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THINKING CRITICALLY ABOUT RESEARCH

TITLE OF ARTICLE: _____

DATE OF ARTICLE: _____

AUTHOR: _____

DOCUMENT INFORMATION:

1. According to researchers, what happens to the teenage brain during (and even after) marijuana use?
2. Why do you think this article was written? What evidence in the document helps you know why it was written? (Please quote the article.)
3. What alternatives were given in the article to smoking marijuana?
4. Write a question to the author that is left unanswered by the article.
5. What is your opinion of the article? Explain.

Name _____

Heavy Marijuana Use Alters Teenage Brain Structure

Daily marijuana use changes teenage brain structure and impairs memory function.

Published on March 30, 2014 by Christopher Bergland in *The Athlete's Way*

Article taken from www.psychologytoday.com

It's common sense that being a heavy cannabis user might make someone more spaced-out and less likely to perform well on memory tasks. Excessive chronic use of any type of drug is going to have detrimental mental and physical side effects.

In a study published in December 2013, researchers at Northwestern Medicine discovered that the developing teenage brain may be particularly vulnerable to excessive marijuana use. The researchers found that teens who smoked marijuana daily for about three years had abnormal changes in their brain structures related to working memory and performed poorly on memory tasks.

In an alarming twist, the study found abnormalities in brain structure and also identified memory problems two years *after* the heavy marijuana users had stopped smoking pot as teenagers. The researchers found that memory-related structures in their brains appeared to shrink and collapse inward, reflecting a possible decrease in neuron volume. These findings indicate that there could be long-term detriments of chronic marijuana use as a teenager.

Cannabis use has long been associated with working memory impairments. However, the exact relationship between cannabis use and working memory neural circuitry remains somewhat of a mystery.

Previous research has found that prolonged cannabis use is detrimental to mental health. This Northwestern study is the first to target key brain regions in the deep subcortical gray matter of heavy marijuana smokers using structural MRI and to correlate abnormalities in these regions with working memory.

The Northwestern team examined whether a cannabis use disorder (CUD) was associated with differences in brain structure between control subjects with and without a CUD. The study reports that the younger the individuals were when they started chronically using marijuana, the more abnormally their brain regions were structured. The findings suggest that the brain regions related to memory may be more susceptible to the effects of cannabis if abuse starts at an earlier age.

Conclusion: Endocannabinoids and "Just Say No 2.0"

Some people consider marijuana to be a harmless drug when used in moderation. Some doctors believe that cannabis has a wide range of medicinal benefits. That said, this Northwestern study suggests that excessive use of marijuana can alter a teenager's brain development. As parents and caregivers, this study serves as a reminder that it's important that we strive to keep our children from heavily abusing marijuana.

What can we do to stop teenagers from developing a cannabis use disorder? I know there are no easy answers. But as I zealot for the power of daily lifestyle habits to improve brain function, health, happiness... it is worth noting that aerobic exercise releases endocannabinoids which have excellent stress-reducing benefits for a teenager who may be smoking marijuana to self-medicate for anxiety.

In my book, *The Athlete's Way* I write extensively about the power of endocannabinoids and other neurochemicals to create the runner's high and state of calmness. Our body naturally makes a wide range of substances endogenously that have receptors throughout the brain which are hijacked by 'exogenous' drugs. Endo- means "from within." Endocannabinoids are your body's own cannabis, endorphins are your body's own morphine, etc.

Also, other daily habits like: maintaining a strong social network, playing a musical instrument, making art, certain types of video gaming, mindfulness training and meditation have all been shown to change brain structure in positive ways that actually improve working memory and fluid intelligence.

Physical activity and meditation are not a panacea for substance abuse or addiction. However, I believe that if we can get more teenagers rigorously working out their bodies and minds most days of the week—and realizing how great breaking a sweat and meditation makes them feel—many would get in the habit of seeking a daily "runner's high" or zen-like state of calm instead of developing a cannabis use disorder.

BERRY - PSYCHOLOGY 1st PERIOD OFF SITE LEARNING PACKET DAY 3

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