

Refining Litigation as an Instrument of Tobacco Control Annotated Expert Testimony on Nicotine Addiction

INTRODUCTION

Tobacco industry conduct has been the focus of extensive judicial scrutiny. Numerous individual and class-action lawsuits have also been filed and many more lawsuits are expected both in this country and elsewhere.

Judges and juries rely on expert witnesses to untangle complex scientific and technical questions in tobacco litigation. The admission of tobacco documents and articles from scientific journals is not enough. Experts are needed to provide a context for interpreting the particular facts of each case.

Much of tobacco litigation involves the question of nicotine addiction. The nicotine in tobacco smoke causes a powerful addiction leading to dependence in 85 percent of smokers. Although ritualistic aspects of smoking, peer pressure, awareness and personal motivation affect smoking behavior, well settled research shows that nicotine addiction is the primary cause of sustained smoking. Internal industry documents and other sources of information reveal that cigarette manufacturers have exploited the addictive properties of nicotine in order to sell cigarettes while downplaying nicotine addiction to the public.

The leading cigarette manufacturers have made some questionable claims regarding addiction during litigation. First, manufacturers have argued that smoking cigarettes is not addictive because some smokers can, and have, quit smoking on their own. Second, they have argued that smoking cigarettes is not addictive because it does not lead to physical dependence. Third, they have argued that smoking cigarettes is not addictive because it does not induce intoxication. Fourth, they have argued that smoking cigarettes is not addictive because cigarettes are not like other addictive drugs; rather, smoking is merely a pleasurable behavior. Fifth they may argue that smokers should be blamed because they lacked the personal motivation to quit. Focusing on the plaintiff's conduct tends to distract attention from the defendant's conduct.

The following excerpts of expert trial testimony are intended to provide potential expert witnesses and other interested parties with a sense of how smoking and health science is presented and challenged in the courtrooms. The following excerpts of expert witness testimony are selected from various cases. A brief description is provided at the beginning of each excerpt along with a citation. "Focus points" are included throughout the excerpts providing insight into the questioning attorney's motivations for asking particular questions, comments on the expert's testimony and overall trial strategy. The cited transcripts as well as others are available at the Deposition and Trial Testimony Archive (DATTA) housed at the *Legacy Tobacco Documents Library*. DATTA contains 4,850 transcripts of depositions and trial testimony, including a total of about 820, 000 transcript pages. (www.legacy.library.ucsf.edu)¹

¹ The commentary and annotations are for educational purposes only. They do not necessarily represent the opinions of the testifying expert or other parties involved in the litigation. This work is funded by a grant from the American Legacy Foundation.

ANNOTATED TESTIMONY

The expert testifies that the nicotine in cigarettes mimics a neurotransmitter in the body and artificially triggers elevated hormonal activity. Direct Testimony of Professor Neal Benowitz (Plaintiff), *Boeken v. Philip Morris*, April 6, 2001, Pp. 1906-1910.

Q. Why is it addictive?

A. Well, let me just start by talking about what is nicotine.

Q. Okay.

A. It's a chemical that's found mostly in tobacco. Significant amounts, obviously in tobacco. It's a chemical that has a structure that's like a body hormone, acetylcholine.

Q. Stop.

A. It's called acetylcholine and it's important here more than in the body because this is responsible for nerve communication. One nerve talks to another. It signals by release of this hormone. I could call it A.C.H., maybe that would be easier.

Focus Point: The expert's detailed description of the chemical processes underlying nicotine addiction provides jurors with an accurate understanding of the addiction and helps the jury assess the extent to which the plaintiff was addicted. The description also counters the defendant's expert testimony emphasizing the role of personal responsibility in smoking cessation. A primary strategy for the defendants in tobacco litigation has been to blame the smoker for his or her smoking-related diseases. This defense tactic shifts the jury and judge's focus from the manufacturer's conduct to that of the plaintiff.

Q. A.C.H., where is that in the body?

A. It's throughout the nervous system, in very high concentration in the brain. A.C.H. works by binding to what's called a receptor. A receptor is a protein that behaves like a lock and key mechanism so the key would be the hormone or A.C.H. that attaches to the receptor and then activates the receptor. And then the receptor does something, causes an effect in the brain that actually causes release of other hormones that affect mood and behavior.

Q. Let me stop you for a second. A.C.H. allows the receptors to work?

A. Right. That's the key that opens up the lock. The receptor is the lock.

Q. Define 'receptor.'

A. Okay. Well, a receptor is a protein that has got a part of its structure is to allow hormones or chemicals to attach to it. There are -- it's shaped in such a way, sort of like a lock so a key fits in. And it is just the right shape. And in these receptors, these are A.C.H. receptors that are just the right shape to fit into this keyhole.

Q. So what happens when the key fits into the keyhole?

A. Well, it activates the receptor, actually, causes a change in the shape of the receptor, activates a nerve to fire and then that nerve, in turn, releases other hormones that have effects on behavior and thinking and mood. So, anyway, getting back to what I was saying before, nicotine, is shaped like A.C.H. It's not normally in the body. But if a person takes in nicotine, it attaches to the same receptors that are meant for A.C.H. so it's a way for you to sort of take, in a drug form, a drug that stimulates receptors that are

meant for a body hormone. So you take nicotine and you activate the receptors just as if your brain was releasing A.C.H.

Q. So nicotine is like a duplicate key for A.C.H.?

A. Right.

Q. And nicotine, therefore, artificially does what your brain can do under normal circumstances?

Focus Point: Later in this case, the defendant's expert describes this process as a slight elevation in naturally occurring chemicals in the body. The defendant's counsel probably wants the jury and judge to think of cigarettes as nothing more than tobacco wrapped in paper with a filter at the end. In actuality, cigarettes are highly engineered products.

A. Right. But it does it in larger amounts because you can activate these receptors more with nicotine than the brain would normally do it with A.C.H. and you can do it at different times. You can do it at times when A.C.H. levels might be low but you can take a cigarette and deliver the receptors. So you can sort of take over a normal body function with the drug.

