

understanding
THE ADOLESCENT
BRAIN

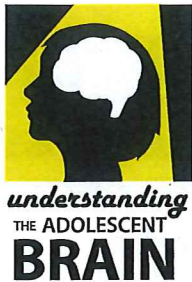
What You'll Find:

**Ways to better understand
adolescent behavior
from the latest brain
development research.**

**Tips and ideas for
adults and youth
to make the most of this
stage of development
and strengthen relationships
between adolescents and adults.**



**Washington State
Office of Superintendent of Public Instruction
June 2017**



MODULE

1

BRAIN BASICS

Putting the latest science into practice to support youth development.

Washington Office of Superintendent of Public Instruction

June 2017



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What You'll Find:

Ways to better understand adolescent behavior through the latest in brain development research.

Tips and ideas for adults and youth to make the most of this stage of development and strengthen relationships between adolescents and adults.

Adolescence is an Open Window

The human brain is an amazing and complex organ that experiences continuous development throughout the lifespan. During adolescence, in addition to the many changes happening within the body, the brain is developing in significant ways.

Understanding the science behind brain development can be a valuable tool for anyone with young people in their life. It can inspire ways to support youth to develop into healthy, productive, fulfilled, independent, and successful adults. While scientists are still working to understand the mysteries of the brain, it is understood that brain development is not a completely pre-determined (genetic) process. With support from the community, adults and others, youth can mitigate challenging genetic predispositions as a means to bolster optimal brain development and to foster future success.

Why is adolescence so important to brain development?

Neuroplasticity and integration. The brain adapts, heals, grows, and changes in response to its environment and experiences. Neural connections and pathways are created,

formed, and altered. Neuroplasticity is at work throughout our lives; adolescence is second only to the first three years of life in terms of growth and development.

In this developmental stage, the brain fortifies often-used neural pathways and diminishes ones that are less used. This is known as **pruning**. In this way, the most used connections and pathways become dominant and stable, and the brain becomes more efficient and focused. Scientists estimate that more than 40% of the brain's synapses are diminished or pruned by adulthood. This defines adolescence as a "use it or lose it time" where environments and experiences influence which connections become dominant. The brain functions as a system, made up of different interdependent parts, each with a specialized function. Think of the brain as interconnected specialists influencing one another and working together as one with multiple tasks. During adolescence, each part becomes more efficient in its role and the connections strengthen. This is called **integration**.

Learn more about **bold** terms in the Glossary.

Series Overview

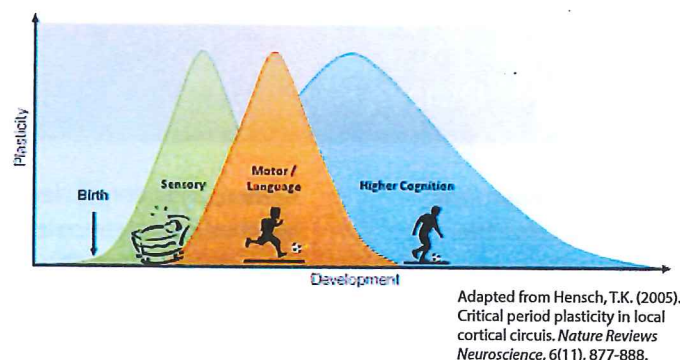
Our brains develop throughout our lives, and life experiences play a role in creating brains that are uniquely wired from one individual to another. During ages 0-3, neural connections are created at a rapid pace. During adolescence, the experiences we have enhance or diminish these neural connections. Adolescence is an incredible time that we all experience but once in our lives. Our brains are at their peak ability to learn and remember, sensations are heightened, and we are mentally confronting some of life's most profound pleasures and challenges for the first time.

This evolution, however, can stress relationships between adolescents and adults, and at times it can feel like we're looking at each other through a funhouse mirror. By better understanding the developmental changes in the brain, we can practice strategies for making the most of this open window, and we can maintain and strengthen relationships in a way that's better for youth, for families, and for the community.

While research on the adolescent brain continues to develop and be debated, this series of modules is designed as an introduction for youth and adults to some of the key areas of concurrence:

- **MODULE 1: Brain Basics.** Major physical changes taking place in the adolescent brain.
- **MODULE 2: Life Skills.** Key life skills influenced by adolescent brain development.
- **MODULE 3: Trajectories Under Trauma, Mental Health, and Negative-Risk Taking.** The impact of trauma and other life experiences on developmental trajectories.

Windows of Plasticity in Brain Development



Brain Development Milestones

EARLY CHILDHOOD (AGE 0-3)

- Brain systems dedicated to senses and motor skills develop rapidly as the child explores the world.
- During the first years of life, neurons form new connections at a rate of over one-million per second.
- 50–75% of energy consumption is allocated to brain development at this time.
- Neural connections established in early childhood lay the foundation for more complex circuits that are built later.

CHILDHOOD (AGE 4-11)

- The brain is developing in communication areas. Children learn language skills, using words and images to represent things.
- Children understand concrete objects, and in later childhood are able to understand logical sequences, manipulating words and numbers in their brain.
- Children are learning to take on challenges by building problem solving, coping, and emotional regulation skills as they grow in independence and begin to see themselves in relation to others in their lives.

ADOLESCENCE (AGE 12-25)

- Brain systems dedicated to ability to plan, think abstractly and hypothetically, and regulate emotions are maturing.
- The brain is integrating, keeping used connections and losing others. By age 18 the number of brain connections streamline to about 500 trillion.
- Adolescents develop a more complex personality and self-identity, and are drawn to peer relationships as they move over time into a more independent social role.

Adolescence is an Open Window

Three specialized and interrelated parts of the brain that are under a lot of study regarding adolescence are:

1. **The Brain Stem** is the oldest part of the brain and controls life supporting autonomic functions such as heart rate, breathing and fear, freeze, and flight mechanism, and coordinates motor control signals sent from the brain to the body. It is highly influenced by both the limbic system and the Prefrontal Cortex (PFC).
2. **The Limbic System** is the emotional network of the brain, including the amygdala (which has a large role in emotional response) and the hippocampus (which has a large role in memory, allowing us to build from past events and experiences). This system, responsible for emotional regulation, mood swings, reward seeking, is especially active during adolescence.
3. **The PFC** is one of the last parts of the brain to mature and highly influenced by experiential learning. You might think of it as the “air traffic control system” of the brain. It plays a key role in integrating signals from all parts of the brain and determining how they get processed by other parts of the brain. It is responsible for **executive function**

tasks like abstract thinking, analysis, regulating behavior, mitigating conflicts in thought, choosing between right and wrong, and being able to pre-determine outcomes. The PFC also governs the emotional part of our brain, the limbic system, and is key in maintaining emotional control.

The balance and influence among and between the various parts of the brain is a large part of what shapes behavior and decisions. Scientists have observed that youth access and use these parts of the brain that are specifically tailored to the environment, experiences, and development happening during this life stage. This means a youth and an adult might process and react to the same situation in different, but both perfectly logical, ways! We'll explore more about adolescent brain changes having a role in developing life skills like empathy, resilience, executive function, and self-regulation in Module 2.

For some youth who are impacted by **trauma** and/or **toxic stress** early in life, this development could take a different course where the brain prioritizes development of survival functions (freeze, flight, or fight) over executive functions (Module 3). This understanding can help ensure that youth-serving environments and interactions are set up to maximize the tremendous potential of this developmental stage.

