Why do we yawn?

Answer:

Yawning might serve a social function (to communicate boredom) and a physiological function (regulation of body state).

The study of yawning is anything but boring. It boasts a rich history of claims that go back to Antiquity, but thus far the biological function of yawning remains a mystery.

Not all yawns are the same. Most of us yawn and stretch (pandiculation) when we wake up or go to bed, yawn when we are bored or when we need to "pop" our ears after traveling in high altitudes, and even yawn just because we saw someone else yawn. The act of yawning (oscitation) occurs in almost all vertebrates- even birds and fish exhibit a form of mouth gaping similar to yawning. In humans, yawning can start as early as 20 weeks after conception.

Small boy with long hair wearing hat and sailor coat yawning. Prints & Photographs Catalog, Library of Congress.

A yawn is a coordinated movement of the thoracic muscles in the chest, diaphragm, larynx in the throat, and palate in the mouth. By yawning, we help distribute surfactant (wetting agent) to coat the alveoli (tiny air sacs) in the lungs. Generally speaking, we cannot yawn on command. It is proposed that yawning is a semi-voluntary action and partly a reflex controlled by neurotransmitters in the hypothalamus of the brain. It is also associated with increased levels of neurotransmitters, neuropeptide proteins and certain hormones.

Why do we yawn?

There are numerous claims on why we yawn and scientists have yet to come to any consensus. One of the first claims for why we yawn can be traced back to Hippocrates, the father of medicine, who hypothesized that yawning precedes a fever and is a way to remove bad air from the lungs. Based on modern evidence, however, it seems unlikely that yawning serves as a function of the respiratory system.

By the 17th and 18th centuries scientists were challenging the Hippocratic claims of yawning. These new claims focused on the circulatory system, suggesting that yawning causes an increase in blood pressure, heart rate and oxygen in the blood, which in turn improves motor function and alertness. This might explain why many athletes yawn before playing their respective sports. Yet, current tests have shown that the heart rate, sweating or brain's electrical activity do not increase after yawning.

La Paressea. Caricature by Boilly, Louis Léopoldl. Order no. A021432. From the Images from the History of Medicine database, National Library of Medicine.

Today, scientists continue to research the function(s) of yawning. Pioneer researcher on contagious behavior Dr.

Robert Provine suggests that yawning is "associated with the change of a behavioral state- wakefulness to sleep, sleep to wakefulness, boredom to alertness…(Provine, 2005)." And more recent studies have suggested that yawning might be connected to brain temperature (Gallup and Gallup, 2008). When the brain becomes warmer than the homeostatic (stable) temperature, we might yawn to cool the brain. It is proposed that cooler blood from the body floods into the brain and the warm blood circulates out through the jugular vein.

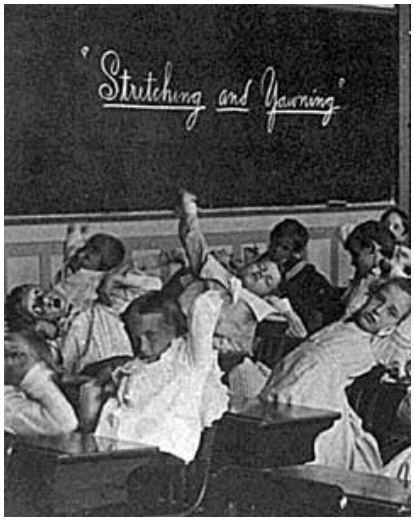
Dr. Andrew Gallup and Omar Tonsi Eldakar (2011) discovered that outside temperature might also affect the amount of yawning as well. If the outside temperature is warmer than normal, then the organism yawns less frequently. A possible explanation of this is that because the air outside is useless to the organism it does not need to suck in more oxygen through yawning. However, other tests showed that the amount of yawning increased when both outside temperature and the temperature of the brain increased.

There are also sociological and evolutionary biological based explanations. Yawning might be linked to our circadian rhythms (biological activity related to a 24 hour cycle) as a signal to go to bed or as a waking ritual. It might be as a way to transmit boredom or feelings of stress to the social group. Yawning can also be contagious.

William Jennings Bryan, yawning, in the courtroom at the Scopes trial. Prints & Photographs Catalog, Library of Congress.

Historic American Sheet Music, ",Sleepy-headed little Mary Green; A yawning song. 1900." Music B-389. Rare Book, Manuscript, and Special Collections Library, Duke University.

"Say 'ah'." Lion at London Zoo seems bored with captivity. Prints & Photographs Catalog, Library of Congress.



Classroom scenes in Washington, D.C. public schools - stretching and yawning exercise. Prints & Photographs Catalog, Library of Congress.

Theories of contagious yawning

Contagious yawning comes from witnessing someone or thinking about another person yawning. According to studies (Platek, et al), 42-55% of human adults will yawn during, or after, watching a video tape of another person repeatedly yawning. It typically happens in older normal well-adjusted

human beings. Traditionally, it is not seen in humans under five or people with autism.

Evolutionary psychologist Gordon Gallup, best describes contagious yawning as a "primitive empathic mechanism related to mental state attribution (*Oxford Handbook of the Self*, 2011: p100)." Yawning activates the motor imitation, empathy, and social behavior parts of the brain. Neurons in the brain fire causing you to feel what that person is experiencing and commanding you to perform the action even if you do not actually feel the need.

After reading this you might have found yourself yawning. I hope it was not because you found this essay boring, but because I put the idea of yawning in your head.

Martians yawning. Prints & Photographs Catalog, Library of Congress.

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https://www.loc.gov/rr/scitech/mysteries/yawn.html

Boy sitting up in bed, yawning and stretching his arms, at the YMCA Winter Camp at Camp Duncan. DN-0080774, Chicago Daily News negatives collection, Chicago History Museum.