Q. So let me stop you there, again. Because I know you have talked about this lots of times, but this is the first time that we are hearing it. Inside of a person's body, the body is regulated, you know, to be a normal kind of regular body, under control, regulated body. There's a certain amount of A.C.H. which is there, and every once in awhile, whenever the body tells it to, it does its open the lock thing, and it has the results that are necessary to keep the body in tune. Is that right so far?

A. Yes.

Q. When someone takes nicotine into their body, the amount of nicotine the person can take into the body can be way more, can mimic way more A.C.H. than the body usually needs and so the thing either gets unlocked and the door opened wider or the door opened more frequently or both. Is that a rough analogy so far?

A. Yes.

The expert describes the mood and performance changes caused by the nicotine in cigarette smoke and explains that smokers eventually need the nicotine in cigarettes just to feel normal. Direct Testimony of Professor Neal Benowitz (Plaintiff), *Boeken v. Philip Morris*, April 6, 2001, Pp. 1917-20, 1924-25.

A. Now what A.C.H. effects do, what activating the receptor does is it causes the brain to release a number of hormones. One hormone that's talked about a lot is dopamine. Dopamine is talked about a lot because that is a hormone in the brain that's involved with pleasure, something feeling good or you feeling good or some sort of pleasurable response. And every drug of abuse releases dopamine in key parts of the brain. That's a commonality. Nicotine also causes other hormones to be released, to do different things. One hormone, as I said, causes pleasure. One hormone can cause arousal of stimulation. Some smokers say the first cigarette in the morning helps me wake up, like coffee would. Smokers will say that helps me concentrate and focus and stay alert. There are other hormones that are involved in performance, thinking and performance effects. So some people say I can work better, you can concentrate better with nicotine. There are other

hormones that are involved in stress mechanism, so many smokers say, I feel stressed, a cigarette really helps me deal with stress. There are some effects that are a little bit like anti-depressant drugs. So many smokers say if I feel bad, if I feel depressed, I have a cigarette, it makes me feel better. An important concept and also eating. The effects of nicotine to reduce body weight, to lose appetite and some people smoke for body weight control. The thing that smokers find is that they use nicotine to help cope with a lot of daily stresses. So they can get stimulation, if they need it, they can get relaxation if they are stressed. They can help lift their mood. They can help concentrate. They can help focus. And many smokers come to depend on nicotine to get through daily life stresses. They use nicotine every day in a regular way and when they don't have it, they feel quite lost and their behavior is disrupted in a sense. So part one -- one-half of what people get from smoking is these nicotine effects that they use to control mood and behavior.

Focus Point: The defendant's counsel may offer expert testimony that links addiction with intoxication or other such psychoactive effects of the type caused by narcotics or heavy alcohol consumption. This interpretation of addiction appears to exploit the common belief that the level of intoxication associated with a drug accurately predicts the drug's potential for addiction. Because the mood and performance changes associated with smoking are less dramatic than those associated with narcotics or heavy alcohol consumption, a jury might conclude that the nicotine in cigarettes is not very addictive. If the jury draws this conclusion, it might blame the plaintiff for any smoking-related illnesses he or she suffered.

By defining nicotine addiction in terms of "normal" and "abnormal" brain function, the plaintiff's expert counters the perception of addiction as simply the desire to get "high." The plaintiff's expert provides an accurate diagnostic framework to evaluate whether the plaintiff was addicted and to what extent he was addicted.

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A. The other thing which is very important is that there's what's called tolerance to nicotine and other drugs of abuse and actually any drug that effects the brain. Tolerance means that the brain is trying to normalize its function. So if it gets too much stimulation in these receptors, the brain tries to normalize things.

And what happens is the brain actually changes the number of receptors in the brain that are meant to be A.C.H. receptors. They are increased in many parts of the brain. They are doubled. Now, they don't work the same way. But the structure of the brain changes. So you can do scanning or you can do tests on brains from smokers who have died and non-smokers who have died and you can measure nicotine receptors and it is quite a different pattern and number.

Q. So smokers get more nicotine receptors?

A. Get more nicotine receptors, they don't function the same way. But the structure of their brain is different than a smoker, different than a non-smoker.

* * *

A. When the brain becomes tolerant, then it changes and gets to the state that it needs nicotine to function normally, not super normally but just normally. And then when a person doesn't smoke cigarettes, then there is a subnormal release of hormones, so it is not the normal A.C.H. function any more. Now there is a deficient release and what one

sees are withdrawal symptoms that are the opposite of the primary symptoms. So instead of feeling good, smokers don't feel good, they don't feel right, they feel depressed, they feel anxious, they are often irritable, often have trouble getting along with family and co-workers, smokers, when they can't smoke, often have trouble concentrating on their jobs and doing their work. They often have trouble dealing with stress. They feel more stressed, feel they can't cope with stress as well. Hunger, weight gain is common. So those are withdrawal symptoms or symptoms. So that's the opposite. And smokers smoke for both those things. They smoke because cigarettes do some things that they like and they also smoke because when they are not smoking they feel bad, and if they feel bad, immediately they have a cigarette, they feel better, because they are relieving the withdrawal symptoms.

So it's a combination of both those things that play a role in smoking. When the brain becomes tolerant, then it changes and gets to the state that it needs nicotine to function normally, not super normally but just normally. And then when a person doesn't smoke cigarettes, then there is a subnormal release of hormones, so it is not the normal A.C.H. function any more.

Now there is a deficient release and what one sees are withdrawal symptoms that are the opposite of the primary symptoms. So instead of feeling good, smokers don't feel good, they don't feel right, they feel depressed, they feel anxious, they are often irritable, often have trouble getting along with family and co-workers, smokers, when they can't smoke, often have trouble concentrating on their jobs and doing their work.

They often have trouble dealing with stress. They feel more stressed, feel they can't cope with stress as well. Hunger, weight gain is common. So those are withdrawal symptoms or symptoms. So that's the opposite. And smokers smoke for both those things. They smoke because cigarettes do some things that they like and they also smoke because when they are not smoking they feel bad, and if they feel bad, immediately they have a cigarette, they feel better, because they are relieving the withdrawal symptoms. So it's a combination of both those things that play a role in smoking.

