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Tobacco

in History and Culture

AN ENCYCLOPEDIA



JORDAN GOODMAN
Editor in Chief

VOLUME

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Addiction-
Music, Popular

CHARLES SCRIBNER'S SONS

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Tobacco in History and Culture: An Encyclopedia

Jordan Goodman

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Preface

T*obacco in History and Culture: An Encyclopedia* is a unique resource. It is a single authoritative encyclopedia on every aspect of tobacco, one of the world's most pervasive substances. We expect this encyclopedia to be used by a wide variety of groups. While it is a useful resource for high school and college curricula in courses on history, business, health, and political science, it is also a scholarly resource for those doing research related to tobacco and its history.

There are over 130 entries in this encyclopedia, each written by an expert in his or her field. The editorial team has assembled the best contributors from all the fields in which tobacco exists—historians, anthropologists, sociologists, economists, botanists, chemists, pharmacologists, physicians, epidemiologists, biostatisticians, lawyers, activists, policy makers and analysts, and collectors. Many of our authors fit more than one of these descriptors. We have endeavored to cover the entire history of tobacco, from its prehistory in Mesoamerica to the most recent developments. Because tobacco knows no political boundaries, the scope of this encyclopedia is international.

In the pages that follow the reader will find a vast array of information, historical and contemporary, from throughout the world. Entries cover the scientific aspects of tobacco, its botany, chemistry, and pharmacology. Here the reader will find out what the tobacco plant is, how it grows, and the chemicals it makes. Special attention is given to nicotine, the plant's psychoactive ingredient. Some chemicals are present in the plant but others are produced when tobacco is burned. These, too, are discussed in the encyclopedia, with the most up-to-date information available.

The tobacco plant requires special cultivation and processing in order to bring it to the point at which it can be consumed. There are specialized entries on all the aspects of bringing tobacco leaf to market. Slave plantations, sharecropping, peasant and tenant farming, and other methods of organizing tobacco cultivation and the labor associated with it are fully considered; as are the methods of growing, harvesting, and curing the leaves and getting them to the manufacturers. The reader will learn in these pages of the diverse types of tobacco leaf and the different ways tobacco is consumed. "Virginia," "Burley," "flue-cured"—words that are often used when talking about tobacco—are given clear definitions.

Tobacco leaves have been consumed in many ways, all of which, with the exception of the modern cigarette, were known in the Americas before the arrival of Christopher Columbus at the end of the fifteenth century. The pipe, the cigar, and the cigarette are the most common forms of consuming the smoke from burning tobacco, but there are many other, more local, forms of smoking that are less common. While we are now accustomed to think of burning the leaf as the most common way of consuming

tobacco, it has not always been so. Tobacco has been consumed as a drink, in the form of an infusion; it has been chewed; and it has been taken in powder form in the mouth and as a nasal preparation. While we generally think of tobacco as a recreational substance it has not always been that way. For many centuries, and up to quite recently in the west, tobacco was used for medical needs, in the form of poultices for abrasions and infections and enemas for ailments of the gut. The reader will find a wealth of fascinating material about these methods of consumption in the encyclopedia.

The cigarette—shredded tobacco leaf in a paper wrapper with or without a filter—is a recent addition to the myriad ways of consuming tobacco. It is the icon of the modern tobacco industry. In the encyclopedia, the reader will find entries on all aspects of the cigarette, from its first appearance in the early nineteenth century to its industrialization with mass-production machinery in the late nineteenth century and to its contemporary dominance over all other methods of consuming tobacco throughout the world. Entries on the business side of cigarette production discuss big players, both companies and individuals, in the history of this singular object; the role of advertising; globalization; and competition.

Tobacco has always been a regulated substance, whether in pre-Columbian America or early twenty-first century New York City. The history of regulation forms an important part of the encyclopedia. Select entries deal with local, national, and international regulation; with anti- and pro-smoking organizations; with advertising and sponsorship bans; and with age and gender proscriptions.