Prefrontal Cortex

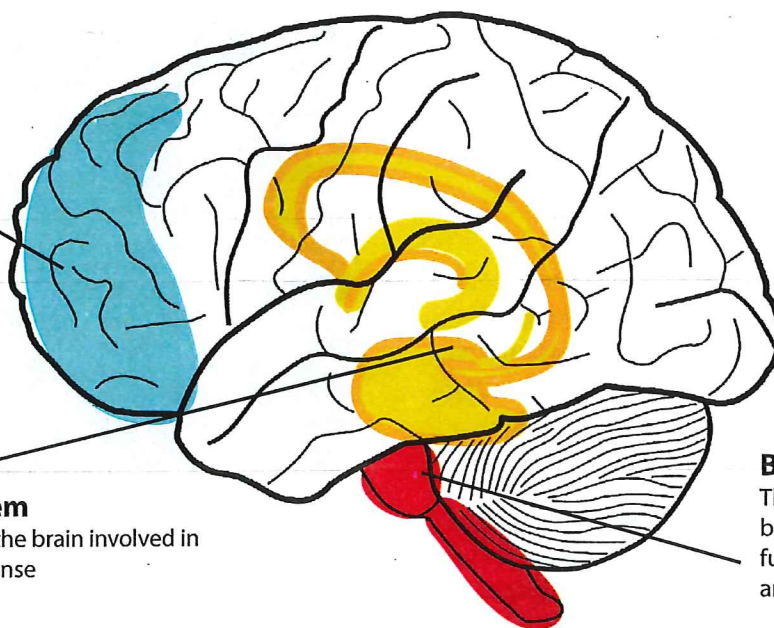
The command system, responsible for abstract thinking, planning, emotional regulation, and executive function

Limbic System

The network of the brain involved in emotional response

Brain Stem

The oldest part of the brain responsible for life functions, motor control, and freeze, flight, or fight



Environments that Support Healthy Development

In schools and other youth-serving environments, adjustments to physical space, routines, adult demeanor, and rituals can have vital impact on neural development and function, and support the strengthening of life-skills like self-regulation, executive function, and resilience. Feeling safe is key. Social environment and culture also play significant roles. A few ideas to get started are:

Living by principles of resilience.

There are six researched principles and key behaviors for developing resilient youth. Use these as a simple guide or checklist for the environment you are operating in.

- 1) Always empower never disempower
- 2) Give unconditional positive regard
- 3) Maintain high expectations
- 4) Check assumptions/observe/question
- 5) Be a relationship coach
- 6) Provide opportunities for meaningful participation

(See *The Heart of Teaching and Learning* to get deeper into each principle).

Create environments, encourage engagement, and optimize times where teen brains thrive.

Experiment with the physical environment to create opportunities for brains to thrive. For example, arrange desks for peer eye contact and collaboration, bring in plants, encourage students to decorate and personalize their space, or create the furniture arrangements together. Physical exercise or movement can also prime the mind, reduce the effect of stress hormones, and elevate the production of **Brain Derived Neurotrophic Factor (BDNF)**, a substance in the brain that nurtures existing brain cells and supports the growth of new ones. Leverage the time after gym class or recess for lessons that require higher degrees of focus, and break up lengthy sessions with opportunities to move.

A culture of relevance, reward, and recognition.

To take advantage of this time in development, it is important to recognize and utilize a youth's natural motivations toward relevance, reward, and recognition. For example, making relevant connections to the real and current world (show them an example from the news), and planning activities that play on their drive for autonomy, independence, and social status. Remember, the brain is more sensitive to reward at this time of brain development, whether it's overcoming a challenging lesson or getting a round of applause in recognition of their work.

Sensitivity to individual needs.

Exercising **executive function** and **emotional regulation** often comes as second nature to mature adults. However, for youth, using executive function is often new learning and can be taxing and exhausting. Developing executive function requires opportunities for practice and coaching. Observing and responding to students' physical signals for when they are tired or feeling challenged can be helpful. These signals are different for every individual. When you recognize them, you can make a quick adaptation to refocus the interaction.



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Positive Interactions

Adolescence is a significant time for the development of self-identity, which begins with important adult relationships fostered in childhood. Over time, the relationship between the adult and youth evolves and requires significant effort from the mature adult who can assist in the transition from childhood to adolescence. Remember that this is a formative stage, and that while youth may appear as a young adults physically, their minds are still developing and open to influences and changes and our supportive presence is still crucial. Adults, whether at home or in school, can initiate positive interactions that are mindful of adolescent brain development. Here are some ideas for what that relationship looks like:

Demonstrating a coaching attitude.

This means asking a teen guiding questions, leading the process of decision making step-by-step through a facilitated learning process to help them come to their own conclusions rather than being given solutions or instructions. This helps develop autonomy. This type of thinking may be new territory for youth and will require a great deal of patience. It is important for the adult to be attuned to the youth by very intentional listening. One tip is to think about listening with both ears and eyes. By listening with our eyes, youth may be giving us visual cues of their level of comfort and receptivity.

Adults as sounding boards.

Today's youth are dealing with incredible pressure and complexity in their daily lives socially, emotionally, and physically. What may be socially relevant for youth may be very different than what is relevant for us. Validate their experience in any situation and always listen first before jumping to conclusions or advice. Adults can help by acting as sounding boards and asking questions, thus creating a learning situation that is based in self-discovery. Encourage teens to think about what is really important to them in terms of their sense of identity.

Looking for the spark of youth motivations.

When adolescents are emotional, it is largely due to the the PFC not being able to fully regulate emotions driven by the other parts of the brain yet. Although emotions can be influenced by body changes and hormonal factors, passion for what they care about is also a feature of this brain development stage.

The social order and the feedback youth receive from peers is highly important to their personal identity-formation. If we want to encourage them to make positive or health-promoting decisions, we need to leverage their passions. To whatever extent possible, we should support exploration and practice in a variety of pro-social risk taking endeavors that stimulate various parts of the brain, such as creative arts, music, sports, and academic pursuits.



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Positive Interactions

Being open to question old assumptions.

Are we leaning on mental models and assumptions? How is that influencing our behavior and approach? Some of the most pervasive and harmful mental assumptions our communities hold are that adolescents have little to offer. How do we change our assumptions and strongly held beliefs to be open to other possibilities? Assumptions can cause adults to sometimes react in a way that indicates we have made a judgment about a youth which can create a negative interaction. Three skills help us observe and question in responsive and relevant ways. First we learn to identify our own assumptions. Second, every time we catch ourselves making an assumption, choose to make an observation instead which is objective and non-judgmental. Third, based on our observations, ask questions and listen. However, asking questions is only worthwhile when we are willing to listen carefully to the response.

Making time for teens/ unconditional positive regard.

It's so important for teens to believe that we value spending time with them. Try scheduling a consistent time in the busy week to do something together. Even if you can only carve out fifteen minutes at a time, research shows that it's not the amount of time we spend with youth, but rather the fact that they know they matter to us with unconditional positive regard, the idea that we will not change our attitude or actions toward a person based on something they say or do. Be present and put potential distractions like smartphones aside. Listening to the responses of youth is one of the ways we seek relevancy and display respect. Listening is also how we show unconditional positive regard. We consider each child independent of any factors we know about his or her personal life; not always easy to do.



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Inspiration and Ideas for Youth

It would be great if all the communities, schools, and services were designed to promote youth brain development. Until we get there, what are some things youth can do to better tap into what is happening in their brain?

Be patient with yourself and take care of the basics.

What you are experiencing is real, totally normal, and most importantly, part of the path to developing into the person you will be as an adult! Changes in the brain are just one of many things your body is dealing with at this stage. Whatever challenges this stage of your life may throw at you, not getting enough sleep will make it even more challenging. So take care of the basics, like sleep, exercise, nutrition, and paying deliberate attention to your feelings. Having these basics handled will allow you to be at your best, most authentic self.

Exercise to benefit both your body and your brain.

