

INSIDE THE TEENAGE BRAIN

Trainer Guide

Continuing Education

Materials List

Standard Classroom Set Up:

Class roster/sign-in sheets

Name tents

White board markers

Flip chart set ups for small group work (easel, pad, markers)

Participant manuals

PowerPoint projector

Computer station with internet access, speakers

Handouts

Handout 1, Do You Know Why Teens Act the Way They Do?

Posters

Slide 7, Teenage Brain 101 (Optional)

Competencies Addressed

103-1 103-2 103-4 202-1

TRAINER GUIDE

SECTION 1: Introduction

Time: 1 hour (9:00-10:00)

Objectives: Participants will

- > Become familiar with the trainer and the training group members.
- Review the agenda and training format.
- > Discuss the importance of the training and take the quiz.

Materials:

- Sign-In Sheets
- Participant Manuals
- Name Tents consider coding name tents with stickers or some other visual cue for quick division into small groups
- PowerPoint Presentation (Trainer Resource)
- Handout 1, Do You Know Why Teens Act the Way They Do?
- Do You Know Why Teens Act the Way They Do? Answers (Trainer Resource)
- YouTube Video via the Internet (http:/teenagebrain.blogspot.com/)
- Trainer Evaluations (To be passed out at the beginning of class)

A. Introductions and Housekeeping (5 minutes)

The trainer should quickly cover the following items:

- The trainer should welcome everyone to the training and take a minute to introduce himself/herself and the title of the training to the group at this time, which should be on Slide 1.
- 2. Survey the audience at this time with the following polls:
 - Raise your hand if you are a professional working with teenagers; Raise your hand if you are a parent of teenagers; Raise your hand if you find yourself acting like a teenager and are here to find out about your own brain?
 - Raise your hand if you work for: DCFS, mental health, medical, education, courts, etc.

- 3. Go over housekeeping issues by explaining that training will be three hours long and three credit hours will be given upon completion of the training. Also remind participants that there will be breaks given every hour, location of restrooms, emergency exits, silence cell phones, and to sign the sign-in sheet.
- 4. Ask participants to turn to page 1 in their participant manuals to review the agenda and objectives.

B. Introduction to the Teenage Brain (50 minutes)

The first several slides of the PowerPoint presentation introduce participants to basic concepts about the teenage brain and "tests" their knowledge about the teenage brain and teenage hormones. Begin with the following opening activity.

Purpose

The purpose of this activity is to help participants become aware of some negative feelings they may have toward teenagers and to remind them to look for strengths in teenagers.

Materials

Participants will need a pen or pencil and their participant manuals. The trainer will need a flip chart or whiteboard and a marker.

<u>Methodology</u>

- Ask each person to write down three words or adjectives that come to mind when they hear the word "teenager." Participants may jot these words down either at the bottom of page 1 or at the top of page 2 in their participant manuals.
- 2. The trainer should ask for 8-10 volunteers to share one of their adjectives with the audience. The trainer should record these on the flipchart or whiteboard.

Processing

• After getting a list of words collected, ask the following question to the group: What do you notice about this list? The words are usually negative. The trainer should point this out to the group if they do not bring it up. Because the teenage years can be awkward and confusing for both teens themselves and their caretakers, those negative characteristics are often emphasized most. However, it isn't all negative. Go to Slide 2, the Quote for the Day. It addresses the issue of remembering to look for the strengths in teenagers.

C. Small Group Activity

Go to Slide 3 and conduct the next small-group activity.

<u>Purpose</u>

The purpose of this activity is two-fold. It will allow participants an opportunity generate a list of questions they would like to have answered during the training, and they will have an opportunity to take a quiz to "test" their knowledge about teenagers.

Materials

Participants will need a pen or pencil and Handout 1, Do You Know Why Teens Act the Way They Do? for this activity. The trainer will need a flip chart and a marker.

<u>Methodology</u>

- 1. The trainer should divide the class into several small groups of 3-6 people.
- 2. The small groups, after they have introduced themselves, are to do two things:a) Generate a list of questions they want answered in the workshop andb) Complete Handout 1, Do You Know Why Teens Act the Way They Do?
- 3. First ask each group to select a recorder and a speaker. The recorder may take notes in the space provided on page 2 in the participant manual. The recorder should write down questions that the group would like to have answered by the end of training.
- 4. After the group has finished generating a list of questions, they should complete the quiz, Handout 1 together.
- 5. After about 10-15 minutes, call time.

