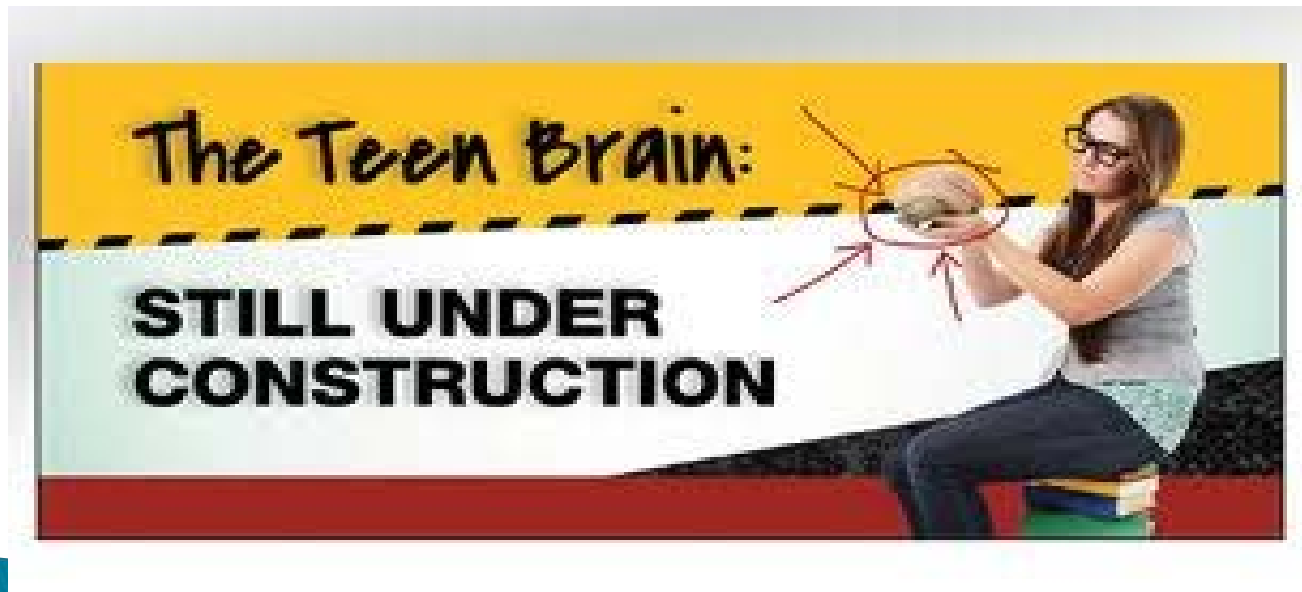


The Challenges of Working with Adolescence



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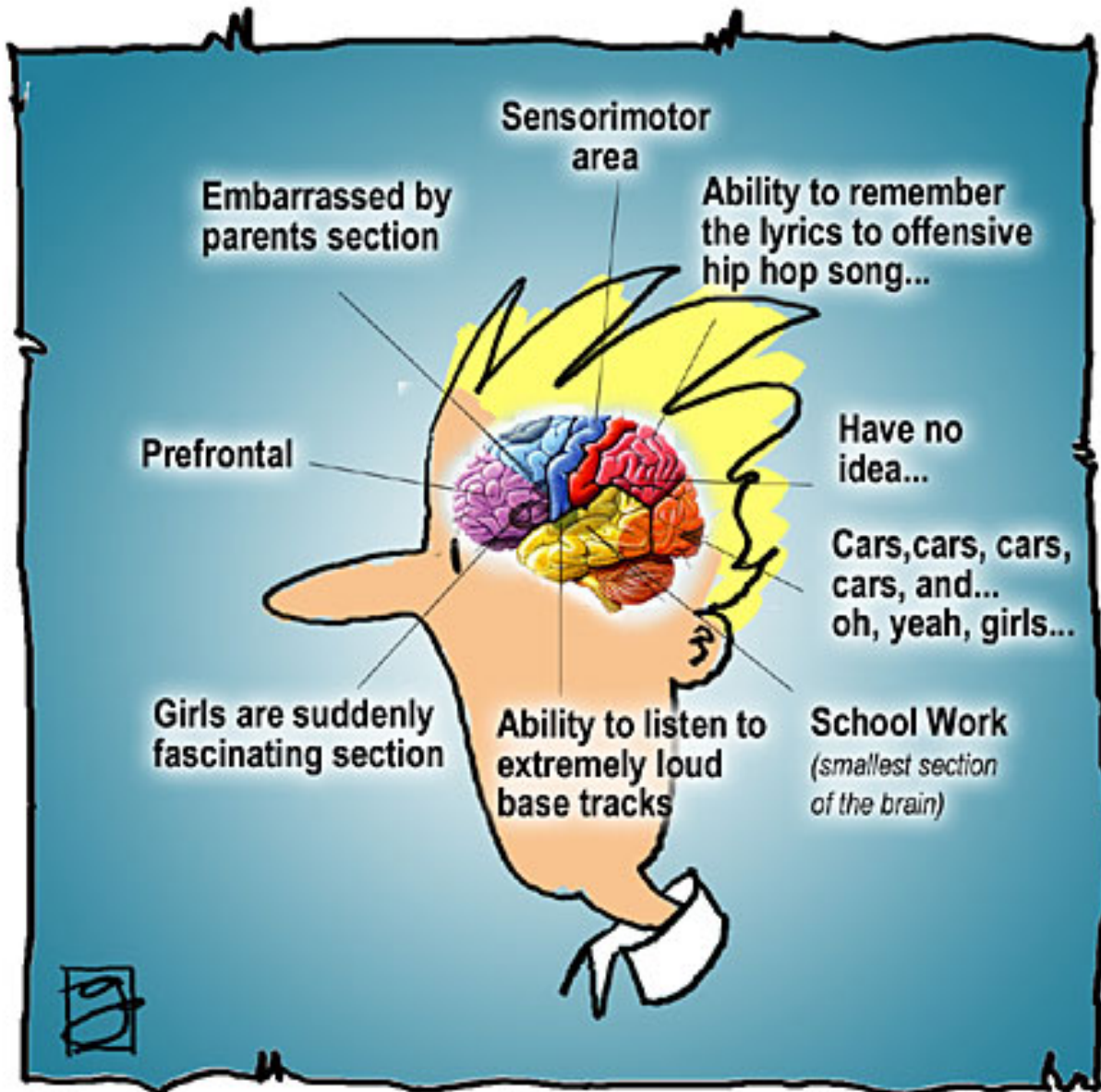
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Anatomy of a Teenager's Brain

Adolescence



- ▶ Adolescence is the period between puberty and adulthood, approximately the early teens to the early 20's.
- ▶ A relatively new concept from a social point of view prompted by the industrial revolution.
- ▶ But a period that we are now understanding is complex in terms of brain development.

Adolescence



- ▶ With the onset of puberty (which can begin by the age of 11 or in some cases even earlier) hormones are in full motion, influencing changes in the body. Anxiety and depression can be a symptom of these changes.

Adolescence



- ▶ Through the ages, many have spoken about the dark forces that affect teens.
- ▶ Aristotle concluded more than 2,300 years ago that "the young are heated by Nature as drunken men by wine."
- ▶ A shepherd in William Shakespeare's play "The Winter's Tale" wishes "there were no age between ten and three-and-twenty, or that youth would sleep out the rest; for there is nothing in the between but getting wenches with child, wronging the ancestors, stealing, fighting."

Adolescence



- ▶ G. Stanley Hall, who formalized adolescent studies in 1904 believed this period of "storm and stress" replicated earlier, less civilized stages of human development.
- ▶ Freud saw adolescence as an expression of torturous psychosexual conflict; Erik Erikson, as the most tumultuous of life's several identity crises.

Adolescence



- ▶ Adolescents today are faced with many challenges.
- ▶ Challenges today include earlier puberty, pressures to succeed academically, pressures to conform to ever demanding social pressures, large quantities of leisure time, dealing with increased access to information, social media, media, increased distractions, sex, alcohol, drugs and rock and roll.

Adolescence



- ▶ The choices that adolescents face every day concerning how to spend their time, their money, who to spend time with, issues of gender identity and sexual activity, exposure to and availability of drugs, exposure to and availability of pornography, access to unlimited forms of multimedia, video games, information, etc. can be overwhelming.
- ▶ Choices that adolescents may be ill equipped to make because of the state of their brain's development.

