

GENERAL / HEALTH

School Start Times and Screen Time Late in the Evening Exacerbate Sleep Deprivation in US Teenagers

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With the school year underway around the U.S., parents and caregivers are once again faced with the age-old struggle of wrangling groggy kids out of bed in the morning. For parents of preteens and teenagers, it can be particularly challenging.

Sometimes this gets chalked up to laziness in teens. But the main reason why a healthy person is unable to naturally wake up without an alarm is that they are not getting the sleep their brain and body need.

That's because studies show that adolescents need more than nine hours of daily sleep to be physically and mentally healthy.

But the likelihood that you know a teenager who gets enough sleep is rather slim. In the U.S., less than 30% of high school students – or those in grades 9 through 12 – sleep the recommended amount, according to the Centers for Disease Control and Prevention. Among middle schoolers in grades 6-8, nearly 60% do not get enough sleep at night.

Yet my laboratory's research suggests that a much higher percentage of teens are getting too little sleep.

I am a professor of biology and have been studying sleep and circadian rhythms for more than 30 years. For the past seven years, my laboratory at the University of Washington has been doing research on sleep in Seattle-area teenagers. Our research has found that, just as in other areas of the U.S., high schoolers in Seattle are not getting the amount of sleep they need. Our study objectively measured sleep in 182 high school sophomores and seniors and found only two that slept at least nine hours at night during school days.

Our studies and those of others indicate that three important factors lie behind this lack-of-sleep epidemic: a

physiological regulation of sleep that leads to a delayed sleep timing in teens and that is not aligned with early school start times, a lack of morning exposure to daylight and excessive exposure to bright electric light and screens late in the evening.

Teen sleep biology

The time people go to bed, fall asleep and wake up is governed by two main factors in the brain. The first is a so-called "wakefulness tracker," a physiological timer that increases our need to sleep the longer we stay awake. This is in part the consequence of the accumulation of chemical signals released by neurons, such as adenosine.

Adenosine accumulates in the brain when we are awake, leading to increased sleepiness as the day wears on. If, for instance, a person wakes up at 7 a.m., these chemical signals will accumulate throughout the day until the levels are high enough that the person will fall asleep, typically in the late evening.

The second factor that drives the sleep/wake cycle is a 24-hour biological clock that tells our brain what times of the day we should be awake and what times we should be sleeping. This biological clock is located in an area of the brain called the hypothalamus. The clock is composed of neurons that coordinate the brain areas regulating sleep and wakefulness to a 24-hour sleep/wake cycle.

These two regulators operate with relative independence from each other. But under typical conditions, they are coordinated so that a person with access to electric-powered light would fall asleep in the late evening – between about 10 p.m. to 11 p.m., and wake up in the early morning, around 6 a.m. to 7 a.m.

So why do teenagers often want to go to bed later and wake up later than their parents?

It turns out that during adolescence,

both the wakefulness tracker and the biological clock conspire to delay the timing of sleep. First, adolescents can be awake until later hours before their wakefulness tracker makes them feel sleepy enough to fall sleep.

Second, the biological clock of teenagers is delayed because in some cases it appears to run at a slower pace, and because it responds differently to light cues that reset the clock daily. This combination leads to a sleep cycle that operates a couple of hours later than in an older adult – if an older adult feels the signals to fall asleep around 10 p.m. or 11 p.m., this won't happen until midnight or later in a teenager.

How school start times contribute

To help find more hours of sleep for teens, one measure that some school districts around the country have taken is to delay the school start time for middle schools and high schools. The American Academy of Pediatrics recommends that schools for this age group should not start before 8:30 a.m.. Yet the majority of high schools in the U.S start at 8 a.m. or earlier.

Based on the recommendation of sleep experts, the Seattle school district, beginning with the 2016-2017 school year, delayed middle school and high school start times by nearly an hour, from 7:50 a.m. to 8:45 a.m. In a study our team conducted after the district enacted the plan, we found that students gained 34 minutes of daily sleep – a huge gain by sleep medicine standards. In addition, student attendance and punctuality improved, and median grades went up by 4.5%.

Despite an abundance of research evidence and the advice from virtually all sleep experts in the country, most school districts are still stuck with school start times that promote chronic sleep deprivation in teenagers. The early school starts are further aggravated

by daylight saving time – when clocks are set one hour ahead in the springtime. This time shift – one that could become permanent in the U.S. in 2023 – exposes teenagers to artificially dark mornings, which exacerbates their naturally delayed sleep timing.

Teaching healthy sleep habits to teens

School start times aside, kids also need to learn the importance of healthy habits that promote sufficient sleep.

Getting bright daylight exposure, particularly during the morning, pushes our biological clock to an earlier time. This, in turn, will promote an earlier bedtime and a natural early morning wake time.