Processing

In a large group, the trainer should record the list of questions the groups want answered on a flip chart. The trainer should post this list in the room in order to return to it at the conclusion of the workshop.

Next, the trainer should <u>quickly</u> review the answers to the quiz, which can be found in the Trainer Resource. The trainer should take this opportunity to point out some of the misconceptions that people have when it comes to teenagers. These will be addressed throughout the training today.

Next, go to Slide 4, the Teenage Brain Strain cartoon to transition into the next part of training.

This cartoon has been included to make the point that teens do not lose their brains during adolescence, even though it seems like it. Their brains are "under construction." It is important for adults to try to get to know this "emerging personality." (The sweet obedient 9 year old is now an emotional, irrational, and often obstinate 12 year old.)

D. The Teen Brain 101

The trainer should now go to Slide 5, the Teen Brain 101. Review the points listed on this slide, keeping in mind that bullet points 2 and 3 were already covered in the quiz earlier. Explain that the man who has pioneered much of the research on the teenage brain is Dr. Jay Giedd, from the National Institute of Mental Health. His research was done with functional MRIs, which measure brain activity. At this time, the trainer should read the quote from *National Geographic* (March 2003) from Dr. Giedd on Slide 6.

E. YouTube Video

Trainer Note: Prior to this portion of training, the trainer may want to "test" the link to the video to make sure it is working properly.

Purpose

The purpose of this video is to allow participants to see Dr. Giedd explain the research he has done on the teenage brain using MRIs.

Materials

There are no required materials for this activity. However, participants may want to take notes in their participant manuals during the video.

<u>Methodology</u>

- The trainer should go to the following YouTube website to play an interview with Dr. Giedd: http:/teenagebrain.blogspot.com/
 Note: The video will take about seven minutes.
- 2. After the clip, ask the participants to share their comments on the video.

Processing

During the discussing, the trainer should remind participants that watching the YouTube video is a great way to get this information to teenagers as well since viewing videos on YouTube is highly appealing to teenagers. If you choose to view this video with a teenager, be sure to spend some tome discussing the clip with the teenager afterwards.

BREAK

SECTION II: The Teenage Brain 101

Time: 1 hour & 30 minutes (10:10-11:40)

Objectives: Participants will

- > Become familiar with the various parts of the brain that affect teen behavior.
- > Discuss what role hormones play in the teen brain.
- > Understand why teens participate in risky behavior and activities.
- > Discuss the impact drugs and alcohol have on developing teenage brains.
- > Understand why teens have poor judgment.
- Understand the importance of sleep for a teen and the effects of sleep deprivation.
- Understand how teens communicate and learn techniques to better communicate with them.

Materials:

- Participant Manuals
- Name Tents consider coding name tents with stickers or some other visual cue for quick division into small groups
- Poster of Slide 7, the Teenage Brain 101 Diagram (Optional)

A. The Teenage Brain 101

Now that participants have been introduced to what the workshop will focus on, explain that this next portion of training is the "meat" of the material.

Begin by showing Slide 7, entitled the Teen Brain 101, which shows a diagram of the brain. Explain that for the remainder of the workshop, the focus will be primarily on 3 brain parts. These parts are found in the diagram and understanding these will be the foundation for the training today. The frontal cortex is the seat of logic (and the last part of the brain to develop), the hippocampus is the seat of memory, and the amygdala is the seat of emotion. It is important to note that the amygdala is in "hyper-drive" in teenagers, which is one of the reasons why they are so emotional. The trainer may want to make a poster of this diagram to use as visual aid throughout the workshop. These brain parts are defined in the next slide (Slide 8) entitled "If I Only Had A Brain."

After reading over the information on Slide 8, proceed to Slide 9, Current Research-Hormones. The trainer should explain that sex hormones alter the brain's structure. Point out that surges of testosterone in BOTH males and females account for an increase in aggression in teenagers. Estrogen enlarges the hippocampus (seat of memory) which makes females less likely to have Alzheimer's disease later in life. Also, surges of estrogen in females strengthen their neurolingistic pathways. This enables teenage girls to use words very effectively (they can be very mean with their words as well). Research indicates that many children who have been maltreated have smaller hippocampuses. This is because stress can change the shape and/or destroy neurons. The implications for children in foster care as it pertains to their educational needs are vast. Next, the trainer should go to Slide 10, entitled Emotional Rollercoaster. This slide discusses the impact the amygdala has on a teen's emotions. As has been previously stated, the amygdala in the teenage brain is in "hyper-drive." This makes them very emotional and unable to verbalize their feelings. The use of alcohol, since it calms the amygdala, is often used as a method of self-medication for teenagers.