Focus Point: The plaintiff's expert testifies that much of the mood and performance changes that smokers experience when smoking is actually relief from nicotine withdrawal. Typical withdrawal symptoms include anxiety, tension, depression, irritability, difficulty in concentrating, disorientation, increased eating, restlessness, headaches, sweating, insomnia, heart palpitation, and tremors.

The expert testifies that burning cigarettes create a nicotine aerosol that greatly speeds up the time between inhalation and the nicotine-induced mood and performance changes. Direct Testimony of Professor Neal Benowitz (Plaintiff), *Boeken v. Philip Morris*, April 6, 2001, Pp. 1910-13.

A. Well, I was going to explain the whole issue of nicotine delivery from a cigarette, just in terms of what is nicotine, the reason why nicotine is in a plant is thought to be because it is a natural insecticide. ... It is sold in stores as black flag 40 -- you can buy it -- or black leaf 40, and use it to spray on roses. That's at higher concentrations. People can use it without getting sick, in part, because of the cigarette.

Focus Point: The testimony that nicotine is a natural and commercial insecticide tells jurors that nicotine is not simply a harmless chemical compound found in tobacco plants, a belief that defendant's counsel may try to foster.

When you smoke a cigarette, when you heat up a cigarette, you boil off nicotine. Nicotine then boils off and then combines with other things that are in the cigarette to form droplets which contain tar, water and nicotine. And those droplets are what's called aerosol, a bunch of droplets that are in gas, which is carbon monoxide and other gases. You breathe nicotine -- you breathe the gas in. It goes to your lungs, very rapidly gets absorbed. And so within 10 or 15 seconds of taking a puff, nicotine gets to your brain because it goes right, lungs, heart and brain. One of the things about smoking is that because it goes right to your brain and it's in a short period of time, you can get very high concentrations, concentrations that if you try to eat nicotine, would poison you. But by smoking them, you can get very high concentrations in a short time to the brain.

Focus Point: Testimony on the speed of nicotine absorption helps the jury distinguish the effects of nicotine absorbed during smoking with the effects of nicotine absorbed through the use of nicotine replacement therapies, such as nicotine gum. Nicotine replacement therapies are effective cessation products, but they cannot replace the nicotine-related effects of smoking. Moreover, clinical guidelines state that cessation products should be used in combination with counseling and other medications.

A. It is most addicting drugs, you take something, you get an effect right away, the body connects it right away and that's the most common situation for addiction. So we know that cigarettes are the most addicting way to take nicotine, just like smoking crack cocaine is the most addicting way the use cocaine. Because if you smoke cocaine, cocaine gets there in higher concentrations, faster, and you can control the dose a little bit.

Focus Point: Focusing on the dose response time counters a possible argument for the defendant's counsel that nicotine creates, at worst, only a mild addiction when compared to other drugs. Note that this prepares the jury for later testimony focusing on the defendant's efforts to increase the dose response time for nicotine.

Q. As opposed to, let's stop there for a second, using crack as opposed to what, snorting cocaine?

A. Snorting, yeah, snorting cocaine or you could even swallow cocaine and you can get an effect. But it is much slower onset. You can't control the dose, so it's not widely used that way. But smoking cocaine is much more addictive than snorting cocaine.

The expert testifies that the nicotine absorbed when smoking cigarettes has vastly different effects than the nicotine received from cessation aids, like the patch or nicotine gum. Direct Testimony of Neal Benowitz (Plaintiff), *United States of America v. Philip Morris et al.*, 2005, Pp 18-21.

Q. You said earlier that it takes 15 to 20 seconds for nicotine to travel from a puff to the smoker's brain. What is the significance of the speed with which nicotine moves through the bloodstream to the brain?

A. The rapidity with which a drug has its effects is an important determinant of the addictiveness of the drug. Rapidity of delivery to the brain is important for several reasons. First, the more quickly a drug gets absorbed and goes to the brain, the higher will be the concentrations and the greater the effects. Second, the more rapidly a drug effect occurs with respect to taking a drug, the more reinforcing the drug-taking process becomes. When a drug is more reinforcing it is more likely to produce addictive behavior. Third, the fact that one takes a drug and gets an effect from that drug quickly allows the individual to titrate or adjust the dose to get the optimal effects. Thus a person can take bigger or smaller puffs, or more or fewer puffs in order to get just the amount of nicotine that they desire.

Q. How would you describe the high concentration in which nicotine enters the brain from smoking?

A. This has been described as an arterial spike. In other words, there is a very rapid rise in the nicotine concentration in the arterial blood which supplies the brain, as well as other body organs.

Q. What is the consequence of the rapid delivery of nicotine to the brain with respect to its reinforcing qualities?

A. The fact that nicotine is absorbed very quickly and results in high arterial blood levels, makes nicotine obtained from cigarette smoke highly reinforcing and addictive. This phenomenon is sometimes called rapid reinforcement.

Focus Point: The defendant's counsel will explore the plaintiff's efforts to stop smoking. The defendant's counsel may try to frame the plaintiff's smoking behavior in a way that suggests the smoker wanted to smoke or lacked the personal responsibility to quit. For example, in situations where the plaintiff used a cessation aid, but was unable to quit, the defendant's counsel might argue that the plaintiff lacked personal motivation. The plaintiff's expert's testimony counters this impression by pointing out that nicotine replacement cessation aids do not replace the effects of nicotine absorbed by smoking.

Q. Is there any other significance to the speed with which nicotine enters the brain?

A. Rapid absorption results in arterial levels of nicotine that are high enough to overcome, at least in part, the tolerance the body has developed to the drug.

Q. What is the significance of smoking nicotine in the form of a cigarette, instead of ingesting it in some other form?

A. Smoking nicotine provides the fastest rate of absorption and highest blood levels of nicotine. When nicotine is taken in from a patch, blood levels rise gradually over four to six hours, and the intensity of effect on the brain is quite low. When someone takes nicotine from gum or a lozenge, blood levels rise over about 30 minutes, with much less

intense stimulation than with smoking. Even with nicotine nasal spray, which is the fastest delivery system aside from smoking, it takes about five minutes before one sees maximal nicotine levels, compared to 15 to 20 seconds with smoking.

