



THE GROWING MIND

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POT AND THE TEENAGE BRAIN

Should we be worried about the effects of marijuana on developing minds?

In a word, yes.

How many cigarettes do you need to smoke before it becomes likely you will contract some form of cancer? No researcher can answer this question, as it can't be quantified. But we don't really need an exact answer. We know that smoking is the leading cause of death by cancer. We know that if we choose to smoke, we take some serious health risks.

So how about this question: how much marijuana do you need to smoke before experiencing adverse physical or mental effects? This is also a

question no researcher can precisely answer. But it is one worth asking, especially when the "you" in question is a teenager rather than an adult.

We are headed toward a world where those of us at age 19 and older can purchase cannabis from government-run retail outlets. This change may be individually celebrated or censured. But it is worth asking whether it will become easier for underage teens to access marijuana, akin to the ease with which many can acquire alcohol.

Should we be worried about the prospect of increased underage consumption of cannabis?

(continued on page 16)

(continued from page 15)

The short answer is yes – and so is the long answer. The teen brain does not mix well with alcohol or drugs. It's not the same as an adult brain. The effects of intoxication are more severe and can have serious long-lasting neurological consequences for younger users.

And here's another part of the story that makes all of this more complicated: the teen brain doesn't become an adult brain until about 25 years of age.

THE TEEN BRAIN

It's a bit inaccurate to talk about “the teen brain” when what we really mean is “the developing brain.” Recent findings indicate that the human brain is not mature until about the mid-20s. So essentially, the teen brain is in place (and in charge) from early adolescence until after completing a post-secondary program. This is a time of tremendous growth and change in the brain as well as great sensitivity to experience and input.

What is the brain up to? The areas associated with thinking and emotional regulation are under construction. Specifically, the pre-frontal cortex is still developing. This is an area behind the forehead associated with



planning, prioritizing, problem-solving, self-evaluation, emotional control, maintaining attention and risk assessment. If your teen struggles to plan their time well or keep their emotional cool in the face of fairly mild stresses, their not-fully-formed pre-frontal cortex is partly to blame.

Immaturity in this region of the brain explains why teens can make impulsive decisions or engage in unsafe activities without much thought. They are not great at assessing risk, in part because they have difficulty seeing ahead to possible consequences of their decisions. Plus, of course, their social group is of great importance to them. Social

NOT YOUR TEEN?

Canadian teens have the highest rate of cannabis use in the developed world. According to a United Nations study, 28% of Canadian children aged 11-15 admitted to using cannabis at least once in the past year. According to the Canadian Centre on Substance Abuse, as many as 5% of Canadian adolescents and 10% of Grade 12 students smoke pot every day.

belonging plays a role in decision making more at this age than it may ever again.

And to reiterate – “at this age” means the ten-year stretch from early adolescence until the mid-20s.

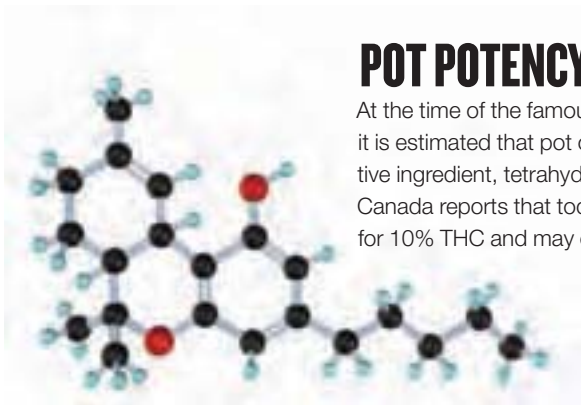
THE INFLUENCE OF MARIJUANA

There are lots of ways to help shape a teen brain so that it becomes the healthiest possible adult version of itself: a nourishing diet, an enriched environment full of interesting challenges and activities, regular exercise, plenty of sleep, positive mentors and relationships, and strategies to reduce stress, to name a few. The absence of any of these health enhancers has an adverse effect on brain development – as do the presence of outright damaging influences. Drinking or taking drugs to the point of intoxication are some of those damaging influences.

To put it simply: the longer a teen delays the use of alcohol or marijuana, the better. A 2017 Université de Montréal study concluded that kids who started using marijuana at 14 years of age (Grade 9) experienced more learning and problem-solving deficits than those who started at 17 years old (Grade



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POT POTENCY

At the time of the famous Woodstock Festival in 1969, it is estimated that pot contained 1% of its psychoactive ingredient, tetrahydrocannabinol (THC). Health Canada reports that today's marijuana typically tests for 10% THC and may contain as much as 30%.

11). Not that starting at age 17 or older is without risk, just that the younger a person starts, the more serious the deficits.

A 2017 study released by Concordia University looked at the effects of regular marijuana use on physical and mental health, focusing on the age of first use. Here is a summary: "In terms of overall effects, the study confirmed that marijuana does affect people's physical and mental health, that it will cause cognitive impairment, memory loss, diminished IQ, limited educational success and likelihood for developing mental illness. Physically, early users also suffer higher rates of respiratory diseases and certain cancers." The study confirmed that a younger start leads to worse outcomes.