The trainer should discuss Slide 11, Impulsivity, before having a quick "Brain Check." Explain that serotonin is a neurotransmitter that helps with relaxation and sleep. Explain to the group that a neurotransmitter is a chemical that transmits messages in the brain. Levels of serotonin seem to decline in teenagers, making them more impulsive. Note: It is not possible to measure serotonin levels directly so researchers have to find substances that correlate to serotonin levels or they have to measure serotonin metabolites when they are doing their research. Research indicates that many women with anorexia have higher levels of serotonin, making them more anxious and perfectionistic. Often-times, women with bulimia have lower levels of serotonin. People with lower levels of serotonin are more prone to depression, which could explain why many teenagers suffer from depression. Drugs for depression like Prozac and Zoloft target the brain's serotonin system. These drugs are a class of drugs called SSRIs-Selective Serotonin Reuptake Inhibitors.

B. Brain Check

Ask participants to participate in the following activity on Slide 12, Brain Check.

Purpose

The purpose of this activity is to allow participants both an opportunity to get to know each other and to think about how they can apply what they have learned thus far to their work with teenagers.

Materials

There are no materials needed for this particular activity, unless participants would like to take their participant manuals along with them to take notes on page 5.

<u>Methodology</u>

1. Have the participants stand up, find a person across the room who they do not know, and go introduce themselves.

- 2. Then, instruct them to talk to their partner about what they have learned so far and have them share how this information might apply to their work with teenagers.
- 3. Allow about five minutes for everyone to share with their partners before calling time.

Processing

Although there will not be a formal discussion with the larger group at this time, allowing participants to verbalize what they have learned so far in the workshop with a partner, will help them understand how they can put to use what they are learning.

After the Brain Check exercise, ask participants to go back to their seats to complete the Riddle found on Slide 13 and page 6 in their participant manuals. Although the answer to the riddle is on the next slide (Slide 14), see if the group can generate some other creative answers to this riddle. Have some fun with this!

Now that participants understand more about how the parts of the brain work, they can now take a deeper look into how the brain affects more specific teen behaviors.

C. Why Do Teens Take Risks?

The trainer should proceed to the next slide, Slide 15, entitled Why Do Teens Take Risks. Begin by surveying the group with a show of hands. "Who took risks in high school? Have the risk-taking activities changed since you were in high school? How?" Explain that today, teens are car surfing (standing on top of a car while another person drives), playing choking games, and attending PHARM parties (where they put a variety of prescription drugs in a bowl-collected from the family medicine cabinets, scoop them out with a medicine cup, and then swallow them).

Proceed to Slide 16, Risk-Taking. Teens are "wired" to take risks. There are many reasons for this. First, it is believed that they have higher levels of dopamine than adults. Dopamine is the neurotransmitter responsible for mood and feelings of pleasure. Thrill-seeking behaviors seem to stimulate the dopamine system. Second, males take more risks than females because testosterone amplifies the dopamine rush. Third, remember

that the amygdala is in "free fall" without the balance of the pre-frontal cortex. Because of this dynamic, risky behavior seems to appeal to their emotional status. Dopamine levels seem to play a major role in addictive behaviors as well.

Read the quote by Robert Sylwester found on Slide 17, Risk-Taking Behaviors. Since the teenage brain is "wired" for taking risks, the trainer should stop and facilitate a short discussion about options for safe risk-taking activities for teenagers.

Purpose

The purpose of this activity is to allow participants an opportunity to generate a list of safe risk-taking activities for teens.

Materials

The trainer will need a white board or flipchart and a marker to record the ideas.

<u>Methodology</u>

- In a large group, the trainer should pose the following question to the group: Because the teenage brain is "wired" for taking risks, what are some safe risktaking activities for teenagers?
- 2. The trainer should record these on the white board or flipchart.

Processing

During the discussion, the trainer should again emphasize that risk taking for teenagers in a normal part of their behavior. It is important to help them understand the difference between dangerous and safe risks. By encouraging safe risk taking, there can hopefully be a happy balance.