Q. As a comparison, how long does it take medicine in the form of a pill to enter and affect the body?

A. Drugs taken in the form of a pill reach their peak concentrations from 30 minutes to two hours, depending upon the drug and the characteristics of the pill.

Q. Why the large difference in the amount of time?

A. When a drug is taken by mouth, the pill has to dissolve and the drug has to pass through the stomach to the small intestine, from which it is absorbed.

Q. How does the rate at which nicotine is delivered from a cigarette compare to the amount of time it takes alcohol to affect the body after someone takes a drink of alcohol?

A. Alcohol is absorbed much more slowly, with peak concentrations seen at 30 minutes or later. Thus, the rate of rise of alcohol levels in the bloodstream and in the brain is much, much slower than that of nicotine after smoking.

Q. In terms of its effects on the body, how does chewing nicotine gum compare to obtaining nicotine through a cigarette?

A. When a person chews a two milligram piece of nicotine gum, the overall absorption is about one milligram, similar to that of a cigarette. However, when chewing nicotine gum, blood levels rise gradually over thirty minutes, reaching peak levels of 5 to 7 nanograms per milliliter. In contrast, smoking a cigarette delivers the same one milligram over approximately eight minutes, with peak arterial nicotine levels in the range of 50 nanograms per milliliter or higher.

Q. In terms of its effects on the body, how does use of a nicotine patch compare to obtaining nicotine through a cigarette?

A. When nicotine is absorbed from a patch, it moves slowly through the skin, and peak levels are achieved in four to six hours. Nicotine levels rise so slowly that most individuals are not aware of the psychoactive effects of the nicotine they are absorbing.

Q. Are nicotine patches addictive?

A. No.

Q. Why is a cigarette addictive and the patch not?

A. The difference is due to the rate of absorption. As noted previously, each cigarette results in a high peak arterial nicotine level and rapid and intense effects on the brain. In contrast, a patch produces a gradual and slowly rising nicotine level, which has relatively little psycho-activity.

Q. Some people have compared caffeine with nicotine in its effects on the body. What do you think of that comparison?

Focus Point: The defendant's counsel will focus on intoxication. A comparison of just the mood and performance effects of drugs makes nicotine addiction seem relatively mild. Note that the defendant's counsel may not address the differences in dose response speed when making this comparison. The cigarette quickly delivers nicotine to the smoker's brain. Caffeinated beverages deliver caffeine at a much slower rate.

A. Both caffeine and nicotine are drugs that work on receptors and have stimulant effects. However, caffeine, like alcohol, is absorbed slowly, with peak levels seen in about 30

minutes. The resultant effects on mental functioning are more subtle. Most people feel a gradual alertness and brightness, but generally do not feel the rapid stimulation that one feels after smoking a cigarette.

The expert concludes that internal tobacco industry documents reveal the defendant secretly designed cigarettes to be addictive as possible. Direct Testimony of Jack Henningfield, *United States of America v. Philip Morris et al.*, 2005, Pp. 35-39 & Direct Testimony of Neal Benowitz (Plaintiff), *Williams v. Philip Morris*, February 26, 1999, Pp. 56-58.

Q. How do the cigarette design efforts of Defendants compare to the efforts of designers of drug delivery systems, like yourself?

A. They use many of the same types of techniques to control the nicotine dose and speed of absorption to the blood stream. However, they use these techniques to increase the ability to obtain more drug than advertised and to increase addictive potential.

Q. From your review of the documents, do the Defendant tobacco companies understand the importance of the different dimensions of drug delivery you have identified – dosage form, location, speed of delivery, and dose – to addiction potential?

A. Yes. The tobacco companies understand the techniques and their effects, have studied nicotine dose control for many decades, and employ many such techniques in their marketed products.

Focus Point: The defendant's counsel may try to imply that the nicotine in cigarette tobacco is naturally occurring and naturally fluctuates. The Plaintiff's expert reveals that the opposite is true; that tobacco manufacturers have engineered cigarettes to make them as addictive as possible.

This testimony supports the plaintiff's claim that he was never fully aware of the addictiveness of smoking. The defendant's counsel cannot argue that the plaintiff consciously assumed the risk of smoking, if that risk was hidden from the plaintiff.

Q. How in your view do cigarettes designed and sold by Defendants reflect that understanding?

A. Cigarettes sold by Defendants facilitate addiction development and maintenance by enabling rapid and readily controlled nicotine delivery. In comparison to cigars, which have mildly alkaline smoke that is not necessary to inhale to provide nicotine absorption, cigarettes have smoke that is easier to inhale, and indeed reinforce inhalation with their high speed of nicotine absorption. In contrast, the nicotine patch is not an attractive dosage form for causing or sustaining addiction, but it is acceptable to people to use for smoking cessation.

I have already discussed the importance of speed of delivery as a determinant of the effects of addictive drugs. With respect to nicotine, absorption of one milligram of nicotine from a cigarette or intravenous injection can produce distinct effects on heart rate and mood. In contrast, the approximately one milligram of nicotine delivered per hour by a nicotine patch produces little discernable effect on mood or heart rate, although it will relieve tobacco withdrawal symptoms. Indeed, Defendants recognized long ago that the cigarette is an optimal vehicle for delivering nicotine.

The dose of drug absorbed is another major determinant of its effects. The approach of the tobacco industry, in light of their understanding that cigarette smokers differ both in the levels of nicotine they self-administer and in their needs for different levels of nicotine to sustain addiction, is to ensure that virtually any major cigarette brand can readily provide any desired dose. The maximum dosages that can be obtained are several times greater than those advertised. Moreover, while smokers in general have become increasingly concerned about the health effects of tar and nicotine, and have increasingly sought brands delivering lower levels over the years, the response of the tobacco industry has been to ensure that virtually any cigarette on the market is capable of providing the nicotine doses needed by smokers to sustain their addictions.