Aerobic exercise is great at bringing more oxygen-rich blood up to your brain, helping your brain stay healthy, increasing its ability to respond quickly, and de-stress. It also produces a protein called Brain Derived Neurotrophic Factor (BDNF). Some researchers have extolled the benefits of BDNF which has been credited with mitigating cortisol and adrenaline (sometimes called stress hormones) levels as well as promoting the growth, maturation, and maintenance of neurons, specifically the synapses between cells where cell to cell communication occurs. Research shows that the boost in BDNF protein is important for learning and memory. Dr. John Medina in his book *Brain Rules*, states (page 22), "BDNF exerts a fertilizer-like growth effect on certain neurons in the brain. The protein keeps existing neurons young and healthy, rendering them much more willing to connect with one another. It also encourages neurogenesis, the formation of new cells in the brain...The more you exercise, the more fertilizer you create." Therefore, regular exercise is one way thought to support optimal brain function.

Share what you know with adults (and be patient with them).

This is relatively new research as science is always discovering new information. There are a lot of 'myths' the generation before you needs to overcome. It's also a scary time for adults, as they "pass the baton" to you, the next generation, they have to let go of control a bit. You can help myth-bust and share some of these resources, and while it might not be easy, remember to be kind.

Interpret and build on your successes.

We all have good days. It's important to recognize that. It's also important to think about what made them good days so you might repeat what you did to make it a good day. It's easy to be critical of others and of ourselves, and sometimes we can develop habits of negative thinking. Affirming what is good, both in yourself and in others, will eventually lead to new habits that appreciate the talents and other good things that come from within and from our peers. Sometimes, it involves setting up some disciplines for ourselves that will help us achieve what we want to accomplish. For example, were you able to finish your homework early when you intentionally left your phone in the other room?

Focus on the now.

It's easy to allow ourselves to fall into a trap of worrying about the future or feeling bad about the past. Take opportunities to pause and focus on the present moment; the here and now. This is called **mindfulness**, which means focusing on the sights, sounds, and other physical sensations present in your immediate experience without judgment. Mindfulness, a simple and powerful thing you can do yourself, is shown by research to decrease depression, anxiety, perceived stress, substance use, and fatigue. It also promotes improvements in emotion regulation, executive functioning, response inhibition, cognitive control, and working memory. Some mindfulness activities include art, meditation, or just doing every day activities like eating lunch while focusing on the smell, taste, and texture of each bite - with appreciation for the nurture it provides your body.

Additional Resources

Here are some additional online YouTube video resources if you:

- Need a sharable youth-led introduction of brain science in less than three minutes: [The Teen Brain: Under Construction](#)
- Want to watch a slightly longer (10 minutes) overview of the brain science: [The Teenage Brain Explained](#)
- Are interested in eight factors for learning as told by youth, and getting quick ideas for making them happen:
[How Youth Learn: Ned's GR8 8](#)
- Want to create better coaching and listening interactions, but need more ideas about exactly what that looks like:
[Dr. Becky Bailey](#)

Search Tip: Go to youtube.com and enter the video name in the search bar.

For More Information

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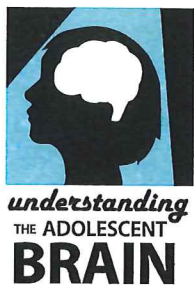
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MODULE

2 LIFE SKILLS

Putting the latest science into practice to support youth development.

Washington Office of Superintendent of Public Instruction

June 2017



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Life Skills: Diving Into Empathy, Growth Mindsets, Executive Function, And Self-Regulation

We have one brain that takes on many tasks and skills. Studies that track individuals over extended periods of time have linked the development of certain skills in **adolescence** to success as an adult. In other words, observations of the brain in the adolescent years can predict what life is like as an adult, including how satisfied we are in relationships, our ability to **emotionally regulate**, and how strong we are at communication and conflict resolution. Many of these skills develop during adolescence and/or can be practiced during adolescence.

What are some of the skills and functions developing in adolescence that have been linked to future success?

Learn more about **bold** terms in the Glossary.

Empathy

Empathy, or the ability to see yourself in another's shoes with compassion, is a crucial part of mature social intelligence. Youth can seem highly engaged in their own identity development, and the "selfish teenager" is one of those cultural stereotypes that can be challenging to overcome. The fact is, while we are born with innate empathy, it develops strongly in adolescence, and the adolescent brain needs to work harder to take on others' perspectives. **Mirror neurons** respond whether we are the ones experiencing something, or watching someone else experience that thing. The science related to mirror neurons is significantly debated and theories abound. Overall, there no certainty about the role of mirror neurons. Neuro-scientist, V. S. Ramachandran from the University of California, San Diego, theorizes that mirror neurons are involved in the ability to attribute mental states to others and the human capacity for empathy. In practice, it's important to remember that youth have the ability to empathize, particularly when it is reinforced.

[Continued on page 3]

Series Overview

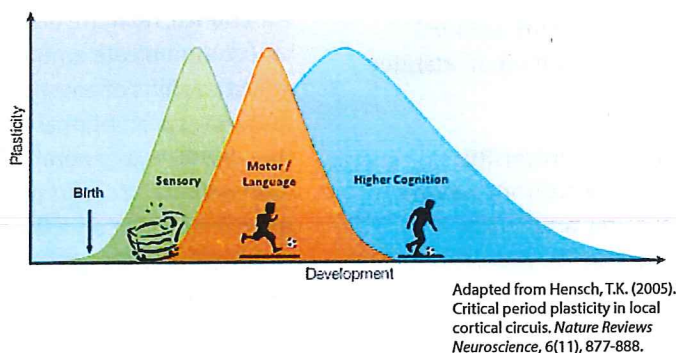
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Windows of Plasticity in Brain Development



Brain Development Milestones

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CHILDHOOD (AGE 4-11)

- The brain is developing in communication areas. Children learn language skills, using words and images to represent things.
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- The brain is integrating, keeping used connections and losing others. By age 18 the number of brain connections streamline to about 500 trillion.
- Adolescents develop a more complex personality and self-identity, and are drawn to peer relationships as they move over time into a more independent social role.

Resilience

Every person alive will at some point face difficult or stressful situations. Resilience, or the ability to overcome obstacles, then move on to bigger and better things, is a skill that can be developed and improved throughout the lifespan. Resilience has been studied and researched in-depth by many researchers, a few of which are highlighted here.

Dr. Kenneth Ginsburg, a pediatrician who emphasizes the role of social and mental health in a person's physical and emotional health. His framework centers on "The 7 Cs" which serve as the building blocks of resilience. They are:

1. competence
2. confidence
3. connection
4. character
5. contribution
6. coping
7. control

In his book, "Building Resilience in Children and Teens: Giving Kids Roots and Wings," Dr. Ginsburg walks youth and adults through the process of developing the 7 Cs with support from home and community and the development of adaptive skills.

Cynthia Lietz, a researcher at Arizona State University, describes sequences of developing resilience, from survival, adaptation, acceptance, growing stronger, and finally, helping others. These two frameworks can be useful tools for strategizing a pathway to resilience in any individual, including those affected by trauma (see Module 3).

The Center for the Study of Social Policy, after conducting a comprehensive synthesis of the research on adolescent brain development, the impact of trauma on that development, the biology of stress, resiliency and positive youth development, identified five protective factors that are essential for mitigating risk and building towards healthy development and well-being in youth. The protective and promotive factors are: youth resiliency, social connections, knowledge of adolescent development, concrete supports in times of need, and cognitive, social and emotional competencies.

Growth Mindset

Dr. Carol Dweck and the research team at Stanford University have pioneered research about mindsets in the classroom. They have found that all individuals have an "implicit theory of intelligence" about whether intelligence is something you can change or something you are born with. Those with a growth mindset, or implicit belief that you can cultivate intelligence through effort, fare better in learning and life than those with a fixed mindset. How we think about our talents and abilities influences the ability to shape the future. People with a fixed mindset—those who believe that abilities are fixed—are less likely to flourish than those with a growth mindset—those who believe that abilities can be developed. Adults in the school environment and at home, and youth, can all play a role in cultivating growth mindsets.

