

YOUR HEALTH

Experts warn that vaping disrupts teens' brain development (/special-sections2/sections/your-health/59848-experts-warn-that-vaping-disrupts-teens-brain-development)

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According to recent studies from agencies such as the Centers for Disease Control and Prevention, the number of teenagers using tobacco has risen nearly 40 percent since 2017. One of the driving factors in the increase is the popularity of vaping, or the smoking of e-cigarettes from brands like Juul that account for approximately 20 percent of all tobacco products used by young people.

The Centers for Disease Control and Prevention recently released its annual report on tobacco use by youth, reporting an alarming 38.3 percent increase in smoking by teenagers since its last report in 2017.

This is the first reported increase in youth smoking in several years – 1.5 million children – and is attributed to vaping, or e-cigarettes, which now account for 20.8 percent of all tobacco products used by youths.

Juul, the most commonly sold e-cigarette in the U.S., is the main culprit for the rise in youth smoking, according to the CDC. Juul presents itself as a product to help adults quit smoking; however, it has not yet been approved by the U.S. Food and Drug Administration, which has instead approved two non-nicotine-based treatments for those wanting to discontinue smoking – Chantix (varenicline tartrate) and Zyban (bupropion hydrochloride).

Juul, shaped like a USB flash drive, can be filled with liquid nicotine pods, containing as much nicotine as a packet of cigarettes. The nicotine pods

are available in various flavors, such as mango and mixed berries. Teens report using Juul inside bathrooms and classrooms in their schools.

NICOTINE AND THE TEENAGE BRAIN

The American Pediatric Association and CDC both warn against the use of nicotine products by children. The impact of nicotine on the developing brain of children and teenagers is of particular significance.

Nicotine functions as a general immune suppressant, increasing the likelihood of teens getting a viral or bacterial infection, and reducing the strength of the body's ability to recover from illness. Nicotine also disrupts sleep, which is vital for teenage growth and cell repair.

Nicotine is processed in the adrenal medulla (at the top of the kidneys) and the liver, and is able to enter the central nervous system and connect to nicotine acetylcholine receptors in the brain. Nicotine reaches the brain typically within 7-10 seconds of it entering the body, stimulating the brain's reward system almost immediately, leading to a release of adrenaline and dopamine – and setting the stage for addiction.

Nicotine stimulates a teen's still-developing prefrontal cortex, affecting thought processes and impacting the visual system. Exposure of the brain to nicotine alters the functioning of synapses in the prefrontal cortex, resulting in lasting reductions to cognitive function. Research has shown that a teen who smokes is more likely to suffer from an attention deficit disorder – which worsens the longer he or she smokes.

Nicotine has an impact on the brain's ability to make and retain memories. Brain imaging studies reveal that smoking causes neurons to die, and entire regions of the brain can become damaged – primarily the prefrontal cortex, hippocampus and thalamus. In addition, nicotine prevents the dentate gyrus from forming new brain cells. The impact on lower neuronal generation may explain why smokers typically have lower IQs than nonsmokers.

Some teens who may be trying to cope with negative feelings or emotions are typically more interested in smoking. The relationship between teens who start smoking at a young age and psychiatric disorders is unclear, but it seems as though nicotine disrupts the normal course of brain maturation, and has lasting consequences on mental health and even personality.

Research has shown that smoking during adolescence increases the risk of developing various psychiatric disorders. There is strong evidence that teens who smoke are at a greater risk of depression, and all smokers regardless of age show more depressive symptoms than nonsmokers, and depressed people have a harder time giving up smoking.

LEGISLATIVE CHANGES

The increase in vaping has become such a concern that San Francisco lawmakers are drafting legislation to prevent companies like Juul, which they accuse of “predatory practices,” from doing business in the city. San Francisco already bans the sale of youth-friendly nicotine flavors (for example, candy) for vaping devices.

It remains to be seen whether Santa Clara County will expand restrictions on the sale of e-cigarettes in light of the recent CDC report and the increasing evidence of the impact of nicotine on the developing brains and bodies of children.

Rita Hitching is a local researcher and teacher who writes on teen brain development. She aims to help teens understand themselves by using the latest neuroscience data to explain how the teen body and brain develop and publishes those explanations on her website, teenbrain.info.

