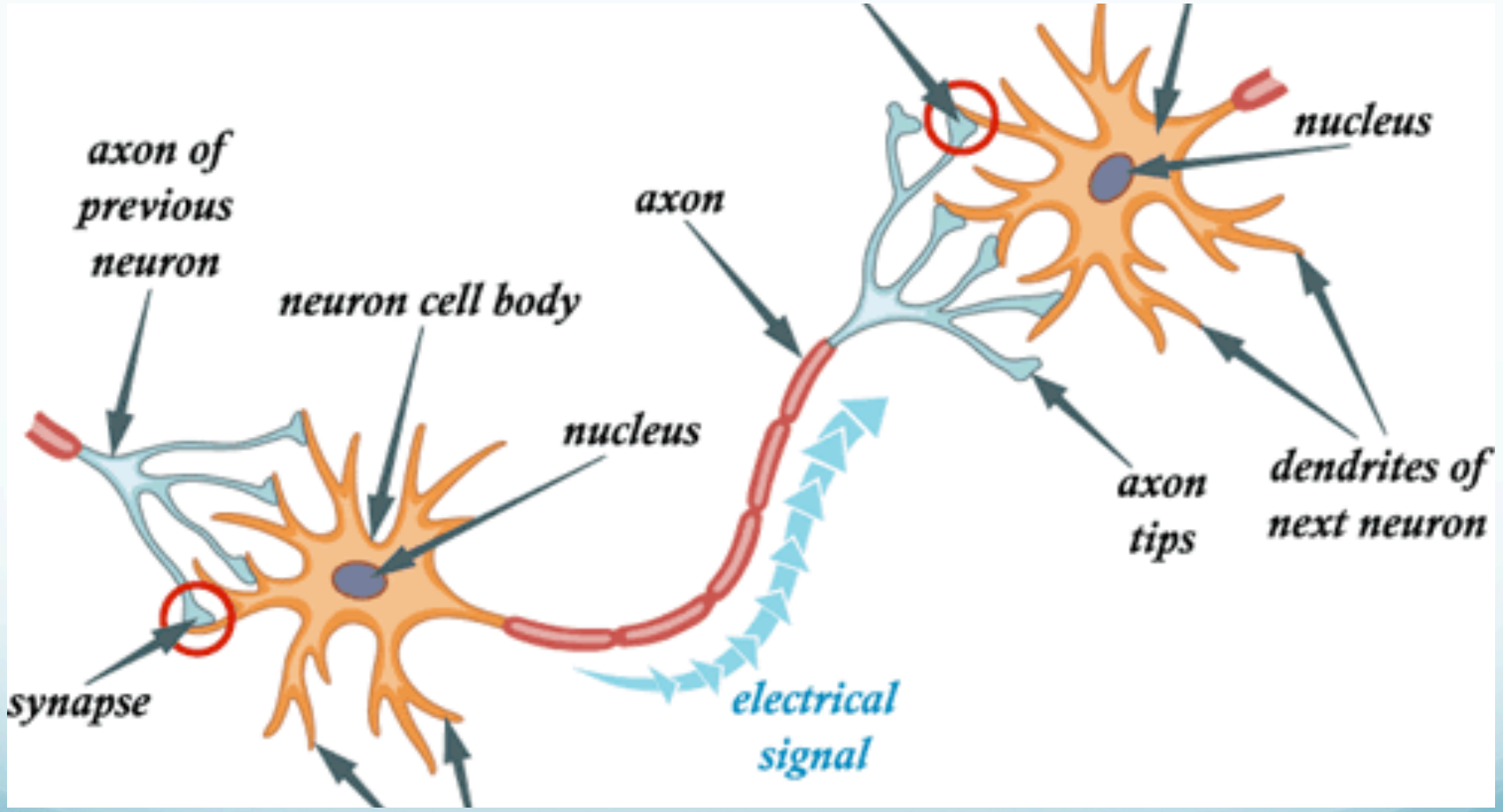
Parenting for Puberty

- Screens off after sunset
  - Caveat: You still need to get your homework done (but for all, and younger children especially, the after school hours are more desirable)
- Avoid endocrine disruptors (pesticides, plastics, parabens, hormones in meat)
  - Caveat: these are unavoidable, no matter how careful you are
- Avoid fighting, especially bickering, in front of (or with) children
  - Caveat: we're all human.