Before leaving the subject of risky behavior in teens, go to Slide 18, Teen Driving. Review the statistics on this slide. Have a brief discussion about the need for progressive driving laws and teen driving contracts.

Illinois does not give permits until the age of 15. There are also restrictions on 16 and 17 year old drivers including nighttime restrictions, limited passengers, and no cell phone use while driving.

D. Teens and Substance Abuse

Review the bullet points on Slide 19, Teen Substance Use/Abuse. Emphasize the point that alcohol and other drugs affect the teenage brain differently than adults; in fact, the effects can be permanent because their brains are immature and more fragile. As Dr. Giedd stated in the video watched earlier, one wild binge can affect the brain for the next 80 years. Notice that the last bullet point mentions that repeated use of foreign substances can cause depression. It has already been mentioned that teens are more prone to depression because of lower levels of serotonin. It's no wonder that there are many teens suffering from depression in this country.

Slide 20 compares two brains side by side. "Which Brain Do You Want for Your Teenager?"- The brain on the right shows brain activity in a healthy 15 year old nondrinker and the brain on the left shows very little brain activity a 15 year old heavy drinker.

Teen Substance Abuse, Slide 21, describes more harmful effects of foreign substances on the teenage brain. Note: White matter in the brain comprises one-half of the brain. It has a myelin coat and is responsible for sending signals from one part of the brain to the next, analogous to cables on a computer. Abnormal white matter formation can cause diseases such as schizophrenia, autism, bipolar disorder and ADHD. What is most critical to note on this slide is the last bullet point: Abuse of any substance in the teenage brain can permanently wire the brain to need an increasing amount of the substance in order to function. See quote on next slide, <u>Slide 22</u>, from Dr. Amen who supports this statement.

At this time, take about a 7-10 minute break.

BREAK

E. Teen Judgment

This next portion of training of training deals with teen judgment...or lack thereof. Go to Slide 23, Judgment. Ask the participants this question: "How many of you know teenagers who show good judgment?" It's rare because their pre-frontal cortex (PFC), the part of the brain responsible for logical, rational decision-making, is the one of Revised November 20 2008 the last parts of the brain to mature. The PFC is analogous to the brakes on the car, and the amygdala serves to act like the fuel injection system. The teen brain is like a race car speeding down the highway without brakes! The anterior cingulate, a brain part in the cortex that has yet to be discussed, is in charge of error detection and reward-based learning. This part of the brain is under-developed as well, making it difficult for teenagers to solve problems. Teens can make good decisions if guided by an adult. This can be done by clearly mapping out choices and both the positive and negative consequences for each choice.

The next slide, Slide 24, is a cartoon that illustrates a point. This Zits cartoon was included to illustrate how teens have a hard time understanding cause and effect. It also shows how teenagers seem to spend a lot of time blaming others for the consequences of their behavior.

F. The Need for Sleep during the Teen Years

The next topic of discussion is the need for sleep for teens. Proceed to Slide 25, entitled Why Do Teens Go to Bed Late and Like to Sleep in? Read the proceeding question to the group and then ask: **"It is because teens are lazy?"** The answer is **NO**. A teenager's biological clock changes as his brain matures. Go to Slide 26 entitled Sleep. Dr. Mary Carskadon has done extensive research on circadian rhythms in teenage brains. She says that they are not chemically ready to go to sleep until around 11 pm and not chemically ready to wake up until 8 or 9 am. Researchers recommend that teens get at least 9 hours of sleep a night. Statistics from the National Sleep Foundation show that teens are not getting nearly enough sleep. Only 15% reported getting even 8 ½ hours of sleep on school nights. Ask the group this question: **"How do you act when you are sleep-deprived?"** Typical responses will be aggressive, irritable, cranky, etc. Note: Serious sleep deprivation is another reason why teens act the way they do.

Review the bullet points on Slide 27, Effects of Sleep Deprivation. Point out that driving while **drowsy** is as serious as driving while drunk. When you drive sleep-deprived, you are as impaired as driving with a blood-alcohol content of .08%, which is illegal for drivers in some states. Ask the group this question: **Is .08% blood alcohol content illegal in Arkansas?**" The answer is YES. Besides affecting memory, learning, and concentration, lack of sleep makes teens more prone to acne and illness. Lack of sleep also affects eating patterns, heightens the effects of alcohol, and increases use of

caffeine and nicotine. Ask the audience this question: "What can adults do to ensure that teenagers are getting adequate amounts of sleep?" Their list may include suggestions like: turn off electronics early in the evening, encourage them to have regular bedtime routines which might include taking a shower, reading a book, etc. In the morning, adding more light to the room can help them wake up. Later school starts could help as well. See next slide, Slide 28, for some other sleeping tips for teens from the National Sleep Foundation.