In contrast, light in the evening – including the light emitted by screens – is highly stimulating to the brain. It inhibits the production of natural signals such as melatonin, a hormone that is produced by the brain's pineal gland as the night arrives and in response to darkness. But when these cues are inhibited by artificial light in the evening, our biological clocks are delayed, promoting a later bedtime and a later morning wake time. And thus the cycle of having to rouse a sleepy, yawning teenager from bed for school begins again.

Yet few schools teach the importance of good daily routines and sleep timing, and parents and teens also do not fully appreciate their importance. Chronic sleep deprivation disrupts every physiological process in the body and has been consistently linked to disease, including depression and anxiety, obesity and addictive behavior.

Conversely, sufficient sleep not only helps to reduce physical ailments and improve mental health, but it has also been shown to be fundamental for optimal physical and mental performance. (The CONVERSATION/Sept 2022)

(BPRW) Report: Tobacco industry continuing decades-long targeting of Black communities, women, youth with menthol products

(Black PR Wire) DALLAS — The massive growth in popularity of menthol cigarettes over several decades is the result of the tobacco industry's intense and persistent targeting of Black communities, women and youth – a campaign the industry continues today with new products and marketing campaigns. These are the findings of a new research study by Stanford Research into the Impact of Tobacco Advertising (SRITA), a research unit of Stanford Medicine, and the American Heart Association, the world's leading voluntary organization focused on heart and brain health.

The report comes as the Food & Drug Administration weighs public comments on draft rules to remove menthol cigarettes and flavored cigars from the market, and as a growing number of states and localities act to stop the sale of menthol cigarettes and other flavored tobacco products. Massachusetts and 160 localities nationwide currently restrict the sale of menthol cigarettes, in addition to other flavored tobacco products. In November, California voters will consider a ballot measure to prohibit flavored tobacco products including menthol.

"This study is a compelling addition to the overwhelming evidence showing that tobacco companies directly target populations including Black communities, women and youth with menthol cigarettes, which make it easier to get hooked and are much tougher to quit than other tobacco products," said Rose Marie Robertson, M.D., FAHA, deputy chief science and medical officer of the American Heart Association and co-director of the Association's National Institutes of Health/Food and Drug Administration-funded Tobacco Center of Regulatory Science. "Nearly a century of disgraceful behavior by the tobacco companies has made clear that menthol and other flavored tobacco products threaten public health and perpetuate inequities – they should no longer be sold."

Menthol cigarettes are used by 85% of Black people who smoke and 44% of women who smoke, compared to 30% of non-Hispanic white people who smoke. More than half of teens who begin smoking start with a menthol brand. Numerous studies have shown that the cooling sensation of menthol cigarettes makes them easier to inhale deeply, which leads to a higher dose of nicotine and a stronger addiction as compared to other cigarettes.

The study finds that disproportionately high use of menthol cigarettes by Black people, women and youth, as well as others including Hispanic people (48% of Hispanic people who smoke use menthol brands), is not the result of organically evolving consumer preferences over time. Rather, it is the result of decades of high-dollar marketing campaigns explicitly targeting these populations.

day in a market dominated by categorical menthol brands such as Newport, Kool and Salem, which are joined by menthol extensions of major cigarette brands including Marlboro, Camel and Pall Mall. One measure of the tobacco industry's strong emphasis on menthol is the number of menthol variants sold in the marketplace. For example,

Marlboro cigarettes are sold in 11 menthol variants, including Black Menthol, Smooth Ice and Bold Ice; Camel sells 12 types of menthol cigarettes, including Crush Smooth and Crush Rich; and market leader Newport offers seven menthol variants, including Smooth, Boost and Boost Gold.

Tobacco companies' recent tactics: flavor bursts, additives and greenwashing. The study finds that tobacco companies have evolved their products with capsule cigarettes, which contain a sphere of flavored liquid in the filter that when squeezed produces a burst of intense flavor. Known as "crushers," "clickers," "kickers," "infusers" and "squeezers," capsules serve as a flavor booster in menthol cigarettes and are sold on the U.S. market by Camel, Marlboro, Lucky Strike, Newport and Pall Mall.

Capsules and other innovations including infusion cards, infused paper, flavor caps and flavor stones also serve as on-demand menthol additives in unflavored cigarettes. These post-market additives enable sellers to circumvent restrictions on menthol tobacco sales. Tobacco companies also attempt to sidestep sales restrictions by offering numerous menthol and mint varieties in categories including e-cigarettes, cigarillos, chewing tobacco, snus and hookah that are currently regulated differently than traditional cigarettes.

Another new industry marketing tactic is the depiction of menthol products as "organic," "additive free" or "plant based". This trend, which the study calls the "greenwashing" of menthol cigarettes, continues years of tobacco industry efforts to hide the health hazards of tobacco use to the public. A federal court in 2006 found that several major tobacco companies had violated civil racketeering laws following decades of lying to the public about the health threats of smoking.