Self-Regulation

Individuals transform their mental abilities to manage their emotions, attention, and behavior. This is called self-regulation. It is a stronger and more reliable indicator of school readiness than general intelligence or academic skills and abilities. To self-regulate, we must be able to recognize and identify our own feelings, connect these feelings to the experience, read the emotional cues of others, safely express and communicate emotional experiences, recognize and adjust to shifts of emotions, and return to a comfortable state following an emotional experience. Research has shown that youth, as a general rule, use self-regulation and usually understand the consequences of their actions, but they often prioritize an outcome that will give them more immediate satisfaction. In the process of self-regulation, the effects of **dopamine** and the associated rewards can cause youth to regard the potential reward more positively than an adult would. This is one reason risk-taking happens in adolescence.



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Executive Function

Self-regulation and executive function are intertwined. Successful and intentional self-regulation is pivotal to develop executive function, a set of skills that allow us to set goals and plan to achieve them. Likewise, executive function bolsters self-regulation. Exercising executive function means we need to be able to control inhibitions, use short-term working memory, and remain “mentally flexible.” When this set of executive function skills are not being accessed, life often feels full of distractions and scattered. There are ways we can learn to call it into action, but it requires exercising the **PfC** which is a work-in-progress during adolescence. With diligent practice, skills such as executive function become more habitualized and a part of every day life.

These are inter-related skills we all have at varying stages of development throughout our lives. Adolescence is a special time because motivations, our environment, and biological development play such a significant role in whether and how we call these skills into action. For example, brain circuits using dopamine, a **neurotransmitter** linked with our reward drive, are very active during adolescence and the natural production of dopamine is at its highest during this time of our lives.

There is also research suggesting that teens experience greater peaks and valleys of dopamine production and release, leading to lower lows and higher highs. The enhanced dopamine release means the adolescent brain is highly motivated by rewards from high-intensity, emotionally-arousing experiences. This motivates young people to make new social relationships and take risks as they begin to “leave the nest” and figure out who they are in the world. Dr. Laurence Steinberg describes adolescence “as driving with the accelerator to the floor without a proper braking system in place.” The good news is, braking systems can be developed. It’s important to remember youth are developing and using these critical life-skills in the context of this underlying biology.

For both youth and adults, understanding our personal motivations and exercising self-regulation and executive function can result in positive outcomes. Youth are equipped to find creative and constructive solutions and call these skills into action when there are easily identifiable incentives. For some who have experienced trauma and or toxic stress early in life, the development of these skills will require extra support and intervention (learn more in Module 3).



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Environments that Support Healthy Development

Social environments where self-regulation and executive function are modeled, practiced, and encouraged can go a long way toward building these skills. What does this look like?

Modeling in schools and other environments.

Adults are not always aware of how our own established mindsets and assumptions drive our behavior when we work with youth. We must be willing to look at how we are projecting and modeling in the classroom, at home, or in other environments with youth. If we start by reflecting on our own set of skills, how they have developed throughout our life, and what was helpful or not helpful during adolescence, we can be better models. For example, how might it influence the room when you single out one student for being smart, or supply an answer when a student is struggling, or have a snap reaction to a misbehavior?

Creating safe and supportive culture among students.

The relationships we establish with and among students influence the tone and demeanor in our classrooms. Recent studies of bullying and harassment highlight that teachers throughout the K-12 years must play a role in managing relationships between students, contrary to the idea held by some teachers that they are trained to teach physics or history, not social skills. By helping students feel safe and supported in our classrooms, students can put more energy into learning. Teachers can be mindful of their role of creating a safe culture, and of the situations of students impacted by **trauma**, so as not to trigger adverse reactions through unpredictability, sudden changes or transitions, perception of rejection, loneliness, over stimulation, confrontation, using a loud voice, proximity, etc.

Peer-to-peer learning and practice.

Youth place significant value on feedback from peers which is a component of healthy social and emotional development. This can be seen in the prevalence of youth with social

media accounts, regularly sharing pictures and updates with friends and exchanging “likes” on one another’s posts. Peer relationships online can also be less affirming, as is the case with cyberbullying, or impulsively engaging in a heated dialogue in the comments section. Opportunities to engage in peer learning online or in the classroom tap into these tendencies and may allow other students to show leadership beyond the usual suspects. Case studies, peer mediation, and group discussions can call on peer relationship skills and allow youth to develop greater empathy and executive function by helping each other reason through challenging situations.

Consistent, emotionally safe, school environments

There are many opportunities to promote the practice of these skills in schools. Organized classroom environments, removal of elements that trigger impulsive or reactive behavior, calming places in each classroom, posted schedules, and displays of affirmation created by students and staff are all ideas for changing a physical space. As for adults in the environment, warmth, predictability in demeanor and routine, and understanding that school-dependent children learn at school what others learn at home can help ensure it is a safe environment for all students to develop. Time in the school day that creates opportunities for practice, mindfulness activities, planned calming rituals or “change-up” routines, greeting students with names and eye contact at the classroom or school door are other opportunities.

Encouraging authentic adolescent voice and engagement.

Try asking students for feedback and collaborative problem solving to create a safe and positive learning environment. Trusting youth to take on the responsibility for a project, or a discussion topic, may help them feel ownership and engage more in the activity or conversation. Actively listening and employing unconditional positive regard may help youth feel comfortable to share what they are experiencing, and result in them sharing more over time. As peers are especially influential at this age, continuing to support this behavior may also allow the space to feel safe for others, who may then join the conversations as well.

Positive Interactions

Adults can support skill-building in these areas in almost every interaction with adolescents. Adolescents are open to a wide variety of peer-learning and are looking to expand their networks. What are some characteristics of positive interactions to look for or create?

Encouraging community connections.

During this developmental stage, adolescents are grappling with their purpose and identity, and changing relationships with their adult caregivers. At the same time, research has shown that connection to a caring and consistent adult (whether a parent or not) is one of the most powerful protective factors, or conditions that, when present, mitigate risk. Help youth find purpose and build new social connections by exposing them to potential role models in various fields of interest.

Validate efforts and experience over characteristics and accomplishments.

Dr. Carol Dweck's research has shown the impact of praise on creating fixed or growth mindsets, through communicating a value system. Feedback that values intelligence, for example "Good score, you must be smart," creates fixed mindsets, and turns children off from learning and into projecting the image of competence. On the other hand, feedback that values process, "Good score, you must have worked really hard," creates a desire for more learning challenges and mastery.

Conversations that light up their purpose.

The risk- and reward-seeking motivations, coupled with identity-seeking, means this is when youth can discover their heart's interests and passions and try many new things along the way. Finding a purpose directs their attention and energy to more positive activities. It is not up to you to find their purpose, but support their exploration through exposure, like volunteering, workshops, service-learning, travel, and community activism. Most importantly, encourage reflection on the experience and how they might see themselves in the roles they are exposed to. In conversation, adults often assume the role of "telling," but making a connection in conversation during this time is really important.

Open and honest communication.

Establish lines of communication early about risks with negative consequences such as taking drugs, sex, drinking alcohol, and petty crime well before they become an issue. Keep them open by honoring their agency and trust without projecting judgment. Though the data is mixed, some science shows this is much harder than it sounds because adolescent brains tend to mis-read facial expressions and emotions. In other words, our curious question or neutral comment can be understood as anger or judgment. Align verbal, facial, and body language messages and never assume a message is interpreted the way we intended it. Whenever possible, validate and check messages in terms of how they are heard.

Encouraging pro-social risk taking.

Youth are going to pursue risk-taking anyway. Teachers and other adults can encourage pro-social risk taking activities. Trying out for a team, performing, and running for class officer are activities that can provide an alternative option for youth.