G. Brain Check

Ask participants to participate in the following activity on Slide 29, Brain Check.

<u>Purpose</u>

The purpose of this activity is to allow participants both an opportunity to get to know each other and to think about how they can apply what they have learned thus far to their work with teenagers.

Materials

There are no materials needed for this particular activity, unless participants would like to take their participant manuals along with them to take notes on page 11.

<u>Methodology</u>

- 1. Have the participants stand up, find a person across the room that they do not know, and go introduce themselves.
- 2. Then instruct them to talk to their partner about what they have learned since the last break. Also, have them share how this information might apply to their work with teenagers.
- 3. Allow about five minutes for everyone to share with their partners before calling time.

Processing

As with the previous Brain Check activity, there will not be a formal discussion with the larger group at this time either. Again, allowing participants to verbalize what they have

learned so far in the workshop with a partner will help them understand how they can put to use what they are learning.

H. Communicating with Teens

This next part of the training will focus on how teens communicate and how to better communicate with them. Begin with Slide 30, Mixed Signals. Ask the group this question: "Who thinks it is easy to communicate with teenagers?" You will probably not see many hands going up. This is because teens do not have the capacity to read facial signals like adults can, so teens will often misinterpret comments or overreact to statements made by adults. Explain to the group that teenagers use the amygdala (emotional center) when reading facial signals while instead, adults use the pre-frontal cortex (logical center). Since non-verbal communication comprises 55% of total communication, the implications for this are significant. Show the next slide, Slide 31, to illustrate this point.

After brining up Slide 31, Mixed Signals (Face), ask the group this question: "What emotion do you see on this face?" Most adults will say FEAR. When teens were asked the same question, they responded with words like shock, confusion, sadness. For more information on this research, participants (or the trainer) may wish to look up Dr. Yurgelun-Todd's research at McLean Hospital. Show the next slide for a good visual of what's happening in both adult and teen brains while identifying emotions.

Go to, Slide 32, Identifying Emotions and explain to the audience that the area highlighted in the teen brain is the mid-brain, where the amygdala is located. This part of the brain is used by teens to read facial signals. In the adult brain, the area used to interpret facial signals is located in the frontal cortex. The learning point is this: Expect teens to misread your facial signals! Simple awareness of this fact can prevent miscommunication with teenagers. The next slide, Slide 33, which is another ZITS cartoon, illustrates how teens and adults can "fly at different altitudes" when it comes to perceptions related to communication.

Proceed to Slide 34, Talking to the Teenage Brain. This slide gives tips for talking to teenagers. The bullet points are self-explanatory.

SECTION III: Conclusion

Time: 20 minutes (11:40 – 12:00)

Objectives: Participants will

- > Understand ways to apply the techniques discussed today.
- Have an opportunity to discuss strategies for sharing the information they learned with teenagers.
- Learn about additional resources for dealing with adolescents and for parenting teenagers.

Materials:

Participant Manuals

A. Applying the Information Learned

The next two slides, Slides 35-36, summarize tips for working with teenagers. The trainer may want to use these two slides to "test" the group's knowledge of the points made throughout the workshop. For example, with the first bullet point, the trainer can ask: "Why are teenagers big risk-takers?" The answer is that they have an increased amount of dopamine in their brains plus testosterone in males magnifies the dopamine rush. Bullet point number two: "Why do teens think with their emotions?" The answer is that the amygdala is in "hyper-drive" and unchecked by the rational pre-frontal cortex. On the second application slide, the trainer may want to explain the difference between a manager and a consultant. In a nutshell, a manager tells people what to do and a consultant gives options. Show the final quote on Slide 37, "The love of an adolescent is held with an open hand, not a closed fist." Even though adults get very frustrated with teens and sometimes feel like hitting them, it is important to remember to look for their strengths and to show some empathy for what they are going through.

B. Discussion Questions

Conduct the following group discussion.

Purpose

The purpose of this activity is to help participants think about what they think should and should not be shared with teenagers from the workshop.