"Our report shows that since at least the 1930s, tobacco companies have systematically preyed on targeted populations with menthol cigarette promotions intended to get more people to start smoking a product that the companies know is both harmful to health and exceedingly difficult to quit," said Robert K. Jackler, MD, principal investigator, Stanford Research into the Impact of Tobacco Advertising and Edward & Amy Sewall Professor, Stanford University School of Medicine. "By continuously rolling out new marketing campaigns and innovating their products to avoid oversight, the tobacco industry is intent on recruiting new tobacco users and

continuing to threaten public health."

A long history of industry targeting. The study is the result of exhaustive research of tobacco industry marketing and internal corporate correspondence since the 1930s, including company advertisements targeting specific consumer segments by skin color, gender and age over the course of decades. The study also includes excerpts from numerous internal company documents reflecting the industry's sophisticated marketing approaches in areas including:

- Building a menthol market in Black communities – The report examines tobacco industry efforts to sell more menthol products within Black communities by deluging urban centers with menthol cigarette advertisements on billboards, buses and subways, distributing free "starter packs" and discount coupons, and featuring prominent Black athletes and entertainers in menthol advertisements in leading Black newspapers and magazines. For example, industry documents show that Newport employees handing out samples in predominantly Black communities from a Newport van were instructed to "assertively ask people to accept samples of Newports" as part of an overall effort to "provide aggressive promotional and advertising support for the brand." A 1981 RJ Reynolds corporate document stated that "the Black segment has been identified as the Brand's Special Market priority" for its Salem brand.

- Seizing on menthol's popularity among women – The report states that when tobacco companies discovered that women were early adopters of menthol brands, they responded in kind with marketing campaigns such as Kool's "Lady, Be Cool" and Salem's "For More of a Woman," and with brands argeting women such as Virginia Slims ("You've come a long way baby"), Eve and Capri. The Eve brand, launched in 1971 by Liggett & Myers, intentionally chose both a "feminine package design" and a "truly female name," according to industry documents. Philip Morris Executive Larry Williams indicated that the name Virginia Slims, launched in 1968, was chosen because "most women like to think of themselves as slim."

- Targeting youth – Internal company documents reveal a consistent focus on attracting youth smokers since the 1920s. An internal RJ Reynolds document from September 1927 states "School days are here. And that means BIG TOBACCO BUSINESS for somebody. Let's get it. And start after it RIGHT NOW." In other internal correspondence, companies adopted acronyms such as "YAS" (Young Adult Smokers) and "FUBYAS" (First Usual Brand Younger Adult Smokers), referring to the targets of their youth ori-

ented advertising campaigns. Lorillard's 1984 promotion plan for Newport noted that: "Newport's franchise represents the youngest demographic profile in the industry. This profile is enviable in terms of it being an 'in' brand, as well as insuring future viability as long as these smokers stay within the Newport

franchise." The patently youth-targeted "Alive with Pleasure" campaign established Newport as a dominant youth starter brand, the best-selling menthol brand, and the second best-selling cigarette in the U.S. after Marlboro. Internal Newport documents reflect that a primary market for Newport cigarettes was young African Americans. Newport's 1992 brand plan revealed that the products was targeted "primarily to young ethnic adult smokers ages 18-24," and that "the ethnic market could be a major source of new business for the brand that we plan to exploit it."

- Financing music festivals – From the Newport Jazz Festival that began in the 1950s, to the Salem Spirit Concert Series in the 1980s, to tobacco-sponsored concert series today including Kool MIXX, Marlboro's Vinyl Vibes and Salem's Stir the Senses, tobacco companies continue to recruit new users across populations through music events. The Family Smoking Prevention and Tobacco Control Act prohibited music and art event sponsorships by cigarette and oral tobacco brands, but not by cigars or emerging nicotine products such as e-cigarettes and heated tobacco.

- Obfuscating the harms of smoking – For much of the last century, tobacco companies attempted to reassure a public increasingly worried about the health consequences of smoking through marketing campaigns with claims such as "More Doctors Smoke Camels," and "Got a cold? Smoke a Kool." Today, menthol tobacco advertising continues to include health reassurance messaging with the use of proxy terms such as "natural" and "organic" tobacco.

"Exposing the ways tobacco companies target people in disadvantaged communities with products that threaten their health is core to the American Heart Association's commitment to battling systemic racism," said Michelle A. Albert, M.D., M.P.H., FAHA, volunteer president of the American Heart Association, immediate past president of the Association of Black Cardiologists and Walter A. Haas-Lucie Stern endowed chair in Cardiology, professor of medicine at the University of California at San Francisco. "To promote public health and achieve health equity, we must enact proven public policies that prevent the industry from engaging in practices that have contributed to the loss of millions of lives from tobacco use."