Inspiration and Ideas for Youth

What are some things youth can do to better build these skills we know are crucial for success?

Take care of the basics.

It may sound obvious but we'll have better self-control and decision-making if we're not sleep-deprived, stressed, or hungry! Good nutrition is crucial to exercising will-power and self-control. Sleep and hunger are more easily identified needs to fix, but how to de-stress? Stress is a personal thing everyone must figure out on their own, but some common, simple methods include **mindfulness**, physical exercise, being in nature, walking, or other personally identified de-stressing activities.

Choose and reflect with intention.

Adolescence is all about exercising control over your own life. You get to make more decisions that were previously made for you by adults or other authority figures. You are walking into a time when you begin to exercise control in a way you have not previously experienced like how to react to a situation, how to spend your free time and with whom, and what new things you want to learn and experience. With every new choice, you can think about the intention behind it, the results, and the learning. Keeping a journal and using it to record and evaluate your experiences may help you track and remind yourself of how hard a new thing was when you first started, or just practice reflecting in your mind. Song writing, and spoken word can also be great opportunities for self-reflection. You may also find some things you want to end, like hanging out with someone who always makes you feel bad. And remember you're not going through this alone, look for a sounding board to help you along.

Look for a sounding board.

In combination with reflection, try bouncing ideas off of trusted peers and important adults in your life to gain insight along the journey. You might be surprised to find someone who has gone through a similar experience or can offer a new take that you haven't thought of.

Check in with your emotions.

Often, we are our own best teachers. Do you know the signals that tell you when your emotions are getting out of control? Do you get a knot in your stomach, or maybe your nose itches? Everyone has different signs. Building awareness and learning about ourselves in a very intentional way and then gauging future decisions is a form of self-care that must be exercised to live a healthy life. By recognizing your emotions, you can gain control sooner before things escalate, and you can make adaptations with people around you.

Paying attention to patterns in your body.

Paying attention to how emotions feel in our body is part of mindfulness. For example, a person might lie down with their eyes closed and begin by focusing on their toes, then on their feet, then calves, then knees, stopping at any point where they notice tension or discomfort to acknowledge that it is there without judging or worrying about why, continuing upwards until they reach their head, and then ending with a moment to feel the body as a whole. This brief pause from the many activities of daily life is one way to practice mindfulness and is an effective stress reduction tool that can be helpful in further developing emotional regulation.



Juan Ramos / Unsplash

Additional Resources

Here are some additional resources if you:

- Want to see what empathy does and doesn't sound like, watch this video: [Brene Brown on Empathy](#)
- Are interested in more tips and lessons on executive function: [11 Executive Skills](#) by Han A.I. Executive function and how to master it: [The Adventures of You](#) (3 part series); [Tips from Harvard Center of the Developing Child](#) (page 13) (see Resource List)
- Want to stay current on research from the Center for the Study of Social Policy: [Youth Thrive](#)
- Dig into self-control by learning about: (1) one of the best-known experiments and examples of self-control - [The Marshmallow Test](#); (2) A short animated video lesson: [Self Control: Teaching Students About Their Greatest Inner Strength with Nathan DeWall](#)
- Want to learn more about mindsets and how to cultivate them in a short video, [RSA Animate: How to Help Every Child Fulfil Their Potential](#) and evidence-based toolkit: [PERTS \(www.perts.net\)](#)
- Are interested in exploring mindfulness for self-regulation through:
 - o A quick introductory video: [Mindfulness: Youth Voices](#)
 - o Scientific American Article: [What Does Mindfulness Meditation Do to Your Brain?](#)
 - o How adolescents can practice it: [Mindfulness for Teens Website \(www.mindfulnessforteens.com\)](#)
 - o How one organization is bringing it to the classroom: [Mindful Schools \(mindfulschools.org\)](#)
- Are looking for interesting articles to prompt further discussion in the classroom or at home:
 - o [Dopamine and Teenage Logic](#) article from the Atlantic
 - o [Teens are still developing Empathy Skills](#) article and resource from WSJ
 - o [Beautiful Brains](#) by National Geographic Magazine
 - o [The Distracted Teen Brain](#) and other articles from ScienceNews for Students

For More Information

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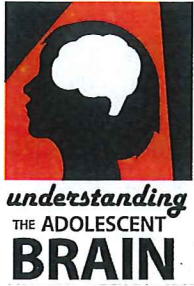
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MODULE 3 ALTERNATE TRAJECTORIES

Putting the latest science into practice to support youth development.

Washington Office of Superintendent of Public Instruction

June 2017



Apollo Reyes/ Unsplash

What You'll Find:

Ways to better understand adolescent behavior through the latest in brain development research.

Tips and tricks for adults and youth to make the most of this stage of development and strengthen relationships between adolescents and adults.

IT'S NEVER TOO LATE TO CHANGE A PATH

Adolescence is at once an open window of great opportunity and of great vulnerability. We have probably all heard some disheartening statistics. One in five teenagers has a diagnosable mental health disorder, two thirds have experienced Adverse Childhood Experiences, and nearly one-third show signs of depression. Despite being at lifetime physical and mental peak, the leading cause of death for adolescents is unintentional injury including motor vehicle crashes, poisoning, drug overdose, and suicide. Many of these issues are closely interconnected, and the same youth can experience several of these issues at the same time (comorbidity).

Some youth will have a great deal of difficulty intentionally controlling their behavior. This may be due to organic brain differences from birth or from injuries. Some may be diagnosed with mental illness, personality disorders, or developmental disabilities. These issues can result in impaired mental processing and behavior that includes: hyperactivity, impulsivity, emotionality, anxiety, inconsistent emotional responses, unpredictable intense mood swings, withdrawal, and episodes of rage.

Traumatic experiences (including emotional and physical neglect), mental health issues, and/or negative risk-taking behaviors can shape future brain development and life trajectories, and these issues can become much more present during adolescence.

Adverse Childhood Experiences

All experiences in a person's lifetime — the good, the bad, and the boring or already forgotten — have a role in shaping their brain, behaviors, emotions, and approach to new experiences. When the experiences during childhood are particularly difficult, or toxically stressful, they may be referred to as **Adverse Childhood Experiences (ACEs)**. ACEs can affect how a person handles social situations such as meeting new people and making new friends. They also have been linked to violent experiences or other health conditions later in life.

[Continued on page 3]

Learn more about **bold** terms in the Glossary.

Series Overview

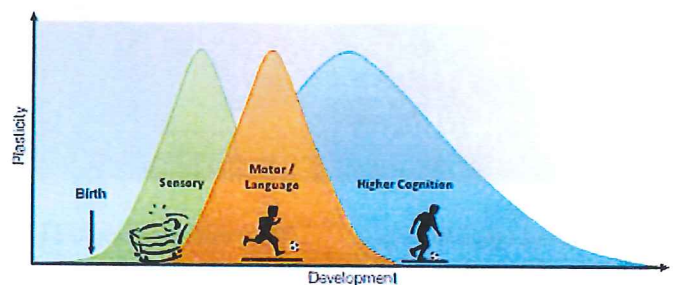
Our brains develop throughout our lives, and life experiences play a role in creating brains that are uniquely wired from one individual to another. During ages 0-3, neural connections are created at a rapid pace. During adolescence, the experiences we have enhance or diminish these neural connections. Adolescence is an incredible time that we all experience but once in our lives. Our brains are at their peak ability to learn and remember, sensations are heightened, and we are mentally confronting some of life's most profound pleasures and challenges for the first time.

This evolution, however, can stress relationships between adolescents and adults, and at times it can feel like we're looking at each other through a funhouse mirror. By better understanding the developmental changes in the brain, we can practice strategies for making the most of this open window, and we can maintain and strengthen relationships in a way that's better for youth, for families, and for the community.