Materials

There are no required materials for this activity. However participants may choose to use their participant manuals as a reference guide.

<u>Methodology</u>

- 1. Ask the participants to get into small groups of about 3-4, depending on the size of the class.
- 2. The trainer should go to Slide 38 and bring up the two discussion questions listed:
 - a) Should you share this information with teenagers? Why or why not?
 - b) If you answered yes to the above question, share strategies for effectively sharing this information with teenagers.
- 3. Ask the small groups to answer both questions listed on Slide 38. These questions can also be found on page 14 in their participant manuals.
- 4. After about five minutes, the trainer should call time.

Processing

During the discussion, the trainer may probe the group to discover what information they would share and why. Most participants agree that SOME of the information on the teenage brain should be shared with teenagers. People usually conclude that teenagers could use this brain information as an excuse for all of their behaviors.

C. Summary

Close with the Summary of final points on Slide 39 before reading the final quote A Work in Progress on Slide 40.

Point out Slides 41-42 on references and books on parenting. Also make sure that participants are aware of the final two pages at the end of their participant manuals entitled Changes in Adolescence-Suggested Strategies on pages 16 and 17. This information gives great suggestions for dealing with teen behavior in all four of the developmental domains.

D. Conclusion

If time permits, return to the list generated by the small groups entitled "What I Want Answered in this Workshop." See if all of the questions were answered in the workshop. Conclude the presentation by thanking the audience for their participation. Make sure that training evaluations are completed before their departure and that they pick up training certificates on the way out the door.

DO YOU KNOW WHY TEENS ACT THE WAY THEY DO?

	A
	S S

- 1. Typical teenage behavior is the result of hormones, plain and simple. True X False
- 2. Teenagers are not as capable of juggling multiple tasks as adults. XTrue ____False
- 3. Our weight-obsessed culture is the sole cause of anorexia. XFalse True
- Teenagers need no more than 8 hours of sleep at night. 4. True XFalse
- The teen brain is not chemically ready for sleep until 11 p.m. or later. 5. ____False XTrue
- 6. Adults assume that teens who look older have a better grasp of the consequences than they actually do. XTrue False
- 7. The teen years are as important as the first 3 years of life in setting patterns for adult behavior. XTrue False
 - The teen brain is fully mature by about the age of 16.
- 8. XFalse True
- 9. Teens are not very adept readers of social signals even while they seem to do nothing but socialize. XTrue False
- Surges of testosterone occur in both sexes in adolescence. 10. ____ False XTrue



INSIDE THE TEENAGE BRAIN

Participant Manual

Continuing Education

3 Hours

University of Arkansas at Little Rock

INSIDE THE TEENAGE BRAIN AGENDA

I. Introduction/Objectives

II. Opening Activity

A. Quiz: Do You Know Why Teens Act the Way They Do?B. What Do I Want to Learn from This Training?

III. Teen Brain 101

A. Dr. Giedd Video from YouTube

IV. Current Research/Application

V. Discussion

- A. Strategies for Sharing this Information with Teenagers
- B. Changes in Adolescence-Suggested Strategies

VI. Closing Activity

CLASS OBJECTIVES: Participants will

- Understand current research on adolescent brain development.
- Discuss and understand strategies for dealing with challenging teenage behaviors.
- Discuss methods for effectively sharing information with teenagers.



Slide 2



teenagers, always remember to look at what is *strong* with them, not what is wrong with them."

Slide 3



- Spokesperson/Recorder
- □10-15 minutes

Revised November 20, 2008



Slide 5

The Teen Brain 101

- The brain, not hormones, is the true source of teen behavior.
- The pre-frontal cortex of the brain is asleep at the wheel. It is not fully developed until about the age of 25.
- Teens do not appreciate consequences or weigh information like adults.
- The teen brain has uneven development (sprouts/prunes).

Slide 6

N National Geographic (Mar '05)

he executive brain doesn't hit adult levels until the age of 25, "says Jay Giedd of the NIMH, one of the lead scientists on the neuroimaging studies.

studies. "At puberty, you have adult passions, sex drive, energy, and emotion, but the reigning in doesn't happen until much later." It is no wonder perhaps that teenagers seem to lack good judgment or the ability to restrain impulses. "We can vote at 18," says Giedd, "and drive a car. But you can't rent a car until you're 25. In terms of brain anatomy, the only ones who have it right are the car rental people."



