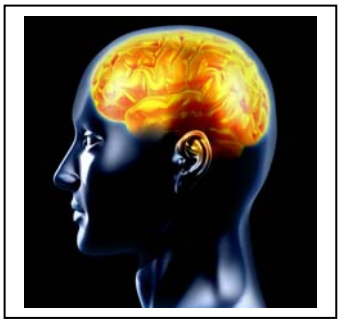

INTERNET SAFETY CONFERENCE

Further Studies on BRAIN DEVELOPMENT

Presenter: Karen Williams

"No exploration of outer-space can rival the marvels of our inner-space. We are our own 'final frontier' and our own explorers. Now, research makes it possible for everyone to make the journey."

The following provides an overview of recent research on adolescent brain development and the special risks and vulnerabilities associated with adolescence.

BRAIN DEVELOPMENT:

The first ever longitudinal study of healthy brain development was released in 2004 by the National Institutes of Health. Conducted by Drs. Jay Giedd (NIH) and Paul Thompson (UCLA), it showed that the healthy human brain continues to develop well into our middle 20's, with the development pace slowing significantly at about age 25 or so.

EASY TO CHANGE & AT INCREASED RISK: Our brain never stops changing; however, there are times when it is more "plastic" – easier to change. These periods of "plasticity" allow the healthy brain to "download" new capacities, skills, and abilities in different regions of the brain at an extremely rapid pace during concentrated periods of time. During adolescence, the parts of the brain devoted to reasoning, learning and memory are highly plastic and undergo major reorganization. The rapid pace of brain activity during adolescence makes the brain more vulnerable to neural interruptions and disturbances such as those created by substance abuse, prolonged distress, and traumatic brain injury. The study also showed that the parts of the brain involved in risk management and judgment are still significantly underdeveloped even at age 20. Given the additional exposure to risks associated with new technologies, this information has strong implications for additional internet protections for teens. Finally, the study's findings are currently influencing discussions about trying youth as adults and about sentencing youth to death for crimes that do not involve a death.

NOT ROAD READY: The results of this study also showed that the parts of our brain involved in driving - such as risk management, processing the speed of oncoming vehicles, locating own vehicle in relationship to the road & others, and making critical judgments quickly - do not mature until around age 18 or so, which has influenced the expansion of graduated drivers license laws.

The study is available at: http://www.loni.ucla.edu/~thompson/DEVEL/PR.html

BRAIN INJURY:

MILD TRAUMATIC BRAIN INJURY – CONCUSSIONS: Also in 2004, a landmark study revealed that the impact of concussions on adolescents is *different and greater* than the impact of concussions on mature adults (Micky Collins and Mark Lovell, University of Pittsburgh Medical Center, 2004).

PROLONGED STRESS:

Prolonged traumatic stress (such as the distress of recurrent/ongoing neglect and abuse) produces high levels of cortisol (body's natural steriod) which can shrink the hippocampus, resulting in learning and memory deficits in youth (Victor Carrion, Stanford University, 2007).

SUBSTANCE ABUSE:

- Because the adolescent brain is not fully mature, alcohol and other psychoactive substances treat it *differently* than they treat the mature brain (over 25). Alcohol suppresses the activity of the hippocampus in the adolescent brain, interfering with learning & memory of NEW tasks (definition of development), an effect which is not present in the mature brain. Alcohol impairs learning in 21-24 year olds much more than in those just a few years older at 25-29. It takes twice to three times the amount of alcohol to produce the same level of impairment in the mature brain (Scott Swartzwelder & Aaron White, Duke, 2000). Research available to www.niaaa.nih.gov .

- The brains of teens who engage in the heavy use of alcohol, i.e., binge drinking (as defined by Monitoring the Future) are *different* from the brains of teens who don't use alcohol. The brains of teens who get drunk have less neural activity & function when attempting NEW tasks (definition of development) than those who do not drink - and this impairment lasts for an extended period after alcohol has left the body – up to several months. In addition, teens who get drunk frequently respond to visual ads for alcoholic beverages *differently* than teens who do not use alcohol (Susan Tapert and Sandra Brown, UCSD, 2000, 2004, 2005). Research and slides are available at www.niaaa.nih.gov .

- The hippocampus (the area involved in long term memory and learning) is significantly smaller (up to 10% smaller) in adolescents who get drunk frequently. Teens with less brain activity and function don't lose what they have already learned; they have trouble learning and remembering NEW skills and information (the definition of development); that's why the damage doesn't show up right away (Beers and DeBellis, 2002).

- Multiple studies have shown that alcohol impairs the structure and function of neurons in the pre-frontal cortex, the part of the brain devoted to reasoning and self-control, which is supposed to be undergoing massive new development during adolescence. The latest study helps identify the mechanism behind the loss of neural activity (Woodward and Weitliuf, Charleston ARC, 2008).

- A significant number of teens are missing a vital "warning system." Large numbers of teens cannot tell how intoxicated they are – they don't experience sleepiness - so they keep drinking, creating significant harm to their brains. Persons under 25 can overdose easier than persons over 25; the lack of symptoms of drunkenness means that they don't know they are in trouble until they can no longer ask for help (Swartzwelder & White, Duke, 2000).

- Energy drinks - mixed or used with alcohol - mask the symptoms of drunkenness, increasing the risk for alcohol poisoning (Mary Claire O'Brien, Wake Forest University School of Medicine, 2007).

- Based on over 30 years of research showing that the risk for addiction plummets after age 21, the National Institute of Drug Abuse (NIDA) has declared addiction to be an "adolescent brain disease." Prolonged exposure to psychoactive substances during the developmental years (under 25) places young people at up to five (5) times greater risk for addiction than persons over 25. A family history of addiction increases the risks exponentially (Nora Volkow, NIDA, 2007).

Presentation underwritten by Rainbow Days, Inc., which provides behavioral health protection services to children living in high-risk situations, such as: being homeless; experiencing family violence; having parents or siblings with AIDS; having parents or siblings in the juvenile/criminal justice system; having substance abusing or addicted parents; awaiting or being in foster care; living in extreme poverty. Learn more at: www.rdikids.org