To be clear, research on the effects of marijuana on the brain is in its early stages compared to other long-term research areas, such as the effects of smoking or alcohol abuse. At this point, it is difficult to establish cause-effect outcomes and easier to point to correlations.

However, there are some peer-reviewed studies with conclusions worth considering. A few are summarized below.

- Adolescent marijuana users aged 16-18 showed slower mental processing and

poorer verbal learning and memory than non-users.

- Users aged 15-19 who then became abstinent improved in learning and memory but maintained lower attention abilities.
- Users aged 20-24 experienced memory deficits with improvements in memory only after eight years of abstinence.
- Users aged 13-24 performed worse on measures of immediate and delayed verbal memory compared to community controls.
- Users aged 16-20 performed worse on learning and recall than control groups, with poorer performance related to severity, frequency and age of first use.
- Users who started prior to age 15 demonstrated poorer cognitive performance on tasks of sustained attention, impulse control and executive functioning compared to older users.

As summed up by two University of California researchers reviewing the findings: "Overall, the majority of data support poorer cognitive performance on measures of attention and learning, and memory in adolescent users of cannabis; however, frequency and severity of use is likely to play a role, particularly in those reporting younger age of initiation."

Excerpts from
the revised 2017-2018
CDS Code of Conduct

DRUGS, ALCOHOL, VAPING AND TOBACCO

The Country Day School is deeply committed to ensuring that all school events and the School itself are free from the influence of harmful substances such as alcohol, tobacco, vaping and illicit drugs. It is the School's belief that the presence of these products undermines the fabric of the School and promotes an atmosphere of harm and conflict. The use of these substances can seriously inhibit learning. Brain science has firmly established that the young brain can suffer irreparable damage when exposed to intoxicants during adolescence.

In any case that a student is under the influence or in possession of intoxicants, alcohol, vaping materials or tobacco while at school or a school event, a Director will investigate and address the situation with the student. For alcohol, vaping and tobacco related offences, students typically face a suspension from school, but may be expelled. For drug-related offences (including marijuana in any amount), students will automatically face a disciplinary hearing, and if it is determined that they were involved in a drug-related offence, may be expelled from school.

Behaviour at The Country Day School is bound by the four corners of the enrolment contract which explicitly cites that students will be bound to our Code of Conduct or risk continuance at the School.

We will endeavour to make the information in this article, as well as the continued prohibition of marijuana, clear to our students in the coming months.

John Liggett, Head of School

WHAT ABOUT MENTAL HEALTH?

As mentioned above, it's early days for many aspects of marijuana research. This means that some study results have not yet been reliably replicated (proven a second time). However, there are enough studies that link marijuana use to psychiatric disorders, depression and anxiety – as well as to substance abuse, such as alcoholism or addiction to other drugs – to raise concerns.

The Royal College of Psychiatrists in the United Kingdom and the US National Institute on Drug Abuse have determined that there is sufficient evidence linking early cannabis use and later mental health problems in those with a genetic vulnerability. The link is particularly notable when marijuana is first used in adolescence.

In one study, adolescents who used cannabis regularly (in some cases, daily) were five times more likely to develop depression and anxiety later in life. Younger users also have a higher than average risk

of developing schizophrenia or bipolar disorder. The more cannabis used, and the younger the exposure, the greater the risk. The Royal College notes that, because the teenage brain is streamlining its systems so it can become more efficient and reliable, any substance that interferes with this process has the potential to produce long-term psychological effects.

One last note about mental health: yes, cannabis is an addictive substance. A person develops a tolerance with consumption, requiring more and more of the drug to produce the same effect. Cannabis cessation after regular use also has withdrawal symptoms, such as decreased appetite, sleep difficulties, irritability and restlessness. These symptoms are similar in discomfort to withdrawing from tobacco.

The American Psychological Association (APA) has found that 9% of adults who use cannabis become addicted, whereas 17% of those who start smoking in their teens become addicted. Again, the research shows that teens are more vulnerable than adults to the harmful effects of marijuana.

PERCEPTION OF RISK

The APA notes that when perceptions of marijuana's risks drop, its use rises almost immediately. In 2014, less than 40% of high school seniors in the US believed that regular marijuana use was risky. And yet many of the risks can be found in the research, even with the caveat that more studies are needed to deepen our understanding.

Staci Gruber, director of the Marijuana Investigations for Neuroscientific Discovery (MIND) program at Harvard Medical School, says that social change in drug policy and attitudes is outpacing scientific research. She also says that there is good reason to think that adolescents are uniquely susceptible to lasting damage from marijuana use. There is general consensus that teen use of cannabis carries a real risk of physical and neurological disorders as well as later life addiction.

Teens are smart. If they have access to good information, they are more likely to make healthy decisions. For example, smoking rates have dropped more among Canadian teens over the past decade than among adults. But adolescents likely know less about the unique features of “the teen brain” and its vulnerability to both alcohol and cannabis. They certainly know that being intoxicated creates all kinds of short-term difficulties (making good decisions, driving impaired, alcohol poisoning, and so on). But they may not understand that an intoxicated teenage brain undergoes changes that last beyond the moment and well into the future.

Parents and schools have some work to do to educate young people and protect their developing minds. Having conversations, sharing research and staying connected to our teens are good places to start. ■



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