Slide 8



Prefrontal Cortex (PFC)-One of the last parts of the brain to mature. It is in charge of functions like planning, organizing, & making sound judgments. Hippocampus-Located in the mid-brain. It is the seat of memory.

<u>Amygdala</u>-Located in the mid-brain. It is the seat of emotions.

Slide 9

N Current Research-Hormones

- Sex hormones alter the brain's structure.
- Surges of testosterone causes <u>both</u> sexes to be more aggressive and irritable.
 Estrogen enlarges the hippocampus (seat of memory) more in girls.
- Children who have been maltreated often have <u>smaller</u> hippocampuses.
- Surges of estrogen in girls serve to strengthen their neurolinguistic pathways (biting words).



- Anticipate strong emotional reactions with no ability to name the feelings.

□ Alcohol serves to calm the overactive amygdala.

Slide 11

Impulsivity

- Serotonin is a neurotransmitter that helps with relaxation and sleep.
- Levels of serotonin <u>decline</u> in teenagers, making them more likely to act impulsively.
- Girls with anorexia have <u>higher</u> than average levels of serotonin (anxious/perfection).
- Girls with bulimia have <u>lower</u> than average levels of serotonin (prone to depression).
- Starving/bingeing behaviors help to <u>self-regulate</u> serotonin levels.





Slide 14







Slide 17



"It should come as no surprise to discover that the *how-to-do-it* capabilities mature before the *whether-to-do-it* capabilities. Therefore, many adolescents can successfully do things that they shouldn't."

Robert Sylwester The Adolescent Brain: Reaching for Autonom





When repeatedly using foreign substances to bring on dopamine surge, the body "down-regulates" its normal production. (Result = Depression)

Slide 20



Slide 21

Teen Substance Abuse

- Alcohol and marijuana impair growth of the hippocampus.
- Alcohol and nicotine affect the development of white matter in the brain.
- White matter in the brain. 1 Tobacco causes greater impairment of working memory in teens than in adults. Nicotine interferes with concentration, attentiveness, and causes hearing problems. *Abuse of any substance during adolescence can permanently wire the brain to need an increasing amount of that substance to function.



"Underage drinking can PROGRAM the brain for alcoholism."

Dr. Daniel Amen, neuroscientist and psychiatrist from Southern California

Slide 23



- The amygdala is fully functioning (fuel injector).
 "The teen brain is like a race car without brakes."
 The teen brain has yet to develop full capacity for consequential thought. It can't quite generate options for decision- making.
 Without a fully functioning PFC, there is little "common sense" feedback to indicate that an activity might be dangerous.





Slide 26



- mature. Most teen brains are not chemically ready for sleep until <u>11 p.m.</u> and are not ready to wake until <u>8 or 9 a.m.</u> Teens need at least 9 hours & 15 minutes of sleep daily. Only 15% reported getting 8 ½ hours of sleep on school nights. Most experts advise against computer use before bedtime, because a bright computer screen is believed to affect biological rhythms.

Slide 27

Effects of Sleep Deprivation

- Lack of sleep affects memory, concentration, and hearing. Increases aggression.
 Drowsy driving is as dangerous as drunk driving: When you drive sleep-deprived, you are as impaired as driving with a blood alcohol content of .08%, which is illegal for drivers in some states.
- Makes teens more prone to acne and illness.
- Affects eating patterns, heightens effects of alcohol, and increases use of caffeine/nicotine.

Sleeping Tips for Teens

- $\hfill\square$ Organize life for sleep. Make it a priority. □ Naps can help. Not too close to bedtime. Create the right space: cool, quiet, dark. You can't "fake wake". Avoid caffeine pills and drinks, alcohol, and nicotine.
- Keep a consistent routine and maintain a bedtime ritual (shower/book).
 - Avoid stimulation= Electronics/Exercise National Sleep Foundation

Slide 29



- Share <u>another</u> thing you have learned since the last "brain check."

- Share how you might <u>apply</u> this information to a teen with whom you are working.



- the logical center of their brains.
- □ To adults, teens' reactions to social
- situations may appear confusing, baffling, and inappropriate.



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Talking to the Teenage Brain

- Teens have trouble regulating their emotions because of their amygdala. Respond with softness and empathy. Look for the feelings behind the behaviors.
- Don't argue with them. Use this line: "I love you too much to argue."
 Understand their confusion. Discuss choices and consequences. Let them experience the consequences of their decisions: "I will honor your choice and allow you to earn this consequence."
- Do not talk to them about important things until NOON!