Adolescence



- ▶ The brain reaches 90 percent of its full size by the time a child is six years old, and a thickening skull accounts for most head growth afterward.
- ▶ It was believed until recently that the brain was pretty much done growing by the end of childhood.
- ▶ But we now know that as young people move through adolescence, their brains undergo extensive remodeling, resembling a network and wiring upgrade.

Adolescence



- ▶ The first full series of brain scans of the developing adolescent brain was conducted at the National Institutes of Health (NIH) with a project that studied over a hundred young people as they grew up during the 1990s and consisted of fMRI scans every two years.
- ▶ These demonstrated that that our brains undergo a massive reorganization between the 12th and 25th years. The brain doesn't actually grow very much during this period, rather it reorganizes itself.

Adolescence



- ▶ The brain of a baby grows by over-producing synapses, or connections. It's only recently been discovered that there is a second period of over-production. In a baby, the brain over-produces brain cells (neurons) and connections between brain cells (synapses) and then starts pruning them back around the age of three as some connections are reinforced by use and others wither away from lack of use.
- ▶ The process is much like the pruning of a tree. By cutting back weak branches, others flourish.

Adolescence



- ▶ The brain's axons—the long nerve fibers that neurons use to send signals to other neurons—become more insulated with a fatty substance called myelin (the brain's white matter), eventually boosting the axons' transmission speed up to a hundred times.
- ▶ Meanwhile, dendrites, the branchlike extensions that neurons use to receive signals from nearby axons, grow branches, and the most heavily used synapses—the little chemical junctures across which axons and dendrites pass notes—grow richer and stronger.

Adolescence



- ▶ At the same time, synapses that see little use begin to wither.
- ▶ This synaptic pruning, as it is called, causes the brain's cortex—the outer layer of gray matter where we do much of our conscious and complicated thinking—to become thinner but more efficient.

Adolescence



- ▶ The second wave of synapse formation produces a spurt of growth just before puberty (age 11 in girls, 12 in boys) and then a pruning back in adolescence.
- ▶ The brain actually consolidates learning by pruning away synapses and wrapping white matter (myelin) around other connections to stabilize and strengthen them. The period of pruning, in which the brain actually loses gray matter, is as important for brain development as is the period of growth.

Adolescence



- ▶ Even though the brain of a teenager between 13 and 18 is maturing, they are losing 1 percent of their gray matter every year.
- ▶ The cerebral cortex, the outer layer of our brains, actually becomes thinner with age but much more complex and organized.

Adolescence



The physical changes in the brain move in a slow wave from the brain's rear to its front, from areas close to the brain stem that look after older and more basic functions, such as vision, movement, and fundamental processing, to the evolutionarily newer and more complicated thinking areas up front.

- ▶ The corpus callosum, which connects the brain's left and right hemispheres and carries traffic essential to many advanced brain functions, steadily thickens.

Adolescence



Stronger links develop between the hippocampus, a sort of memory directory, and frontal areas that set goals and weigh different agendas;

As a result, we get better at integrating memory and experience into our decisions.

At the same time, the frontal areas develop greater speed and richer connections, allowing us to generate and weigh far more variables and agendas than before.

Adolescence



- ▶ The corpus callosum, which connects the brain's left and right hemispheres steadily thickens.
- ▶ Stronger links also develop between the hippocampus, a sort of memory directory, and frontal areas that set goals and weigh different agendas.

Adolescence



- ▶ As a result, teens start to get better at integrating memory and experience into their decisions.
- ▶ At the same time, the frontal areas develop greater speed and richer connections, allowing them to generate and weigh far more variables and agendas than before.

