

## On the Evolutionary Significance of Smoking Tobacco

Alan Cohen's excellent questions near the end of Monday's lecture caused me to think that a brief discussion of a few aspects of the evolutionary significance of smoking might be useful. Smoking is actually an absorbing topic, especially now, when American society seems to be changing its views on the topic rapidly and massively, and big bucks have really become involved. For us, trying to take an evolutionary view of current human affairs, it is also a potentially multi-faceted topic that can yield useful general insights, even though I cannot possibly know enough to deal with all aspects here. The following are a few things anyone must take into account when considering smoking from an evolutionary perspective:

**1. Physiological Pleasure.** Smoking evidently gives many people immediate pleasurable feelings, parallel to the effects of taking other drugs, and maybe exaggerations of pleasurable feelings that come from a large number of different reproductive acts. I don't understand the physiology involved, but I don't think we need to know all about that in order to understand this first point. The initial pleasurable effects, perhaps accurately described as "mind-altering" in part, surely influence many people to continue smoking, after doing it once or a few times, and are probably also involved (in ways yet to be elucidated) in the apparently repeated appearance of social, symbolic, and sacred aspects of tobacco use (see below).

**2. Addiction.** Nicotine is evidently also addictive, surely a reason for many people continuing to smoke in the face of (a) whatever they may learn about predictable deleterious physiological or genetic effects and (b) the considerable expense of routine use of tobacco and its accouterments. In evolutionary terms, addiction can reasonably be hypothesized to be an extreme case of seeking to repeat pleasure, pleasure being recognized as an effect that evolves only because it correlates with increased reproduction (yes, I do mean only). The compulsive repetition that is called addiction can also be seen as thwarting conscious or rational over-rides of immediate pleasures, hypothesized in the consciousness handout (#52, see p. 110) to be a facilitator of longer-term more substantial reproductive rewards. Once pleasure mechanisms have evolved to be experienced from a wide variety of our activities, pleasure surely becomes extensive in the central nervous system, evidently including generalized "centers" that can be influenced by a variety of stimuli (pleasure centers were originally demonstrated in rats by a Michigan psychologist, James Olds). Such generality probably makes us vulnerable to incidental or accidental addictions, such as might involve evolutionarily novel substances that somehow "short-circuit" so as to utilize a pleasure mechanism evolved in some other context (that's a speculation). Given addiction combined with evolutionary novelty (see below), I think we have a right to wonder if something like a "short-circuit" bypassing reproductive function is involved in the apparently "instantly" (in evolutionary terms) pleasurable effects of drugs like nicotine.

**3. Evolutionary Novelty.** For most of the current American human population, smoking can be viewed as an evolutionary novelty. Thus, tobacco is native to the New World, but it was carried to Europe only about 500 years (25 human generations) ago, and the rest of the world perhaps a little later (I have no direct information on this last aspect, but presume that tobacco traveled to Asia and Africa after it had been taken from America to Europe). This means that smoking may be prevalent because selection has not yet accomplished the elimination of those genetic variants who are (a) more strongly affected by the (evolutionarily false?) pleasures of

smoking, (b) more easily addicted to smoking, and (c) more influenced by the various social influences associated with smoking (see below). Use of any addictive substance that is deleterious to lifetime reproduction will surely decrease as a result of natural selection; but if the deleterious effects are not extreme, or if they occur late in life, such genetic change can be extremely slow. It is cultural change that is being proposed currently in this country, and that's happening as a result of rapidly growing medical knowledge about effects of tobacco. In other words, we are now trying, at various governmental levels, to employ conscious knowledge to accelerate reduction of tobacco use -- to find ways to overcome the lures of its short-term pleasures and addiction exactly as we are also doing with other addictive and deleterious drugs (government was successful long ago in declaring marijuana an illegal drug, but failed with alcohol; will smoking also be too popular?). Of course, at the same time we are manufacturing increasing numbers of new artificial chemicals, sometimes with somewhat parallel effects, but heralded and favored because of medically benefits that unfortunately often correlate with long lists of deleterious effects of various sorts. We would like to believe that we are all using our conscious and rational abilities to weigh costs and benefits to use such medically indicated or suggestive chemicals, but we are also obviously being influenced dramatically by advertising, therefore by social (and status) effects paralleling those involving nicotine and other naturally occurring drugs (see below). This morning, on ABC's *Good Morning, America*, a study was reviewed which estimated that 100,000 deaths are caused each year in the United States from "adverse reactions" to [man-made] drugs!