Consuming tobacco has its own varied and highly fascinating history. Whether we think about it as a sacred and highly ritualized substance in native America or as a recreational substance in a secular setting, tobacco has cultural meanings in all the societies in which it has had a place. The means of consuming tobacco, as well as the practices associated with that consumption—the technologies, the artifacts (cigarette papers and packs, cigar boxes, snuff bottles and boxes), the paraphernalia (cigarette cases and holders, tobacco containers, lighters, ashtrays, and clothing), even the gestures—are culturally active. These are discussed in the pages that follow.

Smoking, in particular, has spawned a substantial cultural industry. Whether through literature, art and photography, film, or music, both popular and classical, tobacco has been the object of cultural comment. The representations of tobacco and its consumers have been a powerful element of the history of the substance and entries on its cultural manifestation abound in the encyclopedia.

Tobacco has been a powerful agent of European settlement overseas and European colonialism. The economic development of Spanish America, Brazil, the Chesapeake colonies of Virginia and Maryland, the Caribbean islands, French and Dutch possessions in the Americas, Africa, and Southeast Asia has been, to a greater or lesser extent, affected by tobacco cultivation and its culture. Almost as soon as they realized that taxing tobacco was a lucrative business, whether by imposts or by regulating manufacture and sales through monopolies, European governments have recognized the value of growing tobacco in their distant possessions. This has been true from the sixteenth to the twenty-first century, and users of the encyclopedia will be rewarded with full discussions of tobacco's role in extending European power worldwide over this long period of time.

The second half of the twentieth century witnessed a remarkable change in our relationship with this remarkable plant. Tobacco has been implicated as a major cause of some of the deadliest of diseases and has been blamed for millions of premature deaths worldwide. Attacks on the use of tobacco have come from a wide variety of directions, from the health sector, from environmental groups, from nutritionists and fitness experts, from workers exposed to secondhand smoke, from human rights groups, not to mention government agencies themselves, often using scientific evidence

to make their case. In response, other groups have sought to argue against these findings, appealing to the importance of tobacco growing and sales to local economies and the right of the individual to choose to use tobacco. Both sides have wrangled over issues of risk, addiction, economics, and politics. The encyclopedia has entries on all of these conflicts. Other entries discuss several high-profile legal cases, which have led to extraordinary settlements, between individuals and governments, on the one hand, and tobacco companies on the other. The release of sensitive and highly secret documents from the tobacco industry, an outcome of the lawsuits, is also covered in the pages that follow.

It is well, however, to remember that conflicts over and around tobacco are not new. The encyclopedia covers the historic relationship between tobacco and religion, tobacco and the state, and tobacco and medicine, and brings out the nature of our complex association with the plant over the many centuries and in virtually every society.

We believe that this encyclopedia is unique in that it brings together, in one place, the extensive connections between tobacco and human life. We hope that our approach to tobacco will stimulate readers to appreciate the powerful ways in which this plant has made history.

I wish to thank Sarah Turner, and the development team—Nathalie Duval, Frank Menchaca, and John Fitzpatrick—for initiating this project. I also want to thank the entire editorial team—especially Cindy Clendenon and Ken Wachsberger—for bringing the project to completion.

To the authors of the many entries, I wish to acknowledge my gratitude for their support and contributions. Finally, I would like to express my warmest and deepest thanks to my outstanding editorial colleagues, Marcy Norton and Mark Parascandola, for their unstinting efforts in giving this encyclopedia its ultimate shape and contents.