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- Expect teens to be impulsive. Guide
- them in their decision-making.
- Don't assume that they can read social signals.
- Discuss the consequences of drugs & alcohol on their fragile brains.





"The love of an adolescent is held with an open hand, not a closed fist."

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Discussion Questions

Should you share this information with teenagers? Why or why not?

□ If you answered yes to the above question, discuss strategies for effectively sharing this information with teenagers.

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Summary

- The true source of teen behavior is the brain, not hormones.
- The teen brain has not completely matured until the mid-20's.
- Teens are creating their own brains by the experiences they choose.

What impact can we adults have on how teenage brains are hardwired?



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References

- The Primal Teen: What the New Discoveries About the Teenage Brain Tell Us About Our Kids, Barbara Strauch, 2003 Secrets of the Teenage Brain, Sheryl Feinstein, 2004
- 2004 Why Do They Act That Way? A Survival Guide to the Adolescent Brain, David Walsh, 2004 □ The Adolescent Brain: A Work in Progress, "J. Giedd et al, 2005 Parenting the Teenage Brain: Understanding a Work in Progress, Sheryl Feinstein, 2007 PBS website: Teenage brain

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A Good Books on Parenting

- <u>Teen-Proofing</u>, John Rosemond, 2001
 <u>Get Out of My Life, But First Could You</u>
- Drive Me and Cheryl to the Mall? Anthony E. Wolf, 2002 □ Teen Tips: A Practical Survival Guide for Parents with Kids 11-19, Tom McMahon, 2003
- Parenting Teens With Love and Logic, Foster Cline and Jim Fay, 2006

CHANGES IN ADOLESCENCE – SUGGESTED STRATEGIES

EMOTIONAL CHANGES	SUGGESTED STRATEGIES
Mood Fluctuations	Understand link between emotions & physical changes Be consistent with discipline Expect back talk, bossiness within limits Expect adult advice to be rejected
Changes in Alliances	Understand importance of peer acceptance Maintain a stable home environment
Concern About Self	Stress teen's positive qualities Help find activities he/she does well Listen sensitively to fears
Idealism	Help teen understand everyone makes mistakes Help teen set realistic goals
SOCIAL CHANGES	SUGGESTED STRATEGIES
Allegiance to Peers	Realize family will be rejected Try to accept friendships Discuss drug and alcohol abuse Allow social activities in the home Support school-related social activities Expect new looks, new friends, often
Interest in Sex	Discuss normal behavior Try to put sex into perspective
Desire for Independence	Expect rebellion within limits Understand need for privacy Be tolerant of one-syllable responses

PHYSICAL CHANGES	SUGGESTED STRATEGIES
Rapid Growth	Believe complaints about aching bones, muscles Allow time for stretching Be tolerant of fidgeting
Sexual Development	Respect need for privacy Provide information about changes Provide products for hygiene, grooming Provide time to talk/listen
Hormonal Changes	Provide balanced meals and snacks Allow naps if needed
Aggressive Behavior	Encourage involvement in sports, community Channel aggression into physical work
INTELLECTUAL CHANGES	SUGGESTED STRATEGIES
Brain Growth	Expect fluctuations in grades Break large tasks into smaller ones Expect short attention span
Intellectual Maturing	Expect both childlike and adult thought patterns Encourage reflection, value discussion Include teen in family decision-making Promote career exploration
Identity Concerns	Accept teen's thoughts as important Spend time on individual basis Recognize accomplishments

DO YOU KNOW WHY TEENS ACT THE WAY THEY DO?

1.	Typical teenage beha True	vior is the result of hormones, False	plain and simple.

- 2. Teenagers are not as capable of juggling multiple tasks as adults. ______True ______False
- 4. Teenagers need no more than 8 hours of sleep at night. _____True _____False
- Adults assume that teens who look older have a better grasp of the consequences than they actually do.
 _____True
- The teen years are as important as the first 3 years of life in setting patterns for adult behavior. True
 False
- 8. The teen brain is fully mature by about the age of 16. True False
- Teens are not very adept readers of social signals even while they seem to do nothing but socialize. True
 False
- 10. Surges of testosterone occur in both sexes in adolescence. ______True _____False