Q. You have been shown U.S. Ex. 46,420 for review. Please describe this document for the Court.

A. This document is a September 30, 1966 report from BATCo titled “Further Work on ‘Extractable’ Nicotine.”

Focus Point: Expert witnesses spend a significant amount of time reviewing exhibits for judges and juries. In some cases, the expert may help admit the exhibit into evidence. This work is very important. Tobacco documents and journal articles alone are not enough for judges and juries. An expert is needed to provide a context for the documents and to apply research to the facts of the case.

Q. Please identify any portions that you believe support your conclusions about Defendants’ understanding of the importance of the rate of delivery.

A. This 1966 document illustrates a sophisticated understanding the importance of controlling the dose and speed of delivery in the addictive effects of nicotine. For example, in the paragraph headed “Summary and Conclusions” on Bates page 00039306, the document states that “at the present time, it would appear that increased smoker response is associated with nicotine reaching the brain more quickly.” Then, on page 00039310, the report states: “It is generally thought that the physiological response to nicotine in smoke follows the sequence (i) absorption of nicotine in the various regions of the respiratory system; (ii) transport of the nicotine by the blood-stream to the brain where it exhibits its physiological effect. On this basis, it appears reasonable to assume that the increased response of a smoker to the smoke with a higher amount of extractable nicotine may be either because the nicotine reaches the brain in a different chemical form or because it reaches the brain more quickly.” The document then goes on to discuss the issue and to indicate that more research is needed to even more thoroughly understand the factors controlling nicotine delivery.

Q. What is the significance of this document?

A. This document, like many others I have reviewed, clearly reveals that the tobacco industry understood the concept that rate of drug delivery was an important determinant of the effects of nicotine on the brain, and it reveals a sophisticated understanding of this concept that substantially predates [National Institute on Drug Abuse’s] research efforts on the topic. These efforts on rate of nicotine delivery as a determinant of physiological effects has little, if anything to do with using nicotine for flavoring of the cigarette.

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Focus Point: The plaintiff's expert points out that numerous internal industry documents, which the cigarette industry was forced to disclose and publish on the internet, describe the defendant's research on nicotine delivery and resulting cigarette designs. The defendant's counsel may try to describe these documents as the work of independent investigators or the extreme views of a few individuals.

Q. What is your overall conclusion about the role that cigarette design plays in the product?

A. My overall conclusion is that conventional cigarettes are designed to dispense nicotine in addicting doses on the premise that cigarette smoke is a palatable and effective vehicle for nicotine delivery, albeit a highly toxic vehicle.

Q. On what do you base that conclusion?

A. Documents show that nicotine dosing characteristics have been extensively studied and controlled by the tobacco industry. Furthermore, laboratory and real world studies confirm that despite the possibility of substantially altering nicotine delivery from cigarettes, actual nicotine intake varies remarkably little across a wide range of advertised yields. My own extensive reviews of the scientific literature confirm that wide variations in presumed nicotine dose, as suggested by the FTC rating, produce remarkably small changes in actual nicotine intake.

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Q. Continuing, "It was found that higher peak concentrations of nicotine in blood were achieved at higher pHs. Since the amounts of inhaled nicotine were same, the results indicate that the higher the pH the more rapidly nicotine enters the bloodstream. "Eventually, of course, all of the nicotine regardless of pH would enter the bloodstream. Only rate of entry is pH dependent." Now, in regard to application of that finding, the idea of -- I think we're beyond the possibility of confusion in regard to amounts of inhaled nicotine. We got that. That is what they get from the smoke. But in regard to the results which indicate that the higher the pH the more rapidly the nicotine enters the bloodstream and only the rate of entry is pH dependent. What does that mean?

A. Well, this study actually involves nicotine aerosol. It's not a cigarette.

Q. All right. But in terms of -- all right. So, can you make -- can you translate that over to the application of a cigarette?

A. Well, not directly, actually.

Q. All right. Let's go down to the bottom of it. "We found that increased filler --" Now, what's filler?

A. Well, these are cigarette studies. This has to do with change in pH of some of the constituents of the cigarette.

Q. So, the filler is the stuff inside of here?

A. Yes.

Focus Point: This is a good example of an expert witness deciphering an internal tobacco industry document. The defendant's counsel could try to argue that increasing the acidity of cigarette smoke was done solely to improve the taste or other oral sensations of smoking. However, the plaintiff's expert shows that in the document the defendant recognized that increasing acidity increased the amount of nicotine being absorbed by smokers and therefore the addictiveness of the cigarette.

Q. Okay. "We found that increased filler pH resulted in enhanced electrophysiological subjective effects. We interpreted these data to mean that higher pH is resulted in more unprotonated nicotine, a more physiologically effective form." What does that mean?

A. Well, this is going back to that diagram and saying first that higher pH causes more free nicotine, and then they are saying in here that they think that free nicotine is more physiologically active. It's free nicotine that is causing greater effects to the smoker. That is what this document says.

The expert states that light cigarettes are just as addictive as regular cigarettes. Through titration (increasing puff count and depth of inhalation), light cigarette smokers take in the same amount of nicotine as those who smoke regular brands. Direct Testimony of Neal Benowitz (Plaintiff), *Boeken v. Philip Morris*, April 6, 2001, Pp. 1913-15; 1941-43.

Q. Now, you have said that twice but when you say you can titrate the effects you want, that isn't exactly in the kind of terms we use every day. Please say that differently.

A. Well, if you have, say, there's a certain amount of nicotine that makes you feel great or helps you concentrate doing your job or helps you deal with stress, whatever you are trying to smoke for, I will talk about that in a few minutes, that may require a certain amount of nicotine in your brain to do that. But after each puff your brain can register how much nicotine you got there and the next puff you can take a bigger puff or a smaller puff, this is automatic, your body just does it unconsciously, to get the amount of nicotine. And then you can smoke a cigarette deeply, you can smoke it not so deeply. You can put it out sooner or later. By doing all those things, you can get whatever amount of nicotine dose your brain wants.