■ JORDAN GOODMAN, EDITOR IN CHIEF



Timeline

- c. 50,000 B.C.E.:** Australia populated. Humans there may have begun chewing tobacco species: *Nicotiana. gossei*, *N. ingulba*, *N. simulans*, *N. benthamiana*, *N. cavicola*, *N. excelsior*, *N. velutina*, and *N. megalosiphon*.
- c. 15,000–10,000 B.C.E.:** Americas south of the Arctic populated. Humans there may have begun to pick and use wild tobacco species.
- c. 5000 B.C.E.:** Maize-based agriculture develops in central Mexico, probable beginnings of tobacco cultivation as well.
- c. 1400–1000 B.C.E.:** Remains of cultivated and wild tobacco dating from this period have been found in High Rolls Cave in New Mexico. Dates established by radiocarbon methods.
- 1492:** Columbus sees Taíno (Indians of Greater Antilles) with leaves that are probably tobacco. Two men among Columbus's crew explore the interior of Cuba and see people smoking.
- 1518:** Juan de Grijalva, leader of expedition to Yucatan and Gulf of Mexico, accepts offerings of cigars or pipes.
- 1535:** Publication of Gonzalo Fernández de Oviedo's *Historia general de las Indias*, which has first published reference to tobacco. It condemns it as a "vile vice" but also notes that the habit spread to "Christians" and black slaves as well.
- 1535:** Jacques Cartier encounters natives using tobacco on the island of Montreal.
- 1555:** Franciscan Friar André Thevet of Angoulême (France) witnesses Brazil's Tupinamba Indians smoking tobacco; following year sows tobacco seeds in France.
- 1560:** Jean Nicot, France's ambassador to Portugal, writes of tobacco's medicinal properties, describing it as a panacea. Nicot sends *rustica* plants to French court.
- 1561:** Nicot sends snuff to Catherine de Medici, the Queen Mother of France, to treat her son Francis II's migraine headaches.
- 1565:** Sir John Hawkins's expedition observes Florida natives using tobacco.
- 1571:** Publication of Nicolas Monardes's *Segunda parte del libro, de las cosas que se traen de nuestras Indias Occidentales, que sirven al uso de medicina* [The second part of the book of the things brought from our Occidental Indies which are used as medicine], which has the most extensive and positive description of tobacco to that date.
- 1583:** Council of Lima declares that priests cannot consume tobacco in any form before saying mass, under threat of excommunication.
- 1585:** Francis Drake expedition trades for tobacco with Island Caribs of Dominica.
- 1587:** Gilles Everard's *De herba panacea* (Antwerp) is first publication devoted entirely to tobacco.
- 1588:** Thomas Hariot publishes *A Brief and True Report of the New Found Land of Virginia*, in which he describes Virginia native people smoking tobacco.
- 1595:** Anthony Chute publishes *Tabacco*, the first book in the English language devoted to the subject of tobacco.
- 1600:** Franciscan missionary presents tobacco seeds and tobacco tincture to Tokugawa Ieyasu, who will become Shogun of Japan in 1603.
- 1603:** Spanish colonies of Cumaná and Caracas (Venezuela) produce 30,000 pounds of tobacco.
- 1604:** King James I publishes *A Counterblaste to Tobacco*, in which he condemns tobacco smoking as unhealthy, dirty, and immoral.
- 1606:** King of Spain prohibits the cultivation of tobacco in Caribbean and South America to thwart contraband trade between Spanish settlers and English and