While research on the adolescent brain continues to develop and be debated, this series of modules is designed as an introduction for youth and adults to some of the key areas of concurrence:

- **MODULE 1: Brain Basics.** Major physical changes taking place in the adolescent brain.
- **MODULE 2: Life Skills.** Key life skills influenced by adolescent brain development.
- **MODULE 3: Trajectories Under Trauma, Mental Health, and Negative-Risk Taking.** The impact of trauma and other life experiences on developmental trajectories.

Windows of Plasticity in Brain Development



Adapted from Hensch, T.K. (2005). Critical period plasticity in local cortical circuits. *Nature Reviews Neuroscience*, 6(11), 877-888.

Brain Development Milestones

EARLY CHILDHOOD (AGE 0-3)

- Brain systems dedicated to senses and motor skills develop rapidly as the child explores the world.
- During the first years of life, neurons form new connections at a rate of over one-million per second.
- 50–75% of energy consumption is allocated to brain development at this time.
- Neural connections established in early childhood lay the foundation for more complex circuits that are built later.

CHILDHOOD (AGE 4-11)

- The brain is developing in communication areas. Children learn language skills, using words and images to represent things.
- Children understand concrete objects, and in later childhood are able to understand logical sequences, manipulating words and numbers in their brain.
- Children are learning to take on challenges by building problem solving, coping, and emotional regulation skills as they grow in independence and begin to see themselves in relation to others in their lives.

ADOLESCENCE (AGE 12-25)

- Brain systems dedicated to ability to plan, think abstractly and hypothetically, and regulate emotions are maturing.
- The brain is integrating, keeping used connections and losing others. By age 18 the number of brain connections streamline to about 500 trillion.
- Adolescents develop a more complex personality and self-identity, and are drawn to peer relationships as they move over time into a more independent social role.

3 ALTERNATE TRAJECTORIES

The ten recognized ACEs from the Center for Disease Control/ Kaiser Permanente Study are:

1. Child physical abuse
2. Child sexual abuse
3. Child emotional abuse
4. Emotional neglect
5. Physical neglect
6. Mentally ill, depressed, or suicidal person in the home
7. Drug addicted or alcoholic family member
8. Witnessing domestic violence against the mother
9. Loss of a parent to death or abandonment, including divorce
10. Incarceration of any family member

There are additional stressors that can impact a person's wellbeing. Witnessing or living in the midst of any kind of persistent or episodic violence in the home or community can be a huge impact. Poverty and even persistent and stressful noise, pollution and chaos can also have an impact. These are the areas that were studied as a part of the official ACE study.

Trauma

When we think of trauma, we sometimes imagine large scale disasters or a one-time physical event like a punch to the head, but researchers have shown that the trauma of certain experiences have a lasting impact on the brain and for life outcomes, like chronic health conditions and early death. Trauma isn't always physical or one-time. The absence of sustaining care is also trauma, especially for young children. Stressful environments as well as physical and emotional neglect are also traumatic experiences that can change the trajectory of brain development dramatically. Some examples on longer-term stressful experiences include living in a family experiencing homelessness, experience with the juvenile justice system, and/or growing up in foster care. Impacted by trauma, the brain becomes wired to prioritize survival functions over other areas, like those necessary for **self-regulation** and **executive function**. In other words, under trauma and stress, survival is the priority.

Epigenetics

The impact of long term intergenerational trauma is informed by the study of epigenetics. Our development is considered by many to be a blend of nature—the way we are biologically built and predisposed—and nurture—the result of learning, experience, or training. Sometimes, the two interact and affect one another, as is the case with epigenetics. Not all the genes in a person's DNA will present as noticeable traits. **Epigenetics** is defined as the effects of environmental factors on which and how the inherited genes are expressed. This can occur on an individual level as well as on a species level. In short, the environments in which we grow up affect how our genes are expressed, including those that influence brain development. Understanding how a youth may be wired based on their parents and grandparents genetic coding that is passed on to their offspring may help adults working with youth to better understand and respond when some youth seem to "over-react" to situations that other youth seem to manage. It could be influenced by the way in which they are genetically predisposed.



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Mental Health

The first signs of mental health issues often appear in adolescence, though the roots of the issue may go back much earlier in life. Serious psychological disorders including depression, social phobia, obsessive compulsive disorder, bipolar disorder, and schizophrenia are rarely diagnosed before puberty, and most individuals who reach age 25 with no diagnosis are less likely to experience issues later in life. Genes, as well as the interaction of environmental factors (including multigenerational trauma), play a role in mental health risk, so being aware of the individual's and family health history can help you stay alert for signs.

Social Emotional Development

According to the Collaborative for Academic and Social Emotional Learning (CASEL), social emotional learning (SEL) is broadly understood as a process through which people build awareness and skills in managing emotions, setting goals, establishing relationships and making responsible decisions, leading to success in school and in life. Research shows SEL supports better performing and more positive schools and communities.

Social emotional skills are the foundation for thriving and learning. It should be thought of as an integrated and holistic system of support, connecting to all aspects of school life and beyond. SEL connects with some of our most pressing issues (e.g. mental health needs, suicide, bullying, chronic absenteeism, and exclusionary discipline) in Washington. Policy makers, educators, families, and community professionals are working to address these issues by improving access to mental health care for children and youth in crisis, shifting the approach to school discipline, and working to reengage students who have left or been pushed out of school. SEL standards will not replace the need for targeted interventions, but rather, will build a stronger foundation upon which other services and supports can be added and integrated. While these practices are emerging, it is vital to ensure that all recommendations are culturally relevant and competent.

The Office of Superintendent of Public Instruction will be developing a module specific for social emotional learning that will be available in September of 2017.

Negative Risk-Taking

All adolescents are vulnerable to "poor choices" and negative risk-taking, like unprotected/risky sex, substance use, petty crime, or reckless driving, because the adolescent brain is

highly motivated by rewards from high-intensity, emotionally arousing experiences. Not only are they more apt to try these experiences for the first time, ironically, they are especially vulnerable to addiction and repeated behavior because of their heightened **dopamine** response. Highs feel extra high and lows feel extra low. This dynamic is further exacerbated by the presence of peers because of adolescents' high attunement to social status. For most, these risks are part of the normal development process and they exit adolescence relatively unscathed. For others, this is the start of an altered trajectory with life-long consequences, such as teen pregnancy, justice-involvement, addiction, or even death.

The vast majority of youth are connected to at least one institution outside their homes: schools. Youth who experience trauma, justice-involvement, and/or mental health illness or disorders, however, are much more likely to be connected to multiple community based services, including community non-profits, foster care, hospitals, courts, justice centers, youth centers, YMCAs, and substance use clinics. The needs of youth in these situations are fundamentally the same as the others—safe supporting environment, consistently caring adults, and empowerment over their life choices—but they may also need intensive professional intervention. What is unique about this group, is that they may be starting from a different place in terms of brain development (perhaps due to trauma, mental health issues, or substance use), and their support system is likely to be more dispersed and inconsistent, meaning they are experiencing even more tumult than the typical teenager.



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Environments that Support Healthy Development

Environments for youth with development trajectories altered by trauma or other issues require keen attunement from the adult, a great deal of patience, sensitivity, and sometimes professional intervention. If you are not a professional, or even if you are, there are at least three ways the social environment can be supportive.

A culture that reminds us it is never too late to alter a trajectory.

We need to be realistic about how hard it is to work with youth who are already compromised by trauma, negative risk-taking, and/or mental health issues. However, we also need to remember that it is never too late. An environment that both physically (in terms of signage, print materials) and socially (conversations in the hallway, conversations with youth) signals “we are not giving up on you” helps create a supportive culture. Each new opportunity, experience and way for youth to build new capacities helps build the brain and new neural connections.

Light up their purpose and positivity.