Q. Sometimes in today's current world, I see workers going outside of a building, it doesn't have to be a worker, it could be a juror or it could be anyone, someone goes outside of a building to have a puff of a cigarette and I sometimes notice that when I get outside, the first couple of hits of one of these is big ones like that (indicating). Does that play into what you were saying?

A. Yeah, that's exactly right. We did research that I published several years ago, sort of like that. I asked people to smoke fewer cigarettes. So I -- people who normally smoked 30 cigarettes a day, I give them 15 to smoke in a day 5 or 10 or 5. And what I found is that if you restricted someone from 30 down to 5, they take in three times as much nicotine in smoke per cigarette. So really trying to get the most dose they can to maintain what the body sees as a desire level. So if you can't smoke as often as you like, you do take in more with each cigarette.

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Q. Have you written on the fact that regardless of whether something is called a regular or a light or an ultra light, that in the end, the smoker is going to wind up with roughly the same amount of nicotine?

A. Yes.

Q. Now, are light cigarettes, as addictive, generally, as full strength cigarettes?

A. Yes. For the reasons of compensation, our research has shown that smokers take in virtually the same amount of nicotine from a low yield cigarette than a high yield

cigarette. And it's because -- this was work we did even before the cigarette reduction study. We published this in "New England Journal of Medicine," 1983, that surveying smokers smoking a wide range of brands, from nicotine yields of 1 milligram to 1.6 milligrams, that their levels of nicotine intake were the same, didn't matter. They would take in the same amount of nicotine, no matter what brand they were taking. We also found something that was a surprise to me at the time, but I think can help people understand what happened, low yield cigarettes don't contain less of anything. I think it contains -- less tar and nicotine. We measured the tobacco of cigarettes of many different yields, high to low yield cigarettes in 1983 and found, to my surprise, at the time, that the nicotine in a low yield cigarette is exactly the same as a high yield cigarette, the tobacco is the same. What makes them low yield has to do with how they are engineered and how those engineering characteristics effect how they are tested on the machine. But there's the same amount of tobacco and the same amount of nicotine in the low yield as high yield cigarettes. And smokers can easily, by smoking differently than the machines, get whatever nicotine they need and with nicotine comes tar. There's a good correlation and relationship between nicotine and tar. So if you compensate for nicotine, you get just as much tar as without.

Focus Point: Most people mistakenly believe that light cigarettes are less harmful than conventional cigarettes. See Lynn T. Kozlowski & Janine L. Pillitteri, Beliefs about "Light" and "Ultra Light" Cigarettes and Efforts to Change Those Beliefs: An Overview of Early Efforts and Published Research, 10 TOBACCO CONTROL i12, i12 (2001). They may also believe that light cigarettes are less addictive, and as a result, blame the smoker for his or her smoking-related illnesses. This testimony shows that these beliefs are unfounded.

Q. So I don't bother asking the last question because once you go from lights to ultra lights, it is the same story all over again?

A. Yes. The only cigarettes we found that were any different were the very lowest brands of cigarettes which were the 0.1 milligram or 1 milligram tar. And just a couple brands of those and they count for a very small percentage of total sales. What we found with those is about a 30 percent reduction of exposure. But for everything else, there was pretty much a flat line, no relationship in that study between yield and exposure.

The expert compares nicotine addiction to cocaine, heroin, and alcohol addictions. Direct Testimony of Neal Benowitz (Plaintiff), *Boeken v. Philip Morris*, April 6, 2001, Pp. 1915-17 & *United States of America v. Philip Morris et al.*, Pp. 18-21

Q. Thanks. Now, while we are stopped here momentarily. You have told us about an extensive background in tobacco, nicotine, smoking, addiction. But in some of the last answers now, you have gone away from nicotine and into cocaine, for instance.

A. Yes.

Q. How do you know about stuff like cocaine please?

A. Well, I have done some research on other stimulants, cocaine, caffeine, on other drugs. And I have written and taught a lot about drug addiction in general. I have written many chapters that talk about addiction to drugs broadly. And one of the things that became

clear in the surgeon general's report is that there are a lot of sort of brain mechanisms and behavioral mechanisms that are in common with different drugs of abuse. So nicotine and alcohol and cocaine and heroin are not that different, except for intoxication. Intoxication is different. People obviously don't get loaded from nicotine the way they do from cocaine or alcohol or heroin. But if you put that aside, some of the other behavioral effects and behavioral aspects of it are very similar.

Focus Point: The concept of intoxication is important in tobacco litigation. The defendant's counsel may compare the mood and performance effects of nicotine, alcohol and other drugs to support the argument that nicotine addiction is relatively mild and that the plaintiff could have quit if he or she really tried. Using the same argument, the defendant's counsel will attempt to rebut the 1988 statement the Surgeon General C. Everett Koop likening nicotine addiction to that of heroin and cocaine. In this testimony, the plaintiff's expert preempts this argument.

Q. You just used the term, a term, "drugs of abuse." What do you mean by that, please?

A. These are drugs that people use to, what's the best word, to control behavior, or to influence mood or influence behavior. Often the drugs are used in excess. Often the drugs are used to personal harm or social harm. So these are drugs that are used in a way that is really detrimental. I'd say that's probably the best definition.

Q. Okay - and drugs of abuse, including what?

A. Well, the main drugs of abuse that we talk about are, besides nicotine, would be alcohol, heroin, other narcotics, other opiates, marijuana, cocaine, amphetamines and other stimulants, barbiturates, other kinds of sedative drugs, and things like glue sniffing. Steroids can actually be abused. I guess that's, for the most part -- some marijuana. Did I say marijuana is also abused?

Q. Nicotine is in there?

A. Right, nicotine is in there.

Focus Point: The plaintiff illustrates the similarities between nicotine addiction and other addictions. The illustration is useful because most people recognize the addictiveness of the drugs being compared to nicotine. Note that in making this analogy, the expert is careful to recognize the difference in intoxication.