- Dutch traders. Edict rescinded in 1612.
- 1607:** Inhabitants of Sierra Leone seen sowing tobacco.
- 1607:** Jamestown, the first permanent English colony in the Americas, is founded.
- 1612:** John Rolfe raises Virginia's first commercial crop of "tall tobacco."
- 1617:** Mughal Shah Jahangir (reigned 1605–1627) bans smoking because tobacco consumption creates "disturbance in most temperaments."
- 1624:** Texts by Chinese physicians Zhang Jiebin (1563–1640) and Ni Zhumo (c. 1600) mention tobacco in section on pharmacopoeia.
- 1627:** Tobacco cultivation in Ottoman territory is banned.
- 1636:** First state tobacco monopoly established in Castile (Spain).
- 1642:** Papal Bull forbids clerics in Seville from using tobacco in church and other holy places.
- 1674:** Tobacco monopoly established in France.
- 1682:** Virginia colonists rebel when the government fails to decree a cessation in tobacco crops after bumper crops lead to low prices. Disgruntled planters destroy thousands of tobacco plants; six ringleaders are executed.
- 1698:** In Russia, Peter the Great agrees to a monopoly of the tobacco trade with the English, against church wishes.
- 1724:** Pope Benedict XIII learns to smoke and use snuff, and repeals papal bulls against clerical smoking.
- 1753:** Linnaeus names the plant genus *nicotiana*, and describes two species, *nicotiana rustica*, and *nicotiana tabacum*.
- 1760:** Pierre Lorillard establishes a "manufactory" in New York City for processing pipe tobacco, cigars, and snuff. P. Lorillard is the oldest tobacco company in the United States.
- 1794:** U.S. Congress passes the first federal excise tax on snuff, leaving chewing and smoking tobacco unaffected.
- 1827:** First friction match invented.
- 1828:** Isolation of nicotine from tobacco by Wilhelm Posselt and Karl Reimann.
- 1832:** Paper-rolled cigarette is invented in Turkey by an Egyptian artilleryman.
- 1839:** Discovery that flue-curing turns tobacco leaf a bright brilliant yellow and orange color. The bright-leaf industry is born.
- 1843:** French tobacco monopoly begins to manufacture cigarettes.
- 1847:** In London, Philip Morris opens a shop that sells hand-rolled Turkish cigarettes.
- 1849:** J. E. Liggett and Brother is established in St. Louis, Missouri, by John Edmund Liggett.
- 1854:** Philip Morris begins making his own cigarettes. Old Bond Street soon becomes the center of the retail tobacco trade.
- 1868:** British Parliament passes the Railway Bill of 1868, which mandates smoke-free cars to prevent injury to nonsmokers.
- 1880:** James Bonsack is granted a patent for his cigarette-making machine.
- 1881:** James Buchanan (Buck) Duke starts to manufacture cigarettes in Durham, North Carolina.
- 1889:** Five leading cigarette firms, including W. Duke Sons & Company, unite. "Buck" Duke becomes president of the new American Tobacco Company.
- 1890–1892:** Popular revolts against imposition of British-controlled monopoly on sale of tobacco take place in Iran.
- 1899:** Lucy Payne Gaston founds the Chicago Anti-Cigarette League, which grows by 1911 to the Anti-Cigarette League of America, and by 1919 to the Anti-Cigarette League of the World.
- 1902:** Imperial Tobacco (U.K.) and American Tobacco Co. (U.S.) agree to market cigarettes in their respective countries exclusively, and to form a joint venture, the British American Tobacco Company (BAT), to sell both companies' brands abroad.
- 1907:** The U.S. Justice Department files anti-trust charges against American Tobacco.
- 1908:** The U.K. Children Act prohibits the sale of tobacco to children under 16, based on the belief that smoking stunts children's growth.
- 1910:** Gitanes and Gauloises cigarette brands are introduced in France.
- 1911:** U.S. Supreme Court dissolves Duke's trust as a monopoly, in violation of the Sherman Anti-Trust Act (1890). The major companies to emerge are American Tobacco Co., R.J. Reynolds, Liggett & Myers Tobacco Company (Durham, N.C.), Lorillard, and British American Tobacco (BAT).
- 1913:** R.J. Reynolds introduces the Camel brand of cigarettes.
- 1913:** China has its first harvest of Bright leaf tobacco, grown from imported American seeds and using American growing methods.
- 1916:** Henry Ford publishes an anti-cigarette pamphlet titled *The Case against the Little White Slaver*.
- 1924:** Philip Morris introduces Marlboro, a women's cigarette that is "Mild as May."