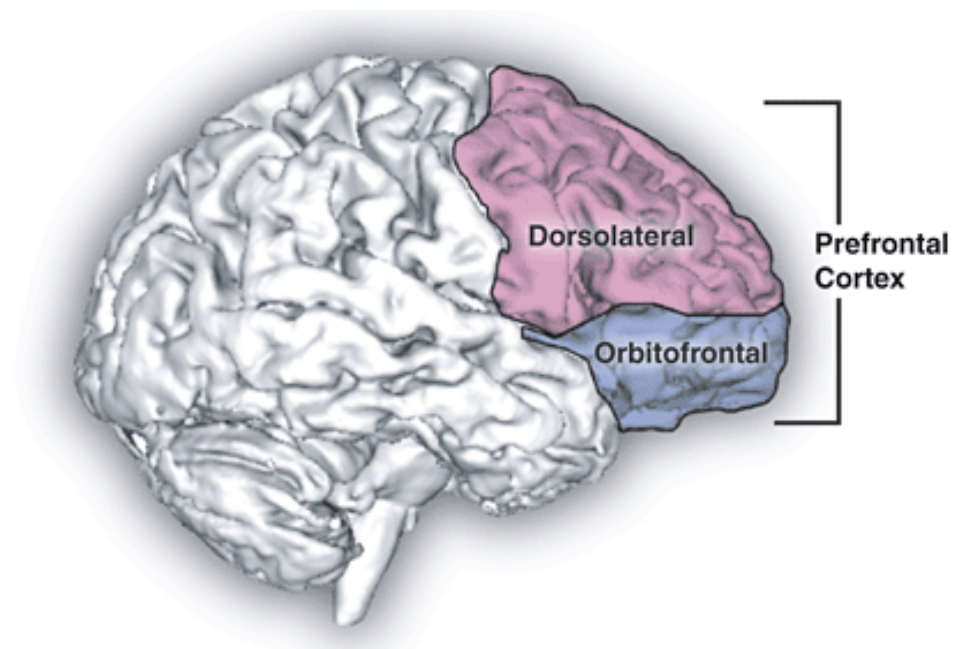
Adolescence



- ▶ With age and physical maturity, teens get better at balancing impulses, desires, goals, self-interest, rules, ethics, and even altruism, generating behavior that is more sensible and less risky and dangerous.
- ▶ But this developmental process is slow and uneven, leading to the erratic and often senseless and risky behaviors that we see in teens.

The prefrontal cortex (PFC)

The anterior part of the frontal lobes of the brain, lying in front of the motor and premotor areas.





The Prefrontal Cortex has been implicated in planning complex cognitive behavior, personality expression, decision making and moderating social behavior.

The basic activity of this brain region is considered to be orchestration of thoughts and actions in accordance with internal goals.



Executive function in the prefrontal cortex relates to abilities to differentiate among conflicting thoughts, determine good and bad, better and best, future consequences of current activities, working toward a defined goal, prediction of outcomes, the ability to suppress urges that, if not suppressed, could lead to socially unacceptable outcomes, etc.

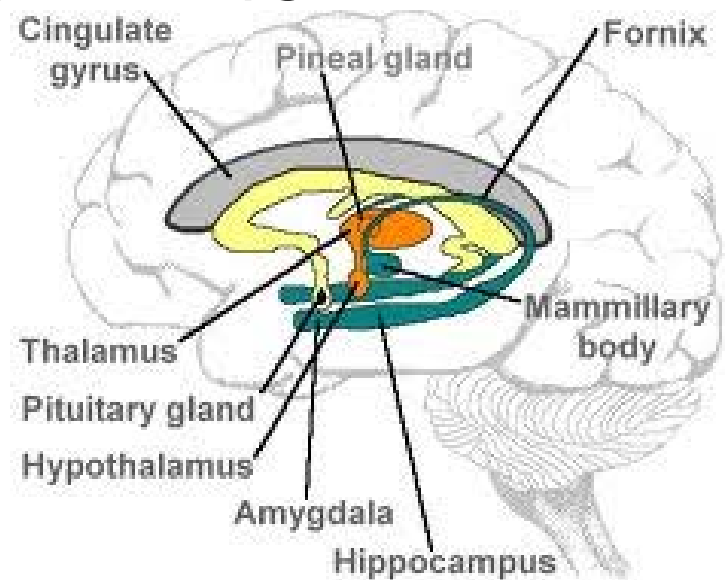


The prefrontal cortex acts as the CEO of the brain, controlling planning, working memory, organization, and modulating mood.

As the prefrontal cortex matures, teenagers can reason better, develop more control over impulses and make judgments better.

The limbic system

A complex set of brain structures that lies on both sides of the thalamus, right under the cerebrum. It is a collection of structures from the cerebrum, diencephalon, and midbrain, including the hypothalamus, hippocampus, amygdalae, thalamus, and pituitary gland.



The Limbic System

The limbic system

This system is highly influenced and affected by dopamine, one of the many neurotransmitters that circulate thru the brain. Dopamine is a neurohormone that is released by the hypothalamus.

