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Brainstorm:

The Power of the Adolescent Brain

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The essential features of adolescence emerge because of healthy, natural changes in the brain. -Dr. Siegel

Dr. Siegel is a clinical professor of psychiatry at UCLA and one of the founding directors of the Mindful Awareness Research Center. Early in his career, Dr. Siegel wrote a neuroscience textbook called The Developing Mind. Now in its second edition, the text is used in medical schools across the country. Dr. Siegel's more recent book, Brainstorm: The Power and Purpose of the Teenage Brain provides an inside-out guide to the emerging adolescent mind and illuminates how brain development impacts teenagers' behavior and relationships. This book is written primarily for adolescents - even including practical steps in 'Mindsight Tools' sections that offer science-proven ways for readers to strengthen their brains and their relationships.

Between the ages of 12 and 24 years, the brain changes in important, and oftentimes maddening, ways. It is no wonder that many parents approach their child's adolescence with fear and trepidation. However, according to Siegel, if parents and teens can work together to form a deeper understanding of the brain science behind all the tumult, they will be able to turn conflict into connection and form a deeper understanding of one another.

Adolescence is defined as the period of time between being a child and having the responsibilities of an adult. Adolescence is seen across cultures and species. In fact, an adolescent gazelle is known to approach a pride of lions, stare them down, and then run away as quickly as possible. Sound like the behavior of a teenager you know?

MYTH BUSTING: Siegel attempts to shatter, or at least challenge, popular misconceptions: to be a teenager is not to be irrationally explosive, immature, or to crave wild independence. Because the media perpetuates these myths, Dr. Siegel wants to dispel them and use the truth to empower both parents and adolescents.

- **MYTH: Adolescents go crazy due to raging hormones.**
- **FACT:** There is no such thing as a 'raging' hormone - there are only 'rising' hormones. There are indeed epigenetic changes in the body during adolescence - most noticeably in the reward circuit of the brain, which is why the experience of the sexual drive is so dramatic. However, placing blame on out-of-control hormones is destructive and incorrect.
- **MYTH: Adolescence is a negative time of life.**
- **FACT:** Adolescence is the most important time of our lives. By calling adolescents lazy or crazy, and associating the adolescent years with difficulty, adolescents become disenfranchised, and disenfranchised individuals experience life differently. The truth is that you can optimize the upsides and minimize the downsides of the changes to the brain.
- **MYTH: Adolescence is a time of immaturity.**
- **FACT:** Adolescence is a time of brain remodeling. Adolescents can learn how to focus their attention and make intentional choices that can strengthen the brain remodeling experience.
- **MYTH: Adolescence is a synonym for the teenage years.**
- **FACT:** Adolescence - and brain development - continues through the mid- to late-20s.
- **MYTH: Adolescence is so difficult, that you want to get it over as quickly as possible.**
- **FACT:** The best thing you can do as an adult is to keep your adolescence going as long as possible. In fact, in his book, The Age of Opportunity, Temple University Professor Laurence Steinberg (a friend of Siegel's) highlights the benefits of harnessing the creativity of an adolescent brain.

TAKE-AWAY: Dr. Siegel advocates using your mind to strengthen your brain. Understanding how you focus your attention throughout life, and especially during the adolescent period, plays an important role in shaping the growth of your brain. For example, the deepest, oldest part of the brain is the brain stem. The brain stem causes humans to exist in two profoundly different states - the **reactive** state that causes the fight, flee, freeze or faint reactions AND the more open state of **receptivity** that allows you to function calmly. The first step of regulating yourself is recognizing what state you are in. If you are in a reactive state, you should take some time to calm down and become receptive again. As an adult, you need to parent from the receptive state. And, as an adolescent, you need to NOT send that email nor post that tweet, photo, post, etc. if you are in a reactive state. No good comes from acting while in a reactive state.

Up until about age 12, brains are sponges - taking everything in. Then, as the brain moves through adolescence, it becomes more selective about information retention and moves towards specialization. The brain starts to prune itself and actually cuts away synaptic connections - similar to a gardener trimming down a rosebush. Experience shapes which neural circuits - the neurons and their synaptic connections - will be pruned away. So if you want to have a musical skill, best to start it early, before the end of adolescence. Your brain will respond to how you focus your attention in your activities. Attention streams energy and information through specific circuits and activates them. The more you use a circuit, the stronger it gets. The less you use a circuit, the more likely it may get pruned away during adolescence. Later in adolescence, the brain starts to lay down a significant amount of myelin to strengthen and integrate the remaining connections. The overall term for this process is called "remodeling" and it results in a more effective and efficient - a more 'integrated' - brain.

One way to remember the essence of the brain changes that happen during adolescence is with the acronym **E.S.S.E.N.C.E.**

ES - Emotional Spark

SE - Social Engagement

N - Novelty

CE - Creative Exploration

Emotional Spark - During adolescence, the changes in the limbic system of the brain create deep emotions. This change is exhibited by dramatic emotional swings between passion and vitality and moodiness and irritability. Adolescents can be taught to 'surf' those emotional waves and to not get flooded. The goal is to tap into the fire in the belly and to live life with emotional intensity.

Social Engagement - One job of the adolescent is to leave home and find membership and engagement in a larger group. The adolescent's overwhelming need to fit in is due to millions of years of evolution - in the past, young adults who left home without a group did not survive. The upside of social engagement is that adolescents can develop deep and meaningful relationships that are the best predictors of well-being, longevity and happiness through the life span. The downside of social engagement is that the drive to fit in may cause an adolescent to give up their moral compass. If adolescents can understand this drive, they can learn to overcome their tendency to act immorally.

Novelty - seeking emerges from an increased drive for rewards in the circuits of the adolescent brain that creates the inner motivation to try something new and feel life more fully. The upside of seeking novelty is that the adolescent has the courage to try new things. The downside of novelty is that sensation seeking and risk taking that overemphasize the thrill and downplay the risk result in dangerous behaviors and injury. As with social engagement, the job of parents is to teach their adolescents to listen to their internal compass. They need to learn how to pay attention to their gut-feelings or their heart-felt senses. They need not be able to verbalize WHY it feels wrong, the important thing is that they understand that feeling is trying to communicate danger.

Creative Exploration - Adolescent brains are the hope for the future. The adolescent brain questions the status quo and approaches problems with 'out of the box' strategies and innovation. It is not surprising that the major contributions in art, science, music and technology come from adolescents.

NOTE TO PARENTS: Instead of shoving adolescents into a place that feels horrible, you may need to reflect on your own adulthood. Before you get frustrated with your adolescent, ask yourself if you have lost your own essence. Are you seeking new experiences, challenging your mind, keeping passion in your life and holding your relationships dear? If not, your adolescent's experience may be triggering a deep longing for those very features that you may have lost. It is never too late to begin to live a fuller life.