- 1927:** Long Island Railroad grants full rights to women in smoking cars.
- 1933:** United States Agricultural Adjustment Act of 1933 compels tobacco farmers to cut back on output by reducing acreage devoted to tobacco production, in return for price supports. They are saved from economic ruin.
- 1938:** Dr. Raymond Pearl of Johns Hopkins University reports to the New York Academy of Medicine that smokers do not live as long as nonsmokers.
- 1950:** Five important epidemiological studies show that lung cancer patients are more likely to be smokers than are other hospital patients.
- 1954:** Results from two prospective epidemiological studies show that smokers have higher lung cancer mortality rates than nonsmokers. The studies were conducted by E. Cuyler Hammond and Daniel Horn in the U.S. and Richard Doll and Austin Bradford Hill in the U.K.
- 1957:** First Japanese-made filter cigarette, Hope, is put on the market.
- 1964:** *Smoking and Health: Report of the Advisory Committee to the Surgeon General*, the first comprehensive governmental report on smoking and health, is released at a highly anticipated press conference. It concludes that smoking is a cause of lung cancer, laryngeal cancer, and chronic bronchitis and "is a health hazard of sufficient importance in the United States to warrant appropriate remedial action."
- 1965:** U.S. Congress passes the Federal Cigarette Labeling and Advertising Act, requiring health warnings on all cigarette packages stating "Caution—cigarette smoking may be hazardous to your health."
- 1970:** U.S. Congress enacts the Public Health Cigarette Smoking Act of 1969. Cigarette advertising is banned on television and radio.
- 1970:** World Health Organization (WHO) takes a public position against cigarette smoking.
- 1972:** First report of the surgeon general to identify involuntary (secondhand) smoking as a health risk.
- 1977:** American Cancer Society (ACS) sponsors the first national "Great American Smokeout," a grassroots campaign to help smokers to quit.
- 1986:** Congress enacts the Comprehensive Smokeless Tobacco Health Education Act, requiring health warnings on smokeless (spit) tobacco packages and advertisements and banning smokeless tobacco advertising on radio and television.
- 1988:** Liggett Group (L&M, Chesterfield) ordered to pay Antonio Cipollone \$400,000 in compensatory damages for its contribution to his wife Rose Cipollone's death (she died in 1984). First-ever financial award in a liability suit against a tobacco company. However, the verdict was later overturned on appeal, and the lawsuit was dropped when the family could no longer afford to continue.
- 1988:** Publication of *The Health Consequences of Smoking: Nicotine Addiction*, the first surgeon general's report to deal exclusively with nicotine and its effects.
- 1990:** Airline smoking ban goes into effect, banning smoking on all scheduled domestic flights of six hours or less.
- 1991:** U.S. Food and Drug Administration (FDA) approves a nicotine patch as a prescription drug.
- 1992:** World Bank establishes a formal policy on tobacco, including discontinuing loans or investments for tobacco agriculture in developing countries.
- 1994:** Six major domestic cigarette manufacturers testify before the U.S. House Subcommittee on Health and the Environment that nicotine is not addicting and that they do not manipulate nicotine in cigarettes.
- 1995:** *Journal of the American Medical Association (JAMA)* publishes a series of articles describing the contents of secret documents from the Brown & Williamson Tobacco Corporation indicating that the industry knew early on about the harmful effects of tobacco use and the addictive nature of nicotine.
- 1996:** President Bill Clinton announces the nation's first comprehensive program to prevent children and adolescents from smoking cigarettes or using smokeless tobacco. Under the plan, the Food and Drug Administration would regulate cigarettes as drug-delivery devices for nicotine.
- 1998:** California becomes the first state in the nation to ban smoking in bars.
- 1999:** U.S. Department of Justice sues the tobacco industry to recover billions of dollars spent on smoking-related health care, accusing cigarette makers of a "coordinated campaign of fraud and deceit."
- 1999:** Attorneys general of 46 states and 5 territories sign a \$206 billion Master Settlement Agreement with major tobacco companies to settle Medicaid lawsuits.
- 2000:** In Canada, Health Minister Allan Rock unveils new health labels that include color pictures.
- 2000:** U.S. Supreme Court issues a 5–4 ruling that existing law does not provide the Food and Drug Administration with authority over tobacco or tobacco marketing, thus invalidating the 1996 Clinton Administration's regulations.
- 2001:** BAT breaks into Vietnam market, announces that it has been granted a license for a \$40 million joint venture with

TIMELINE

- Vintaba to build a processing plant in Vietnam.

2003: First stage of the Tobacco Advertising and Promotion Act 2002 bans new tobacco sponsorship agreements, advertising on billboards and in the press, and free distributions. The ban also covers direct mail, Internet advertising, and new promotions.

2003: New York City's smoking ban goes into effect, forbidding smoking in all restaurants and bars, except for a few cigar lounges.
- 2004:** Complete public smoking ban goes into effect in Ireland.