Dopamine plays a major role in the brain system that is responsible for reward-driven learning. Every type of reward that has been studied increases the level of dopamine transmission in the brain, and a variety of highly addictive drugs, including stimulants such as cocaine and methamphetamine, act directly on the dopamine system.

The limbic system

Physiologically, adolescence brings a peak in the brain's sensitivity to dopamine, which appears to prime and fire reward circuits and aids in learning patterns and making decisions.

This helps explain the teen's quickness of learning and extraordinary receptivity to reward—and his keen, sometimes melodramatic reaction to success as well as defeat.

It also explains teens' tendencies to become easily addicted to a wide variety of activities.

The limbic system

There are significant peaks in dopamine expression during adolescence. Dopamine projections to the prefrontal cortex continue to develop into early adulthood, with dopamine levels peaking in the prefrontal cortex during adolescence versus earlier or later in life.

Dopamine receptor expression is highest in the during early adolescence.

Adolescence

- ▶ Our tendency to focus on highly publicized, spectacular news of suboptimal teenage decision making and behaviors, e.g., drunk driving, substance abuse, teen pregnancies, teen suicides, teen shootings, etc., can leave us with the impression that the teen years and adolescence is a time fraught with dangerous excesses and horrible potential consequences and that teens should be protected from themselves.

Adolescence

- ▶ A few of us, however, have begun to view recent brain and genetic findings in a brighter light, colored by evolutionary theory.
- ▶ This theory of the adolescent brain, the adaptive-adolescent theory, casts the teen less as a bumbling, dangerous half formed adult but rather as a sensitive, highly adaptable young person wired almost perfectly for the job of moving from the safety of home into the complicated world outside.

Adolescence



- ▶ If adolescence is essentially a collection of them—angst, idiocy, and haste; impulsiveness, selfishness, and reckless bumbling—then how did those traits survive selection? How did we survive our own adolescence??
- ▶ Who among us didn't do incredibly stupid and dangerous things when we were teens?
- ▶ Hindsight bias / "I Knew It All Along" Phenomenon

Adolescence



The answer is that the troublesome traits that we tend to believe characterize adolescence; are just what we notice most because they annoy us or put our children in danger.

As B. J. Casey, a neuroscientist at Weill Cornell Medical College said, "We're so used to seeing adolescence as a problem. But the more we learn about what really makes this period unique, the more adolescence starts to seem like a highly functional, even adaptive period."

Adolescence



Teens love thrills. We all like new and exciting things, but we never value them more highly than we do during adolescence. Here we hit a high in sensation seeking: the hunt for the neural buzz, the jolt of the unusual or unexpected.

Seeking sensation isn't necessarily impulsive. Impulsivity generally drops throughout life, starting at about age 10, but this love of the thrill peaks at around age 15.

Adolescence



Although sensation seeking can lead to dangerous behaviors, it can also generate positive ones: The urge to meet more people will create a wider circle of friends, which generally makes us healthier, happier, safer, and more successful.

A love of novelty provides the inspiration needed to explore and learn, to expand our horizons, develop new interests and passions.

Adolescence

What also peaks during adolescence is risk-taking. Teens take more risks than at any other time in life.

This age group dies of accidents of almost every sort (other than work accidents) at high rates. Most long-term drug or alcohol abuse starts during adolescence, and even people who later drink responsibly often drink too much as teens. In the U.S., one in three teen deaths is from car crashes, many involving alcohol.

Adolescence

Are these kids just being stupid? That's the conventional explanation: They're not thinking, or by the work-in-progress model, their puny developing brains fail them.

Laboratory studies have demonstrated that even 14- to 17-year-olds—the biggest risk takers—use the same basic cognitive strategies that adults do, and they usually reason their way through problems just as well as adults.

Adolescence

Teens take more risks not because they don't understand the dangers but because they weigh risk versus reward differently.

In situations where risk can get them something they want, they value the reward more heavily than adults do.

This is the effect of dopamine and the lack of ability to regulate the effects of dopamine.

Adolescence

Over the course of human evolution, the willingness to take risks during adolescence has granted an adaptive edge.

Succeeding often requires moving out of the home and into less secure situations. "The more you seek novelty and take risks, the more rewards are open to you do.

The responsiveness to rewards thus works like the desire for new sensation: It gets kids out of the house and into new turf.

Adolescence

The teen brain is similarly sensitive to oxytocin, another neural hormone, which among other things makes social connections in particular more rewarding.