* * *

Q. What are the similarities between the characteristics of nicotine addiction and addiction to other drugs?

A. The addiction process is essentially the same for nicotine as it is for other drugs, such as heroin, cocaine, and alcohol. All of these drugs are associated with compulsive use. All of these drugs have psychoactive effects on the user. They are all associated with the development of tolerance. They are all associated with withdrawal symptoms when the user attempts to quit. They are all associated with similar high rates of relapse when users try to quit. Finally, in many cases, they show similarities in the use of agonists to treat them.

Q. What is an agonist?

A. An agonist is a drug that has the same types of effects as another drug, and, in this case, is used as a medical treatment to deal with withdrawal symptoms. Examples of this

include the use of methadone to treat heroin withdrawal and the use of nicotine gum to treat nicotine withdrawal.

Q. You identified a number of similarities. Starting with the factor of compulsive use, can you explain precisely how nicotine addiction is similar to heroin, cocaine, or alcohol addiction?

A. Yes. Like users of cocaine, heroin, and alcohol, people addicted to nicotine exhibit compulsive use, meaning that they experience a need to use the drug repeatedly.

Cigarette smokers rarely go more than a single day without nicotine. In work or public places where smoking is proscribed, smokers often take numerous breaks throughout the day to smoke. People who are addicted to heroin, cocaine, or alcohol also have difficulty refraining from drug use.

Q. Is there any other evidence supporting this similarity in terms of compulsive use?

A. Yes. Compulsive use is also indicated by a smoker's persistence in smoking cigarettes, that is, taking nicotine despite the harmful effects of cigarettes. In that regard, its use is similar to that for heroin, cocaine, and alcohol.

Q. How might compulsive use be evident to a clinician treating individuals who use drugs of abuse?

A. This is clearly evident to clinicians who treat alcoholics with chronic alcoholic liver disease or heroin addicts with infective endocarditis, which is an infection of the heart valves that occurs with the use of dirty needles by heroin addicts. In the case of cigarette smokers, many continue to smoke after having a lung removed because of lung cancer or having undergone a tracheotomy for throat cancer. Only 50 percent of smokers who suffer heart attacks quit smoking, despite a physician's advice to do so. The fact that individuals continue to use the drug, even after suffering from life-threatening harmful effects, is a characteristic common to nicotine, heroin, and alcohol.

Q. With respect to the factor of relapse after multiple attempts to quit, how is nicotine addiction similar to heroin or alcohol addiction?

A. The relapse rates after abstinence are similar for tobacco, heroin, and alcohol.

Approximately 60 percent of quitters relapse within three months, and 75 percent relapse within six months.

Q. Where were these relapse rates observed?

A. These relapse rates have been observed in clients in drug abuse or tobacco dependence treatment programs. The data on these relapse rates was extensively reviewed in the 1988 Surgeon General's Report.

Q. With respect to relapse rates, is there any difference for people who quit without seeking medical assistance?

A. It's been argued that the relapse rate for those who do not seek medical assistance, known as "spontaneous quitters," may be lower, but published data indicate otherwise. The relapse rates for smokers who have undergone minimal intervention treatment in a physician's office and who have successfully abstained for 24 hours are 25 percent at two days, 50 percent at one week, and 75 percent at two months. Two-thirds of smokers who quit on their own relapse within two days.

Q. Are there any other similarities in the factor of relapse rates?

A. Recurrent drug cravings have been described for cigarettes, heroin, cocaine, and alcohol. A study comparing the desire to use different drugs among individuals who use multiple drugs of abuse, most of whom smoke cigarettes, indicated that the desire to

smoke cigarettes when cigarettes were unavailable was as strong as, and in most cases stronger than, the desire to use heroin, cocaine, or alcohol.

Q. Can you explain how the tolerance factor in nicotine addiction is similar to that factor in addictions to other drugs?

A. The development of tolerance is a characteristic that is common to nicotine, as well as other drug addictions. Although the time course varies, the development of tolerance to various drugs of abuse is well documented. Tolerance to many effects of nicotine develops quickly, within a day, and there is re-sensitization to many of the effects overnight. Tolerance to the effects of other drugs has likewise been demonstrated.

Q. As for the factor of withdrawal, how is nicotine withdrawal similar to withdrawal experienced by people with addictions to other drugs?

A. Physical dependence on the drug (that is, experiencing withdrawal symptoms during periods of abstinence) occurs in smokers as well as in other drug users. Although it is true that withdrawal from nicotine addiction does not produce seizures and delirium such as may be experienced during alcohol withdrawal, nicotine withdrawal can be extremely disruptive to personal life.

Q. How is nicotine withdrawal disruptive to a smoker's personal life?

A. Nicotine withdrawal is similar to withdrawal from other stimulants, such as cocaine. The withdrawal is not life-threatening, but profoundly affects mood and behavior and remains a strong impetus to recurrent drug use. During withdrawal, smokers are often irritable, anxious, feel they are in a bad mood, and have difficulty concentrating and/or performing their jobs.

Q. Do all smokers experience withdrawal?

A. No, most do, but some do not. Approximately 20 percent of smokers do not report withdrawal symptoms when they stop smoking. Why smokers differ in their experience of withdrawal symptoms is not known, but is suspected to relate to genetic differences.

Q. Is that true for users of other drugs of abuse, that not all users experience symptoms of withdrawal?

Focus Point: The expert provides the jury with some understanding of the strength of nicotine addiction by discussing the withdrawal symptoms.

A. Yes. Not all heroin addicts or alcoholics experience severe withdrawal, and some are able to stop their drug use abruptly without experiencing any withdrawal symptoms.

Q. Earlier you mentioned similarities between nicotine and other drugs with respect to treatment with agonists. How is nicotine addiction treated with agonists?

A. Nicotine agonists, including nicotine gum, nicotine patches, nicotine nasal spray, and nicotine lozenges have been used with some success to alleviate withdrawal symptoms and to facilitate smoking cessation. Similarly, agonists such as methadone for heroin addiction and benzodiazepines for alcoholism have also been successfully employed.