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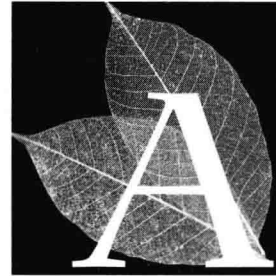
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Addiction

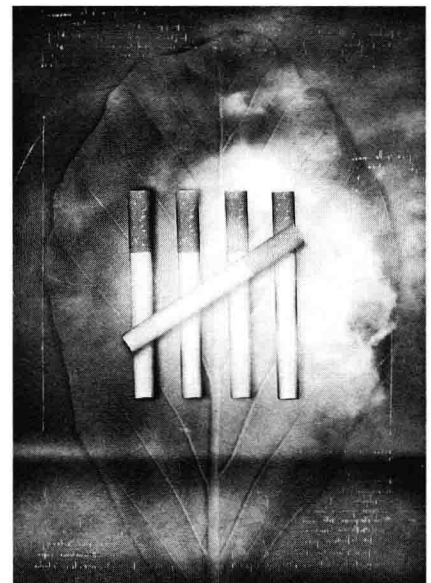
For most of the twentieth century, cigarette smokers counted in the millions and smoking was regarded as a willful behavior. Health care practitioners did not view smoking as a drug addiction, nor was it considered a major cause of premature death. A drastic change in thinking occurred during that century, and smoking was viewed in a new light by the dawn of the twenty-first century.

An explosion of research on the effects of nicotine took place during the last quarter of the twentieth century that profoundly changed how the health care field viewed tobacco products. The leading force was an overwhelming scientific base, which proved the deadly and addictive effects of tobacco beyond deniability even by the tobacco industry itself. The United Nation's World Health Organization (WHO) led the development of a Framework Convention treaty to control tobacco use and tobacco-caused diseases. Two driving motivations of the WHO Framework Convention provoked this change: the recognition that nicotine was an addicting drug and that tobacco addiction would lead approximately one-half of the world's more than 1 billion tobacco users to premature death. The WHO views addiction to nicotine as a powerful biological force that needs to be countered by powerful social, medical, and public health forces.

Why is tobacco recognized as an addicting substance? How do tobacco products compare to other addicting substances in their addicting power? Could nicotine-addicted tobacco users reduce their risk of disease without giving up nicotine? These are some of the key questions being addressed by governments around the world, regulatory agencies such as the U.S. Food and Drug Administration, and the United Nations through the WHO.

History of Nicotine Science

Ludwig Reimann and Wilhelm Heinrich Posselt, chemists at the University of Heidelberg, first isolated nicotine from the tobacco plant in 1828. It was quickly discovered that nicotine was a potent and powerful



Because each puff on a burning cigarette delivers only a small amount of nicotine, the addicted smoker must renew the dose via hundreds of daily puffs and one cigarette after another. © ROYALTY-FREE/CORBIS



chemical that could be absorbed through the skin, which made it an effective pesticide that is still used around the world. By the 1890s John Langley, a physiologist at the University of Cambridge, began a series of studies on nicotine that covered three decades and generated discoveries profoundly important to understanding nicotine actions as well as how the nervous system works. His research showed that nicotine produced strong effects on the nervous system that were transmitted through what he termed “receptive substances” on nerves, known simply as “receptors.” His studies showed that the strength of the effect was closely related to the amount administered (the “dose”); that repeated dosing led to weaker effects (“tolerance”); and that the effects could be countered by other chemicals such as curare (“antagonists”). This pioneering research on nicotine helped lay the foundation for modern research techniques with other nerve acting agents including morphine, cocaine, and drugs used to treat various psychiatric disorders and muscle diseases.

Many observers of behavior (writers, psychologists, religious leaders) documented tobacco’s power to lead some of its users to habitual behavior. Understanding tobacco as a truly addicting substance similar to morphine or cocaine, however, developed slowly, and understanding nicotine was a key finding in this discovery. Louis Lewin’s classic analysis of addicting drugs, *Phantastica* (University of Berlin, 1924) concluded that “the decisive factor in the effects of tobacco, desired or undesired, is nicotine.” Lewin’s conclusions fueled decades of investigations that ultimately confirmed his conclusions that nicotine was a critical determinant not only in the effects of tobacco but of why people used tobacco and of the difficulty in giving up tobacco. His ideas were a source of motivation for considerable subsequent research and further theory although scientific confirmation of his theory was not established until the 1980s.