**4. Sacred Uses of Tobacco.** Arguments that tobacco use is an evolutionary novelty, and provides a pleasure "short-circuit" for most of us should be informed by asking what Native Americans do with tobacco, given that they have lived with tobacco in the New World for perhaps 600 generations. Here are two comments:

Tobacco use has evidently been sacred among native Americans for a long time. Henry R. Schoolcraft, in his 1851-57 *Historical and Statistical Information respecting the Indian Tribes of the United States*, is quoted on the Web as having said that "If anything exceeds the savage's belief in tobacco, it is that which attaches to his pipe. In life it is his dearest companion, and in death is inseparable; for whatever else may be forgotten at his funeral obsequies, his pipe is laid in the grave with him to solace him on his journey to the happy hunting-ground. The first pipe is among the most sacred of their traditions; as well it may be, when it is sincerely believed that no other than the Great Spirit himself was the original smoker."

Continuing: "As far as may be gathered from the various and slightly conflicting accounts of Indian smoking observances, it would seem that to every tribe, or, if it be an extensive one, to every detachment of a tribe, belongs a potent instrument known as medicine pipe-stem. It is nothing more than a tobacco pipe, splendidly adorned with savage trappings, yet it is regarded as a sacred thing to be used only on the most solemn occasions, or in the transaction of such important business as among us could only be concluded by the sanction of a Cabinet Council, and affixing the royal signature."

**5. Social Uses of Tobacco.** For some reason (that is not clear enough to me that I can discuss it confidently) many people -- especially young people in the acute stages of seeking, perhaps for the first time on their own, desirable or acceptable social positions -- often believe that smoking is a "cool" activity that gives them higher status. I feel strongly that I have witnessed this effect all my life (we're talking at least 60 years here!). Even though I have come to look with abhorrence on the habit

of smoking, at 18 I had the ludicrous belief that smoking a cigar gave me prestige. Even today I sometimes feel almost compellingly "drawn" by the feeling of social acceptance and casual arrogance that I think I see in the postures, attitudes, and manners of people (especially young people) when they are smoking. This general attitude is surely reinforced and enhanced by the persuasions of the tobacco companies in their advertisements. I imagine those who develop and market tobacco products intend to develop such feelings in the people who look at their ads, and I imagine as well that they are just building on something that society does for them to a lesser extent.

I therefore think that smoking, particularly of cigarettes, long ago became a social activity of considerable significance in the United States. My own observations suggest to me that it has just about the same effects in other countries. The above remarks about Native American use of tobacco have to make us think about why certain substances that affect us physiologically seem especially likely to take on social or sacred significance, and (if you are an evolutionist) what those social effects mean for reproduction. Maybe it's instant "mind-altering" effects that help cause us to think this way.

**8. Tobacco as Traditional.** Not only has smoking become a social tradition, but because of its prevalence it has also become a traditional way of making a living in some parts of the country (an old dictionary I consulted asserted that 80,000,000 people used tobacco, and that was surely 75-100 years ago when the world population was a small fraction of what it is today!). This traditional way of making a living happens to be an aspect of agriculture, which furthers a certain air of respectability. It is a curious fact that we take extreme and expensive measures in the effort to prevent farmers in other countries from growing crops such as hemp and poppies and coca, from which drugs are made that are addictive and deleterious as well as socially popular in the United States (I am also told that we tend to refine these products to ridiculously potent levels, far beyond those at which they have long been used by Native Americans), yet we cannot bring ourselves even to stop providing various kinds of encouragement and subsidies to tobacco farmers in the United States. Moreover, we can't seem to get interested in the effects of tobacco sold out of America on people in other countries, despite our concern about similarly deleterious products sold into this country from others. Tobacco is thus not only a social issue, but an economic and political one, regionally within this country and internationally, and it involves traditions in way of life that can be used to thwart reduction of its use.

