

# Nicotine as a Means for Weight Control: Advantage or Disadvantage?

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*"Tobacco drieth the brain, dimmeth the sight, vitiateth the smell, hurteth the stomach, destroyeth the concoction, disturbeth the humours and spirits, corrupteth the breath, induceth a trembling of the limbs, exsiccateeth the windpipe, lungs, and liver, annoyeth the milt, scorseth the heart, and causeth the blood to be adjusted." --Tobias Venner*

Via pecta ad vitam Longam, 1693 (Fielding, 1992)

## Introduction:

Since around the 1950's-60's, smoking has been a target of attack for the scientific community and rightly so. Smoking, as well as other forms of tobacco use, has been proven to be linked with serious health problems and diseases such as lung cancer and emphysema. Research has become so extensive that actual causal and not simply correlational relationships have been proven. Yet, smoking remains the number one preventable cause of premature death and disability in the United States (390,000 deaths per year.) (gopher:flminerva.acc.Virginia:70/00/p ... substancetfacts/substance/drucl/tobacco.txt.) So after all the negative evidence of smoking and other uses of tobacco products, why do people insist on continuing? The presence of a substance called nicotine partly answers this question; Nicotine effects in tobacco products are associated with addiction, tolerance, and motivation reasons for use. One motivation less focused on but none the less very important is the use of nicotine as an appetite suppressant. Many people, especially young women, associate nicotine with weight loss and dietary control. Two questions arise: Is the claim that nicotine as a means to control weight grounded in factual evidence, or rather the product of an image portrayed by the tobacco industry? If evidence does support the claim, is the use of nicotine as an appetite suppressant advantageous and efficient enough to outweigh the other proven harmful effects?

## What is Nicotine?

Tobacco is a plant whose dried leaves are used in the production of cigarettes and other tobacco products such as pipe tobacco, cigars, chewing tobacco, and snuff. Over 4,000 gases, particles, and compounds such as tar, nicotine, and carbon monoxide pollute tobacco. Nicotine is the psychoactive compound and is only found in tobacco. This compound is the primary cause for addiction to tobacco products because it acts as a mild stimulant to the central nervous system. In new smokers, nicotine can induce nausea and if taken in larger dosages, it can be associated with tremors, quick breath, and a decrease in the production of urine.

How does Nicotine affect the body?

Nicotine is addictive:

Here is a scary thought for smokers: "The moment smoke enters the body, it attacks the tissues of the mouth, tongue, throat, esophagus, air passages, and lungs. In the lungs, most of the inhaled compounds are retained. Once nicotine is absorbed into the lungs, its effects reach the brain within 6 seconds, twice as fast as main lining heroin."

(gopher:Hminerva.acc.Virginia:70/00/p ... ubstance/facts/substance/drug/tobaccotxt)

According to the National Institute on Drug Abuse (NIDA), nicotine produces a tolerance in users- a need for greater amounts to produce a desired effect.

(gopher:Hminerva.acc.Virginia:70/00/p...ubstance/facts/substance/drug/tobacco.txt Psychological and physiological dependencies occur due to nicotine which is addicting for three main reasons. First, in small doses, it makes the person feel awake and alert. With later doses, it produces a soothing, pleasurable feeling that makes the person want more. However, it is important to note that although it produces a feeling of well being in habitual users, it releases epinephrine, a hormone which creates physiological stress in the smoker rather than relaxation. Second, people usually become dependent on nicotine to the point that they suffer severe withdrawal symptoms which last for a week or longer Psychological symptoms include irritability, anxiety, sleep disturbances, nervousness, headaches, fatigue, nausea, and a long-term craving for tobacco. Physiological symptoms include changes in body temperature, heart rate, muscle tone, and appetite. Finally, because nicotine affects the brain and the central nervous system, it affects the user's mood and temperament. (<http://www.cancer.org.smoking.html>)

Bottom line in terms of addiction: nicotine causes a short term increase in blood pressure, heart rate by 2-3 beats per minute, and flow of blood from the heart, lowering the shin temperature and reducing the flow of blood to the feet and legs. It also causes the arteries to narrow. Carbon monoxide reduces the amount of oxygen the blood can carry. This combined with the effects of nicotine creates an imbalance in the demand for oxygen by the cells and the amount of oxygen the blood is able to supply.