Whatever the youth’s previous experiences, they can discover their heart’s interests and passions as a way toward positive pathways. An environment that communicates positive potentials, in addition to or instead of, reminders of the obstacles and issues to overcome can light the path forward. Posters, sign-ups, inspirational community speakers, gathering places for youth, and visitors, site visits, and other events and materials that signal fresh possibilities are some ideas. Adults, no matter their role in the environment, can look for what lights up their eyes (and their brain) and reinforce from there. The adult’s role is to guide the exploration. Is it working with animals, building things, learning more about a subject, helping other youth with similar issues?

Support students’ development of SEL skills.

To create such an environment, schools and communities must emphasize equity and voice, ensuring meaningful access and opportunity for every student. For schools to implement SEL effectively and equitably, they will need to:

1. Start by evaluating and building school and classroom environments that are conducive to SEL;
2. Incorporate a wide variety of curricula that are available to teach SEL skills in a school setting;
3. Emphasize equity in the selection and implementation of curriculum; and
4. Take a holistic approach, understanding that each person (child and adult) will start at different places and progress in different ways along an SEL continuum.

Consistent and keen observations on an individual level.

The environment should have a tone of rigor and determination while holding youth accountable. If not already in place, schools and other youth serving environments can obtain and keep an up-to-date list of resources/referrals for issues and follow-through. Social emotional benchmarks and standards can help staff understand the difference between normal adolescent turbulence and serious distress signals. Staff can stay attuned for signs of mental health issues and trauma—such as withdrawal or loss of enjoyment in formerly enjoyable things, changes in eating, neglect of personal health, frequent aggression, isolation, or over-compliance—and look for otherwise common events that can serve as triggers for students impacted by trauma, including sudden unpredictable actions, noises, or changes; over stimulation; too much or too little physical space; etc.

Positive Interactions

Adults, no matter the issue, play a key role in connecting youth to resources, offering consistent support and trust, and a non-judgmental sounding board. It's important not to take a back seat during this time. How can adults be prepared and get involved in creating more positive interactions?

Be informed about the issues and be involved.

It can be confusing and stressful to figure out what is day-to-day adolescent turbulence and what is a signal of a more significant issue. Some online research (links below) can help make these determinations, and you can also reach out for expert advice from a family doctor, school counselors, public mental health, helplines, and a variety of community resources that vary greatly by community. Adults should also not be afraid to get involved. Teens often do not have a voice, and when something dangerous or scary happens, they can truly benefit from authentic and caring adult involvement.

Practice self-care and team approaches.

Working with youth who have experienced trauma and other issues can take a long time and a huge amount of effort. Some strategies for staying present: practice self-care (take personal time-outs, set your own clear boundaries, meditate) to maintain empathy and mitigate compassion fatigue, and take a team approach (build relationships with counselors, coaches, and others who are involved in the youth's life). A consistent connection with a non-parent adult is crucial, and sometimes, it will take a team to find the connection that sticks. Our role is not to fix youth who are in trouble but to facilitate their own healing by holding space for them.

Build trust and communication.

While there are a wealth of resources on how to do this, Marsha Linehan's six levels of validation is a good start. These levels are not in any order, but are six ways to build validation in your interactions.

1. Be present, give the moment your full attention and display receptive body posture and facial expressions.
2. Give an accurate reflection, summarize the facts of the situation as objectively as possible.
3. Guessing is a good start when the feelings are unknown, thinking of what another might feel in a similar situation and seeing if that resonates with the current experience.
4. Validating the response based on the history of the individual, since past experiences guide later reactions to such stimuli.
5. Normalizing identifies those feelings or reactions that any person might have if placed in the same situation or experience.
6. Radical genuineness calls upon us to employ the notion that everyone is a real person with real emotions and responses, and as such being completely ourselves is valid.



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Consider your own SEL development.

It is equally important that adults who interact with youth take the time to understand and build their own awareness, their ability to set and achieve goals, establish positive relationships, and to make responsible decisions. "You can't teach what you don't know and you can't lead where you won't go."

Be conscious with discipline.

Discipline is sometimes based on a long history of actions and beliefs that can often manifest as punishment. It's important for the adult to attempt to understand the behavior. How does the youth see the benefit in their actions and what will they learn and take away from corresponding consequences? Most importantly, how can they recover and how can the adult respond to hold them accountable while holding space for the relationship to continue and grow. True discipline is about correction and allowing youth to make their own corrections. It requires patience. Based on what we now know about brain chemistry, the impacts of trauma, and how students grow, we must connect before we correct. Risky behavior from youth can be scary for adults and an immediate reaction may be to demand retribution. Usually, we apply social deprivation (grounding, phone privileges, etc.) because we know that's what youth value. However, it is up to adults to seek to understand the motivation and the underpinnings of the behavior. The behavior may not make sense to the adult but makes sense to youth. More conscious discipline strategies include:

1. Talk about it before acting, try to understand underlying factors that may have caused the behavior.
2. Do not deprive them of their purpose and passion

activities, disconnecting from those may cause more harm.

3. Make your expectations clear, even write them down, so they know what lines were crossed in the behavior.
4. Give them voice by co-developing a consequence appropriate to the behavior instead of doling out punishment (for example, if they shoplifted, ask them to think of a way to apologize or pay it back).

Be prepared to talk about suicide and self-harm behaviors.

Suicide most often occurs when stressors exceed a person's current coping abilities. Depression is the most common condition associated with suicide, and it is often undiagnosed or untreated. Conditions like depression, anxiety and substance problems, especially when unaddressed, increase risk for suicide. Be prepared to ask the question: Sometimes when someone feels like you are feeling, they think about ending their life. Have you thought about harming yourself or ending your life? After getting an answer to this question, you will know how to proceed in providing support for this youth. If the answer is yes, or a wavering unsure answer, follow your organizations protocol for intervening and providing support. This should include a possible assessment and safety plan, as well as critical follow-up to make sure the safety plan developed is working for the youth. It is a myth that asking the question introduces the idea of suicide. Rather, asking the question allows someone who has been thinking about suicide to talk in a safe environment about their feelings and experiences. Often there is relief felt by the person who has been isolated and alone in their thinking. And for those who have not been thinking about suicide, their answer will be a direct no.



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Inspirations and Ideas for Youth

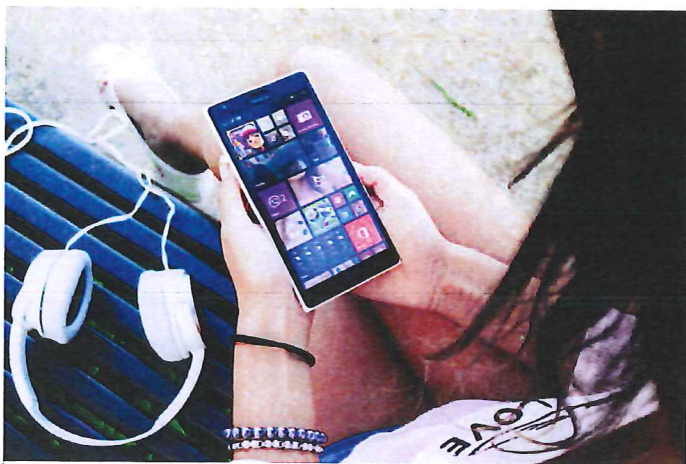
What are some things youth themselves can do to deal with tough issues, for themselves and for peers?

Learn more.

Do online research about issues you think might be affecting you or someone you care about. There are a lot of resources out there and you are certainly not alone. Putting a name to what you are going through, and understanding it better to build awareness is the best way to get started. Some links to get started are below.

Practice self-compassion.