**8. Tobacco and War.** There is something fascinating about the fact that marijuana has come to be despised by certain segments of our population, and the people who use it are sometimes even more despised, while smoking tobacco and using alcohol remain respectable in some of the same circles. One cannot but wonder if this curious difference of attitude does not have roots in (a) the fact that marijuana use was virtually the badge of identification for protestors of the Viet Nam war (I think the laws against it were passed around 1930, but the real "hate" associated with it in some quarters seems to have come along later), and as a result a target of hate for those people who saw themselves as so patriotic that any war our country decides to fight is one we should all embrace unquestioningly, while (b) tobacco smoking has been actually promoted for a long time as virtually a patriotic American activity, perhaps especially during the two world wars, wars for which there was virtually universal strong support. I have wondered at length (and watched unsuccessfully for published evidence) whether the physiological effects of smoking marijuana do not (sometimes) create attitudes interpreted as contrary to the interests of organized patriotism ("Make love not war!"), and tobacco smoking an effect supportive of

organized patriotism. Thus, people seem to smoke tobacco as a social activity in which comradeship and conversation, and even collective resolve, may be promoted, and sometimes under conditions in which there is a shared nervousness, or a need to relax and collect one's thoughts, as before a battle or after one (well, after other things too -- exams, for example -- well, even before exams). Sometimes, at least, the effects of smoking marijuana are almost the opposite, drowsiness and retreat into one's own thoughts, the latter believed by users to be enhanced in some fashion. In the three wars I can remember well, the military seemed to crave tobacco on a wide scale, and it also seemed to make everyone feel very good to hear that cigarettes were being supplied to the military in enormous quantities. Is it possible that cigarettes make warriors better? Or do they mainly make them feel better during breaks? As far as I can tell, there is from marijuana rarely if at all a proneness to aggression, or unity and resolve in an active common defense (or offense). I have great difficulty with a scenario of groups of pot-smokers taking their last puffs in unison, grinding out their butts with the heels of their boots, turning in unison toward the job (or the enemy), and striding out with resolutely grim faces, while saying in steely voices through tight lips, "*Well, let's get on with it!*" Has all of this anything to do with our different attitudes toward marijuana and tobacco smoking?

**9. Tobacco and Cancer.** It's not easy to prove that any particular substance or practice increases the likelihood of cancer, and that surely affects the way we think consciously about the advisability of smoking or not. Cancer causes will always be difficult to pinpoint. Cancer apparently results from successive alterations of the genetic materials, concentrated in tissues that most likely to suffer such damage, thus have retained the greatest abilities to repair damage by rapid cell division that necessarily entails a relatively high risk of running amuck. Because genetic changes are random with respect to whether their effects are beneficial or deleterious, alterations that might lead to cancer are necessarily infrequent. Cancer from any cause is therefore likely to occur years following the causative episode(s) and is never entirely predictable. The time involved and the indirectness of the necessary changes (e.g., increases in mutation rates) mean that doubt can always be cast by arguing that correlations do not prove cause and effect (ironically, these are the same doubts that people often seek to cast on the idea that adaptations evolve). These facts have surely retarded conscious understanding and acceptance of the deleterious effects of smoking. It seems to me that other apparent (or possible) effects of smoking, such as emphysema, high blood pressure, deleterious effects on blood vessels, and many others seem even more remote to people, and probably less horrendous than cancer, so that they weigh even less heavily in decisions about whether or not to smoke.