(<http://www.amhrt.org/heartq/nicoadd.htm>)

Nicotine is Harmful:

Evidence shows that nicotine plays an essential role in increasing a user's risk of Coronary Heart Disease and stroke. The American Heart Association estimates that around one-fourth of fatal heart. Attacks are caused by cigarette smoking (120,000/year). All users are at risk, especially women using oral

contraceptives. (gopher://minerva.acc.Virginia:70/001p ... ubstanceffaGts/substance/drug/tobacco.txt). Tobacco smoke contains 43 carcinogenic substances. Short term effects include a decrease in lung function including shortness of breath, nagging cough, and a lower life expectancy by seven years. Long term effects include cardiovascular diseases such as Coronary Heart Disease, Peripheral Arterial Occlusive Disease, and Cerebrovascular Disease. It also has been proven to cause many kinds of cancer, including lung, mouth esophagus, stomach, kidney, bladder, pancreas, and uterine cervix. Lung Diseases include Chronic Obstructive Pulmonary Disease (COPD), Chronic Bronchitis, and Emphysema. Gastrointestinal disease is also quite common. "Given the deleterious effects of tobacco on cardiovascular, respiratory, and other body substances, coupled with its addictive properties and widespread use, it is perhaps the most dangerous of all psychoactive drugs." (Fielding, 1992)

Why do people still continue to use Nicotine?

Many reasons motivate people to either start or to continue tobacco use despite the overwhelming evidence that it is harmful and even fatal. Most people begin smoking at a very young age, between 10-18 years old. For this age bracket, in addition to the use of nicotine for fun, or for boredom and stress relief, other reasons exist. Social reinforcements such as peer pressure, desire for acceptance, and curiosity are major motivational factors for experimentation. Tobacco use becomes an attribute of maturity or sexual desirability.

Most of these different social motivations return back to one desire effect: to look good, to look "cool". And it is here that the idea of nicotine as a means for weight control comes in to play. Nicotine acts as a mild stimulant to the central nervous system. Behind the idea of nicotine and other stimulants are the physiological responses which include constricting blood vessels, increasing heart rate and blood pressure, and thus decreasing appetite. (Fielding, 1992)

Many people, especially young women, are severely emotionally affected by society's portrayal of the ideal body image. Society encourages its people to strive for perfection, (a perfection which is virtually unattainable), through magazine pictures and advertisements of models who are not even real themselves. Many pictures have been altered and doctored by such photographic techniques as air brushing, airbrushing, or lens manipulation. So in light of the fact that nicotine acts as a mild stimulant, many believe it will help them to attain this ideal body image and keep the weight down. Oral fixation reinforces this idea in users, who instead of eating when they are hungry; they simply reach for a cigarette instead. "Pharmacological factors interact with stimuli in the social environment -social reinforcers- so that after thousands of repetitions of tobacco use, they become inseparable from the substance. This phenomenon is reinforced and exploited by the Tobacco Industry's advertisements for its products. According to the American Cancer Society, it is an industry that spends around \$6 billion dollars a year on advertisements that depict its products as exciting, glamorous, and healthy activity.

(<http://www.cancer.org/smoking.html>)

Advertisements: Who do they target?

Advertisement in the Tobacco Industry play the major role of society's linking nicotine with weight control. Their primary purpose is to gain replacement clientele for the one's they lose. In fact, the tobacco companies need 4,000 new smokers every day to replace the ones who have quit or died. So who do they target primarily? These advertisers focus on four major groups: women, men, youth and minorities, all groups deemed to be susceptible to the desire of the ideal image.