Adolescent Brain Development

- Areas of the brain that change the most are the reward system, the relationship system (social networks), and the regulatory system (in prefrontal cortex)
- Highly emotive events aren't more common in adolescent, but rather the mundane triggers stronger emotions (the "reminiscence bump")
- Risk-taking at an all-time high
  - Can be bad: risk of death increases 200-300%
  - Can be good: AP class, reach college, violin concert, trying out for a team sport or entering a contest

The learning brain



UDLcenter.org

Universal Design for Learning

Recognition Networks

The "what" of learning

How we gather facts and categorize what we see, hear, and read. Identifying letters, words, or an author's style are recognition tasks.

Strategic Networks

The "how" of learning

Planning and performing tasks. How we organize and express our ideas. Writing an essay or solving a math problem are strategic tasks.

Affective Networks

The "why" of learning

How learners get engaged and stay motivated. How they are challenged, excited, or interested. These are affective dimensions.

Metaplasticity

- When one region develops, neighboring regions become more open to development
- CHALLENGE IS GOOD (overwhelm is bad)
- The prefrontal cortex is developing rapidly, the last big push to grow new brain structures
  - (After that it's reorganization and myelination for greater efficiency, not a slow death fyi)

Self-regulation

- Self-regulation is the key capacity for adolescents to develop to enable them to take advantage of the age of opportunity
- Strong self-control is just as advantageous as genetic intelligence and wealth
- Self-regulation can be explicitly taught and lead to changes in brain anatomy
  - Mindfulness and Meditation
  - “n-back task” for working memory
  - Exercise, especially cardio in combination with mental challenge
  - Team Sports
- Teaching self-regulation improves both math and reading comprehension (metaplasticity!!)

5 3 5 7 6

A X Q B N Q

Peer Influence

- Good kids make bad decisions
- The presence of peers lights up the same reward centers of the brain as drugs, sex, food, and money
- Just the knowledge that friends are watching has the same influence on decision-making
  - Social media implications
- Vulnerability to peer effect still strong in early 20s
  - Implications for military, college housing (frats)

Parenting for Peer Influence

- Supervision in the 3-6 hours where risk of death is highest; minimize time spent in unsupervised groups
- Consider family rules around driving
  - "under the influence" = alcohol or friends
  - No teen passengers = more effective than driver ed
- Scaffolding for independence vs. trying to control
- Seek out institutions with a peer culture that values hard work and academics

Parenting for Self-regulation

- The most important environmental contributor to the development of self-regulation is the family.
- In order to develop self-control in our children, we need to be warm, firm, and supportive.
- **Warm:** If they are calm with you, they will become calm on their own (metaplasticity)
  - Express physical affection (without making it a thing)
  - Provide opportunities for meaningful decision-making
  - If you are angry, revisit later when you are calm.
  - Be involved: go to school events whenever possible.

Parenting for Self-regulation

- **Firm**: External structure generalizes to internal structure
  - Clear, explicit, *consistent* rules and expectations
  - Explain the reason for the rule, and ask for opinions. Be fair (age-appropriate).
  - Avoid harsh punishment
    - Research is crystal clear on the negatives of physical punishment, but expressing a lot of anger is also deleterious for development of self-control.

Parenting for Self-regulation

- **Supportive**: Scaffold developing autonomy
  - Gradual release of responsibility
    - Remember the 3-6PM danger zone
    - Increase supervision when in large groups of teens
    - Driving is the biggest risk
  - Set them up to succeed. If they don't, focus on what went right, rather than what went wrong.
  - Praise effort, rather than outcome (growth mindset)
  - Know when to butt out.
  - Psychological distress that lasts longer than two weeks merits a trip to a therapist
    - Early intervention works, and untreated issues linger into adulthood and become more intractable

Resources

- Steinberg, L. Age of Opportunity. Houghton Mifflin Harcourt: 2015. (Parents of all ages)
- Steinberg, L. You and Your Adolescent: The Essential Guide for Ages 10 to 25. (Parents of Olders)
- Bertin, M. How Children Thrive. Highbridge: 2018. (Parents of Youngers)
- Bertin, M. Mindful Parenting for ADHD: A Guide to Cultivating Calm, Reducing Stress, and Helping Children Thrive. New Harbinger Publications: 2015. (Parents of all ages)
- AffectAcademics.com: Training in academic self-regulation and stress reduction

Looking Ahead

- Adolescents *can* exercise self-control, even better than adults can, especially if they know that a reward is involved. But the circuits responsible for this skill are immature, so easily disrupted by emotions, peers, or tiredness.
  - Hint: we're talking about sleep next.
  - Hint 2: we'll also be talking more about peers and social media later
- Don't worry, adults develop too. Ideally.