The neural networks and dynamics associated with general reward and social interactions overlap heavily. Engage one, and you often engage the other.

Adolescence

This helps explain why teens prefer the company of their own peers more than ever before or after. Teens offer teens far more novelty than their parents or siblings.

But teens gravitate towards each other for another, more powerful reason: to invest in the future relations rather than in past ones. Our children enter a world made by their parents. But they will live most of our lives in a world run and remade by their peers.

Adolescence

Knowing, understanding, and building relationships with their peers is a critical skill that will determine much of their future success.

Socially savvy rats or monkeys, for instance, generally get the best nesting areas or territories, the most food and water, more allies, and more sex with better and fitter mates. And no species is more intricately and deeply social than humans are.

Adolescence

Social & Peer Relations

Social and peer relations have more impact and influence over adolescents than the influence of any number of parents, teachers and other adults. This is why it's so frustrating for parents to deal with their teenagers.

Adolescence

Some brain-scan studies suggest that teen brains react to peer exclusion much as they respond to threats to physical health or food supply.

At a neural level, they perceive social rejection as a threat to existence. This might help to understand the hysteria of a 13-year-old deceived by a friend or the gloom of a 15-year-old not invited to a party or de-friended on Facebook.

Adolescence

For parents, the challenge is to walk the blurry line between helping and hindering our kids as they adapt to adulthood.

The United States spends about a billion dollars a year on programs to counsel adolescents on violence, gangs, suicide, sex, substance abuse, and other potential pitfalls. Few of them work.

Adolescence

Studies show that when parents engage and guide their teens with a light but steady hand, staying connected but allowing independence, their kids generally do much better in life.

Adolescents want to learn primarily, but not entirely, from their friends. At some level and at some times, teens can recognize that their parents can offer certain advise and wisdom.

Adolescence



The prolonged plasticity of those late-developing frontal areas as they slowly mature. These areas are the last to lay down the fatty myelin insulation—the brain's white matter—that speeds transmission. And at first glance this seems like bad news: If we need these areas for the complex task of entering the world, why aren't they running at full speed when the challenges are most daunting?

Adolescence



While a myelin coating greatly accelerates an axon's bandwidth, it also inhibits the growth of new branches from the axon.

This makes the period when a brain area lays down myelin a sort of crucial period of learning—the wiring is getting upgraded, but once that's done, it's harder to change.

Adolescence

The delayed completion of connections in the prefrontal cortex—a withholding of readiness—heightens flexibility just as we confront and enter the world that we will face as adults.

This long, slow, back-to-front developmental wave, completed only in the mid-20s, appears to be a uniquely human adaptation. It may be one of our most consequential. It can seem a bit crazy that we humans don't wise up a bit earlier in life. But if we smartened up sooner, we might end up dumber.

Adolescence

Adolescents are very capable of learning and behaving correctly as long as we keep our expectations clear and enforce them consistently.

Consistent enforcement teaches their brains what they can and can't get away with. Consequently, if we ignore their behavior, thinking that they will stop if they don't receive attention, their brains take this information in, and realize that in this environment, they can continue with suboptimal behavior without consequences.

Adolescence



Adolescents need help in learning how to regulate their emotions, making choices, thinking through consequences, etc.

Playing chess: playing chess and chess players.

Adolescence



Treatment Issues with Adolescents

Working with adolescents is not like working with little adults.

As we've discussed, the adolescent brain is not an adult brain, capable of deep levels of analysis, planning and anticipating consequences. Therefore, logic rarely works.

Adolescence



Treatment Issues with Adolescents

To work effectively with adolescents, therapists must avoid judging the teen and their behaviors based on our standards and values.

Effective therapists need to understand the culture of adolescents as much as they can and use that information to relate to and establish rapport with adolescents: drugs, music, fashion, film & TV, social media, etc

Adolescence



Treatment Issues with Adolescents

Without establishing a relationship of trust and understanding, any successful therapeutic work will be impossible.

Confidentiality, therefore, is essential, and parents need to be aware of this.



Adolescence

Treatment Issues with Adolescents

Concept of choices!!!

Adolescents always have the ability to make choices: choice to come to therapy, choice to go to school, to come home at night, to have sex or not, to drink or smoke or not, how much, etc.

Successful therapy teaches adolescents to make good choices.