The tobacco industry targeted women as far back as the 1920's when they advertised cigarettes as a diet tool in the Lucky Strike Campaign. The "Reach for the Lucky instead of a sweet campaign launched in 1928 is one of the finest examples available of promoting nicotine as an appetite suppressant. In one particular ad, a beautiful, slim woman is seen posing for the camera directly under the slogan, "To keep a slender figure, No one can deny, Reach for a Lucky instead of a sweet." According to American Tobacco Company legend, a man named George Washington Hill "was inspired when he saw two differently shaped women on the street. 'Right then and there is hit me; there was the young lady that was stout and chewing (gum), and there was the young girl that was slim and smoking a cigarette... there it was, right there in front of you.' "

(<http://www.discovery-com/DCO/doc/I 012/world/history/cigarettes/cigarettesl.9c.html>)

By 1933, Lucky Strike was the top selling brand in the country. More recent advertisements such as Virginia Slims since 1980 have continued this image by associating smoking with healthy activities such as tennis, as well as including on the package certain adjectives such as "slim" and "light" while also featuring the ads in watercolors and pastels. (<http://www.amhrt.org/heartg/tobtarget.html>) Women are perhaps the group most likely to use nicotine as a means for weight control.

Advertisements also target men, minorities, and youth in an effort to glamorize tobacco use. In the 1950, the Marlboro Man image came into popularity, implying that if men smoked Marlboro cigarettes, they would be tough, virile, and strong. A famous industry ploy targeting minority groups was for the brand, "Uptown" cigarettes, implied that social advancement and self-improvement was through these cigarettes. However, due to controversy and opposition, this marketing campaign failed. A large group targeted successfully by the tobacco industry is the youth. Finally, this marketing campaign is highly successful through the nature of youthful activities promoted such as rock concerts and sporting events combined with the industry's association with glamour, maturity, and ideal image. Ad campaigns such as "Joe Camel" specifically appeal to the young through animation of the character, gestures, fashion, and color, all which feed on the vulnerable youth's highly emotional concern with peer image, freedom, independence, and physical appearance. (<http://www.anhrt.org/heartg/tobtarget.html> ) No matter what group is targeted, the unifying message is that the ideal physical image is obtained through the use of tobacco products. Therefore, it is easy to see why people would turn to nicotine to control their weight: it would first curb the craving and suppress the appetite, therefore keeping weight down, while looking "cool" in the process. But is it true? Does it work?

Research: Is the claim that Nicotine is an appetite suppressant true?

Although much research has been done on the harmful effects on nicotine and other substances found in tobacco, information on nicotine as an appetite suppressant is still limited. However, some experiments have been performed to test nicotine's effect on body weight, many examining the effects of weight gain after smoking cessation. Here are four important studies which help in understanding nicotine's effect on body weight. For more studies, refer to the Reference section.

One study by L. Arcavi, P. Jacob 3rd, M. Hellerstein, & NL Benowitz, 1994, evaluated the divergent tolerance to metabolic and cardiovascular effect in smokers with low and high levels of nicotine consumption. Experimenters were interested in the fact that cigarette smokers weigh less on average than nonsmokers, and that among smokers, however, those who smoke the most weigh the most. By investigating the effects of intravenous nicotine and cigarette smoking in low and high level smokers, they found that both increased heart rate and energy expenditure in low-level smokers was slightly higher. The effects of intravenous nicotine and smoking were of similar magnitude, confirming the fact that the effects of smoking are mediated by nicotine. The study found that there is evidence of "differential development or rate of loss of tolerance to cardiovascular versus metabolic effects of nicotine in low versus high level smokers. Pharmacodynamic differences between low and high level smokers may explain the unusual relationship between cigarette consumption and weight gain."

Another study in the Journal of Applied Psychology by KA Parkins, 1992, examined the metabolic effects of cigarette smoking. Parkins was interested in the inverse relationship between cigarette smoking and body weight, which has long been a strong obstacle to smoking cessation. He hypothesized that this relationship may be due in part to the effects of smoking on increasing whole body metabolism. After review various past studies, evidence suggested that there was an absence in chronic metabolic effect, indicating that most smokers and nonsmokers have similar resting metabolic rates, and that this RMR declines very little after smoking cessation. Although an acute effect is due to smoking, its magnitude varies across studies possibly due to variant smoke exposure and nicotine intake. Although Sympoathoadrenal activation by nicotine is responsible for the metabolic effect of smoking, his conclusions combine this effect with a behavioral aspect to weight gain. Specific situations in which smokers tend to smoke may mediate the magnitude of the effect, insomuch as smoking during casual physical activity may enhance it while smoking after eating may reduce it.