NICOTINE RESEARCH AND ADDICTION. The path to confirmation was complicated, however, by evolving concepts of what defined addicting drugs. During the 1940s and 1950s, WHO reports highlighted the personality disorders of some individuals vulnerable to addictions, and how tranquilizing agents (such as morphine) and intoxicants (such as alcohol) produced addiction. Easily observable and powerful withdrawal symptoms, such as the flu-like symptoms of morphine withdrawal and convulsions from alcohol withdrawal, were also assumed to be hallmarks of addicting drugs. Cocaine addiction did not fit these symptoms but it was recognized as addicting in part because the pure drug was sought by people who were exposed and who had no apparent medical need except that the drug itself seemed to fuel powerfully persistent use in some of those who were exposed.

By contrast, many if not most users of tobacco were upstanding citizens who did not have personality disorders; experience intoxication with nicotine (although it could occur in first-time users or in overdose); or show readily apparent signs of withdrawal (the withdrawal syndrome was assumed to be psychological in nature until the studies of the 1970s and 1980s, which confirmed physical and psychological components). Finally, although few challenged Lewin’s core conclusions, the absence of evidence that pure nicotine would substitute for


tobacco or be sought by users left in doubt the conclusion that nicotine was truly addicting. Even the landmark 1964 report of the U.S. Surgeon General on smoking and health, which concluded that cigarette smoking caused cancer, stated that smoking was most appropriately categorized as a habitual behavior not as drug addiction.

An explosion of research on the effects of nicotine took place during the 1970s and 1980s and continues to the 2000s. These studies confirmed that in compulsive users, the strength of the addiction and difficulty in quitting could be as strong for cigarettes as for heroin or cocaine. Studies of nicotine absorption revealed that the cigarette did for nicotine what crack did for cocaine, namely, provide a portable means of producing tiny but explosively fast spikes of drug in the brain that set off a cascade of biological effects that the smoker wanted to repeat. Other studies showed that there was a nicotine withdrawal syndrome that involved impairment of mental functioning, nicotine craving, and other symptoms. This work contributed to the development of objective standards by major health organizations, including the World Health Organization, for diagnosing the tobacco addiction-related disorders, which were technically termed “withdrawal” and “dependence.” Basic research studies mapped the actions of nicotine in the brain and showed that nicotine could produce powerful changes in brain function. Similar to cocaine and morphine, nicotine produces the entire range of physical and behavioral effects characteristic of addicting drugs. These effects include activation of brain reward systems that create behavioral effects and **physiological** cravings that lead to chronic drug use, tolerance and physical dependence, and withdrawal upon discontinuation.


Research on nicotine showed that it was possible to become addicted to pure nicotine, which led to the development of nicotine-delivering medicines, such as chewing gum containing nicotine and nicotine patches, to relieve withdrawal symptoms and make it easier to quit smoking. Thus, the scientific understanding of nicotine and tobacco as well as the concept of addiction changed during this productive period, which culminated in the 1988 report of the U.S. Surgeon General, *The Health Consequences of Smoking*. This report concluded that cigarettes were addicting; nicotine was the drug that caused addiction; and the underlying processes were similar to those that determined addiction to other drugs such as heroin and cocaine. These conclusions had radical implications for public health efforts to prevent tobacco use, medical efforts to help people quit smoking, and regulatory efforts to control the sale, distribution, and advertising of tobacco products.

Cigarettes: The Most Addicting Form of Nicotine

All tobacco products deliver addicting levels of nicotine and can lead to addictive patterns of use. The risk of addiction, however, varies across tobacco products. Oral smokeless products such as **snuff** and chewing tobacco do not produce as rapid an effect on the brain as cigarette smoke inhalation. In similar fashion, although many cigar and pipe smokers become addicted, these tobacco products are generally taken up later in life, are less likely to be inhaled, and lead to somewhat muted effects. The overall risk of addiction from these products is lower when compared to cigarettes. Speed of delivery is most remarkable with cigarettes,



physiology the study of the functions and processes of the body.



snuff a form of powdered tobacco, usually flavored, either sniffed into the nose or “dipped,” packed between cheek and gum. Snuff was popular in the eighteenth century but had faded to obscurity by the twentieth century.