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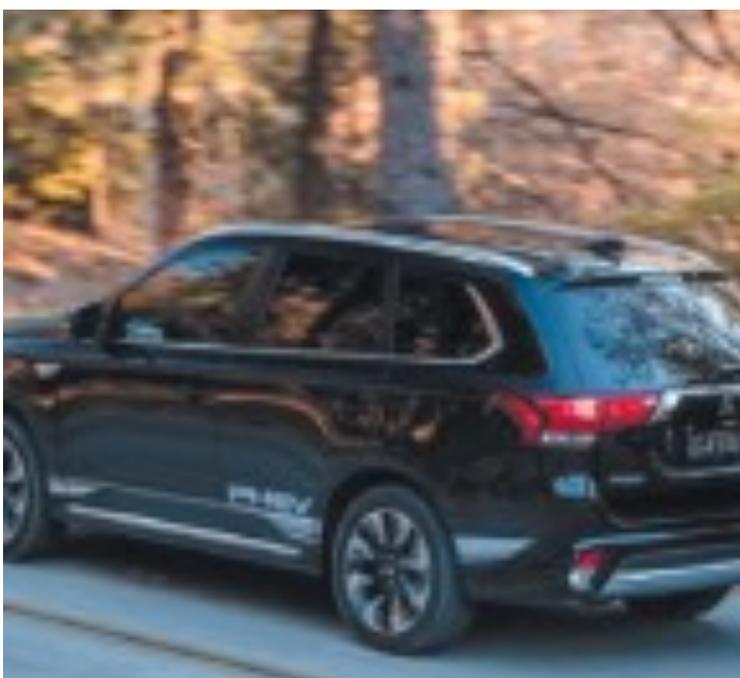
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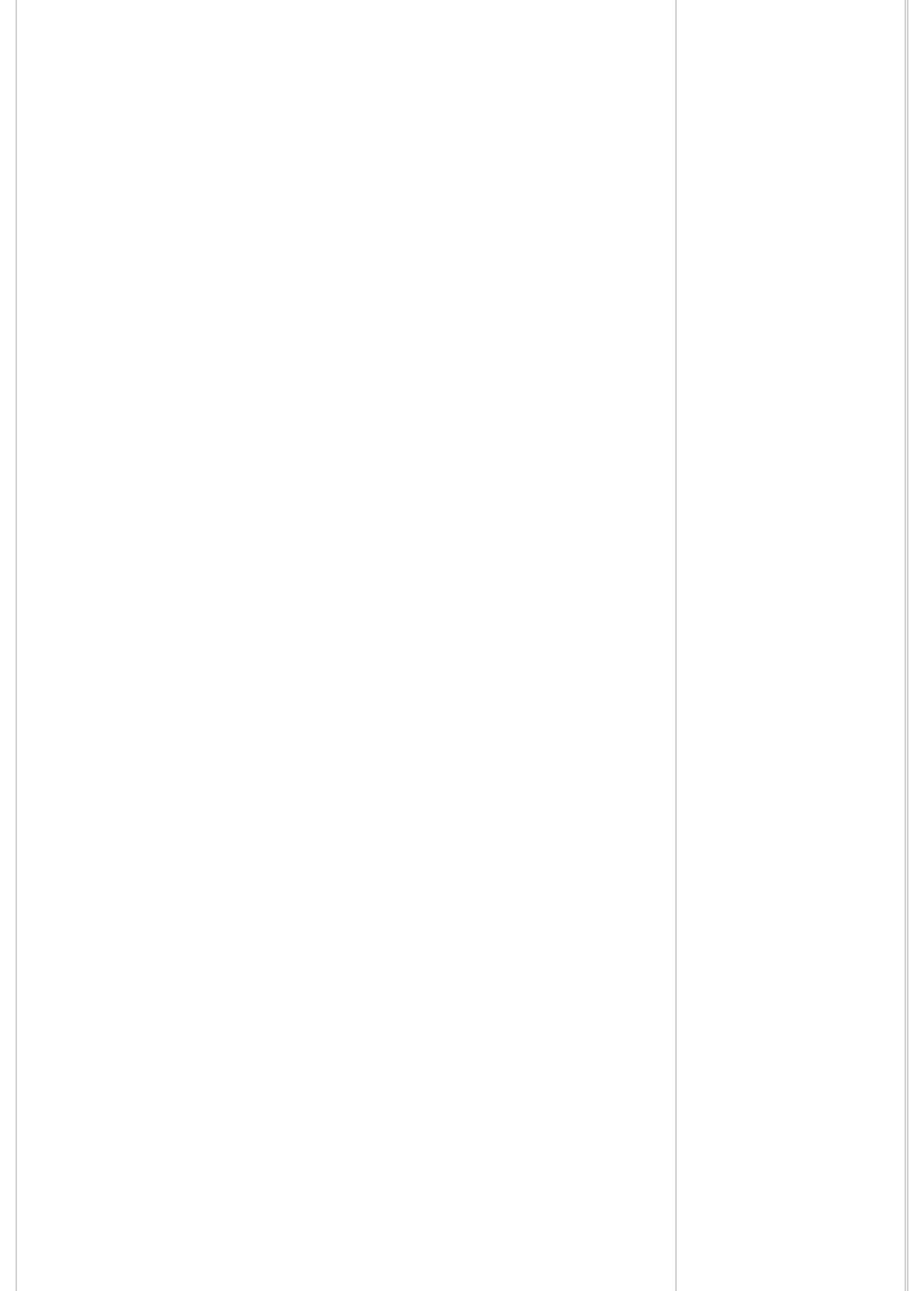
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