Being compassionate to yourself is one of the most powerful things you can do in the name of taking care of yourself, and something that is totally in your control. You are not defined by your illness, your disability, your trauma, your condition, or your past mistakes. Try to view it as part of being human rather than as a failure. Some youth find it helpful to have a simple saying or mantra ("I forgive myself"; "Focus on the good"), or a specific object or token, that is always there to remind you. Others do it by helping a friend out or imagining what they would say to a friend in the same situation. We often have more practice being kind to other people than to ourselves!



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Safe use of Social Media.

As youth increase their online presence, issues from the physical world, such as bullying, may transition into the digital world. Seeing a new notification or unread message pop up on your screen can send a rush through the reward pathways of your brain just like scoring the game-winning point or eating your favorite candy. Addictive behaviors such as constantly checking for updates may develop as you receive instant feedback in the form of likes, comments, or messages. Use social media **'mindfully'**; take time to understand the privacy settings, and be aware of how online behavior connects to real-world consequences and creates a permanent trail of personal information available to friends and former friends, parents and grandparents, future employers, or hackers. See www.safesearchkids.com/a-teens-guide-to-social-media-safety/

Keep an eye out for your peers.

If your friend or peer's behavior concerns you—such as withdrawal or loss of enjoyment in formerly enjoyable things, changes in eating, neglect of personal health, frequent aggression, unable to sleep, substance use/misuse, and easily becomes upset—reach out to them to ask if they are okay. Signs of distress may also appear in social media status updates or pictures, and regardless of someone's history, you should take any threats or indications of suicide seriously. Know that you might have to ask "is anything bothering you?" more than once to get an authentic answer. It is also okay to ask your friend if they are thinking of harming themselves or want to die by suicide. Make sure you help connect your friend to a trusted adult you can count on to follow through. You may have to talk to multiple adults until it seems like someone knows just what to do, but as a friend, you can be a helpful "first-responder." Never agree to keep a secret about someone's suicidal thoughts. Offer to talk to a trusted adult with your friend.

Resources for Youth:

- A Friend Asks App (available on Android & iPhone)
- Crisis Text: text START to 741741
- Crisis Line: 800-273-8255 or 800-201-2121
- LGBTQ Youth: 800-488-7386 or text TREVOR to 202-304-1200

Additional Resources

Here are some additional resources if you:

- Need a full set of resources for parents and teachers: [The Tough Kid Series](#)
- Want to read about making and growing that connection: [The Heart of Learning and Teaching, Reaching Teens](#)
- Are looking for resources on specific issues:
 - Trauma, Adverse Childhood Experiences (ACEs), and how to recognize them: [ACEs at the CDC](#) and [National Child Traumatic Stress Network \(NCTSN\)](#)
 - Mental Health and Suicide Prevention: [Child and Adolescent Mental Health \(NIMH\)](#)
 - Substance Abuse: [Partnership for Drug Free Kids](#)
 - Juvenile justice: [Center for Law, Brain, and Behavior](#)
- Want more resources on suicide prevention, intervention, and postvention:
 - [Suicide Prevention Resource Center](#)
 - [American Foundation for Suicide Prevention](#)
 - [Trevor Support Center: Preventing Suicide](#)
 - [Society for the Prevention of Teen Suicide](#)
 - [Suicide Awareness Voices for Education \(SAVE\)](#)
 - [Substance Abuse and Mental Health Services Administration](#)
 - [National Suicide Prevention Lifeline](#)
 - [Sources of Strength](#)
 - [Stanford Social Psychological Answers to Real-World Questions](#)

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GLOSSARY

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Adolescence: the age range from approximately the onset of puberty to the beginning of independent adulthood, approximately age 25.

Adverse Childhood Experiences (ACEs): a collection of experiences that were coined from the Adverse Childhood Experiences study conducted by The Centers for Disease Control and Kaiser Permanente in San Diego in a broad based study from 1995-1998. These experiences occurring during childhood that are particularly difficult, or stressful that impacts their physical, emotional and social health throughout their lifetime."

Altruism: the selfless concern for or promotion of the wellbeing of another.

Brain Derived Neurotrophic Factor (BDNF): a substance in the brain that nurtures existing brain cells and supports the growth of new ones, commonly referred to as "fertilizer for your brain."

Brain stem: the oldest part of the brain, controls basic life functions such as heartbeat, breathing, and instinctive freeze, fight, or flight responses.

Dialectical Behavior Therapy (DBT): a type of treatment evolved from cognitive-behavioral therapy, originally intended for continuously suicidal and other clients with disorders that were particularly difficult to treat, DBT is now often utilized with those who lack emotional regulation and executive function skills and whose experiences have reinforced destructive responses and behaviors. DBT practitioners promote awareness and acceptance of the current situation, often through mindfulness techniques, and offer techniques to adjust thought patterns, responses, and behaviors when presented with adverse circumstances.

Dopamine: a neurotransmitter in the brain associated with rewards, or positive feelings resulting from certain actions or behaviors

Emotional regulation: control over one's expression of emotions, both the timing and how they are expressed.

Empathy: the understanding of someone else's thoughts or feelings.

Epigenetic: the effects of environmental factors on the expression of inherited genes.

Executive function: the trainable application of the "air traffic control system" skills to everyday life in order to filter and process sensory inputs, focus on the task at hand, and react flexibility and intentionally.

Experiential learning: learning through experiences

Genetic: genes are comprised of DNA, and act as the biological instruction manual for development, including traits and characteristics which are inherited from your parents and passed down to any children you have.

Growth mindset: based on the research of Dr. Carol Dweck and her team, the belief that one can get smarter and better at something, which may ultimately result in successfully improving at that thing.

Inhibition: restraint from acting instinctively or impulsively, whether physically or emotionally.

Integration: a model for understanding how the brain functions as a system of specialized, interdependent parts, with each part becoming more specialized and efficient during adolescence.

GLOSSARY

Limbic system: a set of structures in the brain that serve as the emotional network and include the amygdala (influences emotional response) and the hippocampus (influences memory).

Mindfulness: is the non-judgmental observation of our entire experience. We slow down, observe, and awaken a greater awareness of our being and of our surroundings. From this perspective, we develop a knowing beyond our usual way of trying to intellectually "figure out" what's going on.

Neurons/Neural connections: nerve cells that form a pathway, through which electrochemical signals are sent throughout the brain and central nervous system.

Neuroplasticity: the brain adapts, heals, grows, and changes in response to its environment and experiences. Neural connections and pathways are created, formed, and altered.

Neurotransmitter: chemicals that carry messages through the neural network in the brain.

Pre-frontal cortex (PFC): located in the front of the brain and behind the forehead, the PFC is in charge of personality and planning, and is therefore essential to executive function skills. This part of the brain helps to process and direct incoming signals, similar to an "air traffic control system." It is one of the last parts of the brain to develop (around age 25) and is highly influenced by experiential learning.

Pruning: the process within the brain in which less used neural connections are reduced and removed so that the more useful connections can be strengthened and sped up.

Resilience: the capacity to rise above difficult circumstances, allowing our children to exist in this less-than-perfect world, while moving forward with optimism and confidence.

School-dependent children: youth for whom the school they attend, and the quality of the teaching they experience, is the deciding factor in that individual's success.

Self-regulation: the ability to control impulses, emotions, attention, and behavior, and then act or react intentionally.

Synapse: the gap between two neurons, through which the neural messages must be conveyed.

Toxic stress: occurs when intense, regular, and/or long-term adversity is experienced in one or more areas without employing or having available adequate resources and supports.

Trauma: the unique individual experience of an event or enduring conditions in which the individual's ability to integrate his/her emotional experience is overwhelmed. (Saakvitne, K. et al, 2000)

Unconditional Positive Regard (UPR): from the psychologist Carl Rogers, UPR is the practice of continuing to assist and support a person (usually a client) despite things they may say or do that might otherwise cause someone to cease agreeing with or encouraging them.

Working memory: the part of your short-term memory that is used on-the-spot to process your response (often language-based) to a current stimulus.