One study in the American Journal of Physiology tested the metabolic interactions between surplus dietary intake and cigarette smoking or its cessation. (Neese RA., Benowitz NL., Hoh R., Faix D., LaBua A., Pun K., & Hellerstein MK, 1994) Considering the idea that cigarette smoking (CS) alters lipid metabolism and is associated with the hardening of the arteries, experimenters assumed that CS stimulates lipolysis without increasing oxidation of fat and that cessation of CS does not result in a rebound tendency to synthesize or store fat. Evaluating eight heavy male subjects over a seven day time period, experimenters asked whether intake of surplus dietary energy taken ad libitum or when desired interacts with the metabolic effects of CS or its cessation. The study concluded that contrary to previous suggestions, cessation of CS does not result in a rebound tendency to synthesis or storage of fat. Furthermore, stimulation of lipolysis by CS does not increase the oxidation of fat and thus protect against fat deposition

under conditions of surplus energy intake. Finally, they concluded that the prevention of weight gain after cessation, whether or not nicotine is provided, should focus on energy balance rather than specific alterations in lipid metabolism.

Probably the most important study done in evaluating the use of nicotine as an appetite suppressant is found in the Journal of Substance Abuse entitled "The Female weight control smoker: a profile". (Pomerleau CS., Ehrlich E., Tate JC., Marks JL., Flessland KA., & Pomerleau OF, 1993) The experimenters hypothesized that the existence of a subgroup of female smokers for whom nicotine hides, and abstinence shows, a tendency toward hyperphagia and even underlying disordered eating. Experimenters compared female "weight-controlled smokers" (WC) and "non-weight-control smokers" (NWC) on smoking and eating-related variables, while also looking at the relationship between weight control smoking and withdrawal symptomatology during 48-hours of nicotine abstinence. Although WC were not more depressed or anxious than NWC, they were more likely to report weight gain and increased hunger during abstinence. Experimenters found that weight correlated with increased eating during abstinence. Findings suggest that WC's use dietary restraint as well as smoking to control weight, and abstinence perhaps precipitates episodes of disinhibited or binge eating. Thus reinforcing the behavioral perspective of nicotine as an effective dietary control.

Is it really worth it?

Basically, much information exists in relation to this subject. However, much of the findings vary across studies and imply the existence of confounding variables which deter many concrete, decisive conclusions. However, these studies do suggest a few important findings. First, nicotine is proven to act as a mild stimulant to the central nervous system, and is the mediating factor in the metabolic effect of smoking and other tobacco uses. The key word here, however, is "mild". Nicotine stimulation affects body weight minimally compared to other behavioral factors. People concerned about weight control to the point of turning to nicotine, often use it as a crutch. In these cases, Nicotine simply masks underlying behaviors and tendencies toward indulgence or disinhibited eating.

So when asked, is it worth it?, a closer look must be taken at nicotine and the other harmful consequences of its use. No, it is not worth it. The little amount of metabolic stimulation produced by nicotine pales in comparison to the amount of damage that the substance does to your body. The use of nicotine as an appetite suppressant actually acts as a disadvantage in terms of weight control. Users tend to rely so heavily on nicotine's perceived effect of appetite suppression that they fail to see the actual underlying cognitive, psychological, and behavioral tendencies motivating them to be preoccupied with weight control in the first place. It is important to realize that the only means for healthy weight control is through good nutrition, balanced diet, and exercise. Taking good care of your body and avoiding harmful toxins such as nicotine and other substances is the best way to healthy living. The bottom line: smoking and other substance use as a means for weight control or any other purpose for that matter is not worth dying for.

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