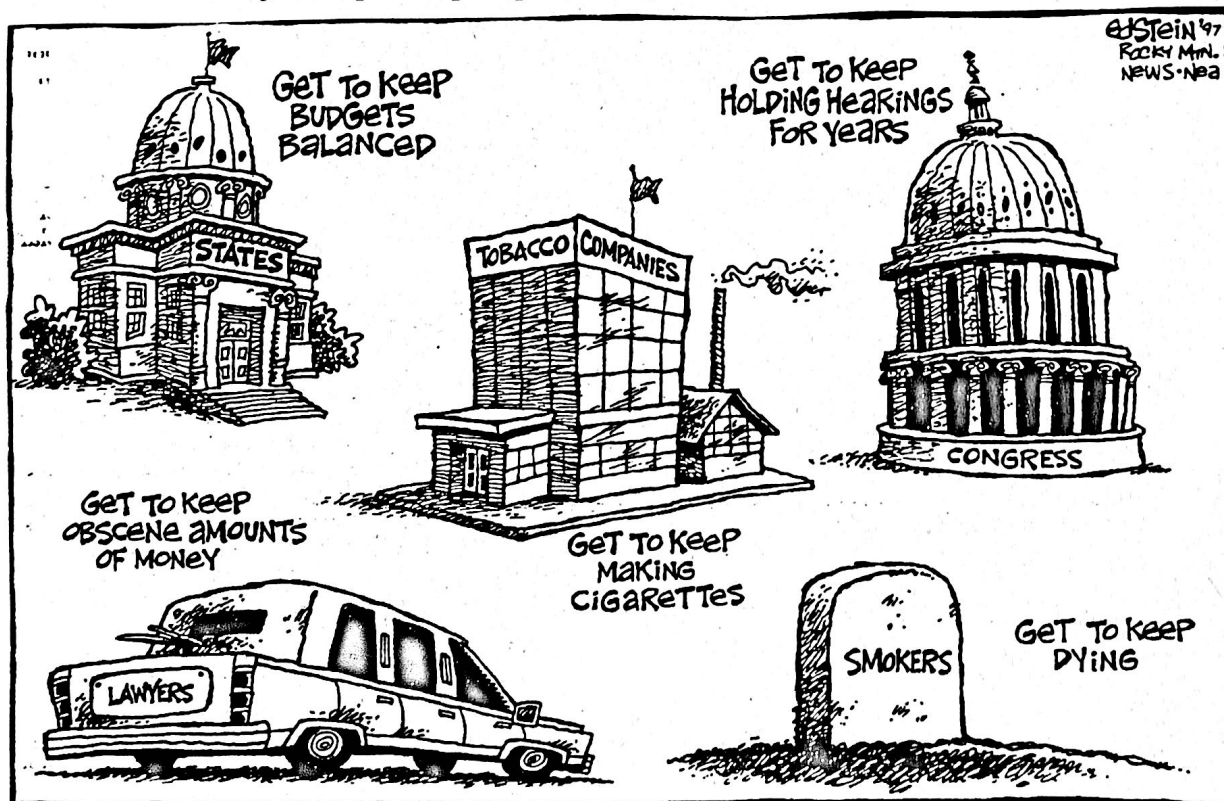
**10. Net Reproductive Effects of Tobacco.** Alan noted that if smoking were reproductively deleterious, tendencies to engage in smoking should ebb as a result of natural selection, even if people were never conscious of the deleterious effects. Remarks above begin explaining why such effects might be very slow to happen, or, if smoking only appeared to us to have a net deleterious effect on reproduction, might not happen at all. Thus, it is difficult to prove that the deleterious effects of smoking -- say, shortening of life and reduction of health before death -- outweigh the positive effects of status acquired as a result of smoking, particularly so long as the status effect can be exaggerated by the persuasion and rhetoric of what appears to (especially young?) people as "society's" admiration of the smoker. Such status effects can influence an individual's access to friends, partners in parenthood, and potential associates with social, professional, and economic benefits to offer. To understand net effects of any activity such as smoking tobacco, one would have to measure positive social effects on reproductive success, and also negative health effects, and weigh them against one another (exactly why the social effects should

appear, or should be so easy to promote, is a difficult question). For tobacco, the answer might vary in different times, different places, and different peoples. In other words, in certain social circumstances it is not clear that smoking is not reproductively beneficial; what the government is now trying to accomplish is to remove the social effects that might make this so. I think we are doing it because we are being dazzled by the medical expenses of tobacco smoking.

**11. Addiction, Pleasure, Status, and Social Manipulation.** It seems likely that different people, maybe males and females, young and old people, people in different occupations, or people in different societies or with different geographic origins, secure their special pleasures from different mixes or different attributes of tobacco (e.g., aroma versus taste; elegance of smoking device versus nicotine content). It would therefore make sense if the enormous corporations that manufacture, advertise, and sell tobacco products to these various populations either inadvertently or deliberately create brands and kinds of smoking devices (cigarettes, cigars, pipes, chewing tobacco, snuff, etc.) that appeal differentially to different portions of the population. Both physiological pleasures and social effects are surely involved. It is odd (to me) that we are sometimes so reluctant to admit that, in every identifiable realm of pleasure or need, we are likely to be manipulated extensively by many such concentrations of power and influence, whether in commerce, education, religion, medicine, politics, economics, or whatever. Is there any other reason for such concentrations of power and influence to develop, elaborate, and persist?

As a footnote, it is curious that the great evolutionary theorist and statistician, Sir Ronald A. Fisher, late in his life (in the 1950's) supported the tobacco companies in their insistence that smoking does not cause cancer (see the biography written by his daughter -- for this essay I have not been able to locate the precise citation).

*Now think about it: Do you really believe it possible to analyze completely and accurately any current topic that involves humans, without including an evolutionary adaptive perspective?*



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