Q. In what ways, if any, is nicotine addiction dissimilar to addiction to other drugs?

A. The main difference is in the nature of the psychoactive effects of the drugs. Cocaine and heroin produce high levels of euphoria, which may be disruptive for everyday activities. Nicotine's mood-altering effects, in contrast, are generally subtle and consistent with maintaining a normal level of cognitive performance. In other words, a person can smoke cigarettes and experience nicotine's psychoactive effects hundreds of times

throughout the day, and still carry on a normal, everyday life. It is only when the addicted smoker stops smoking that he or she has difficulty performing their daily tasks. This quality allows nicotine to exert a very powerful effect on behavior over time.

Q. Does this difference mean that nicotine addiction is fundamentally different than addiction to other drugs?

A. The fact that nicotine's psychoactive effects are generally more subtle than those of other drugs of abuse does not mean that the nature of addiction to nicotine is fundamentally different than the nature of addiction to other drugs.

Q. In your opinion, are the effects of nicotine's addictiveness less harmful than addiction to other drugs?

A. No. The strength of nicotine addiction is just as, or more, powerful than addiction to other drugs. In fact, the consequences of nicotine addiction are more pervasive, as tobacco use is the number-one preventable cause of illness and death in the United States. Individuals are able to use nicotine more frequently than other drugs of abuse because cigarettes are legal and because they do not produce the intoxication that disrupts the smoker's ability to perform everyday activities. In terms of the long-term health consequences, an individual is much more likely to die from health complications associated with smoking than those from the use of any other drug of abuse.

The defendant's counsel has the plaintiff's expert acknowledge that the withdrawal symptoms of heroin and other hard drugs are worse than that of nicotine. Cross Examination Testimony of Neal Benowitz (Plaintiff), *Williams v. Philip Morris*, February 26, 1999, Pp. 52-54.

Q. Dr. Benowitz, one more brief topic. You talked briefly this morning about withdrawal. Do you remember that?

A. Yes.

Q. I want to talk with you about the spectrum of withdrawal, depending upon the substance, okay?

A. Yes.

Q. Let's start with heroin. You would agree, wouldn't you, that withdrawal from heroin is quite different than withdrawal from nicotine?

A. Yes.

Q. Heroin withdrawal can require hospitalization?

Focus Point: The defendant's counsel will contrast withdrawal symptoms of nicotine with other drugs. This comparison makes nicotine addiction appear mild. The testimony is also relevant if the plaintiff has a history of other drug use. If the plaintiff is a recovering alcoholic who smokes, for example, then the defendant's counsel might argue that the plaintiff really did not want to quit.

A. It doesn't usually, but it can.

Q. How about barbiturates? With barbiturates you get abdominal cramps?

A. Yes.

Q. Hypothermia?

A. Yes.

Q. Convulsions?

A. Yes.

Q. Overall weakness?

A. Yes.

Q. Alcohol, seizures?

A. Yes.

Q. Hallucinations?

A. Yes.

Q. Disorientation?

A. Yes.

Q. Delirium tremens?

A. Yes.

Q. Tell the jury what DTs or delirium 24 tremens are.

A. That's an extreme aspect of alcohol withdrawal where people become extremely confused, they don't know where they are. They often have a high fever, sweating, may see things that aren't there. Develop shakes or tremors and often have seizures, and full blown delirium tremens can be fatal if it is not treated.

Q. And finally, let's get to nicotine withdrawal. I think you described the classic symptoms which are irritability?

A. Yes.

Q. Ex-smoker, smoker trying to quit, may become impatient?

A. Yes.

Q. Headaches?

A. Yes.

Q. Some sleep disturbance?

A. Yes.

Q. This condition, anhedonia?

A. Yes.

Q. And that's generally just not feeling right or just not feeling like yourself?

A. That's part of it, yes.

MR. COFER: Thank you, Dr. Benowitz, I appreciate it.

The expert concludes that people who smoke generally do not understand the actual risk. Direct Testimony of Neal Benowitz (Plaintiff), *Boeken v. Philip Morris*, April 6, 2001, Pp. 1991-93, 2003-05.

Q. I've got a couple of last things to talk to you about now. There are bad things that can happen to people from smoking cigarettes. And one of the bad things that can happen is that they can get lung cancer and die. Now, do you have an opinion -- this isn't Mr. Boeken right now -- do you have an opinion, generally, about whether people who smoke truly understand the risks of what they're doing?

A. Yes.

Focus Point: Awareness of risk is an important topic in tobacco litigation. The defendant's counsel typically argues that smokers are aware of the risk of smoking, whether those risks involved the health effects or the addictiveness of smoking. If the defendant's counsel is successful, the jury will think that the plaintiff brought any harm upon him or herself. The defendant's counsel will introduce historians to describe the common knowledge of smoking throughout the plaintiff's life; the plaintiff's should do so as well.

Q. What is that opinion?

A. They underestimate the risk -- [...] well, first of all, when you ask smokers and you compare their estimates of the risks of smoking to estimates of non-smokers, non-smokers rate the risks higher than smokers. If you ask smokers about the risks of smoking for other smokers compared to themselves, they rate the risks as being higher for other smokers compared to them. So most smokers feel that they are not at as high a risk from disease as other smokers are. Now, there are different reasons for this in different people's minds. In some cases, especially for kids, they say, well, I haven't been smoking very long. And it takes a long time to get sick. And so -- and I'll stop before I get sick. The problem is, that often it doesn't happen because people are addicted and they don't stop. A second thing people tell themselves is, as long as I'm not feeling sick, I'm not coughing, I'm not feeling sick, then I'm okay, and if I start feeling sick, then I'll quit. The problem with that is that it's too late. Because the first presentation of heart disease is a heart attack or sudden death. If you get lung cancer, it's too late, because it's incurable. You have emphysema, you already have lost most of your lungs. But people don't realize that they -- just people think if they start feeling bad and they quit, they'll be okay. Smokers -- what was the other -- smokers also think, sometimes, that if they change their brands, they can reduce health risks. For example, if they switch to a lower-yield cigarette, smokers think that a low-yield cigarette is less hazardous. If someone says, well -- or someone feels that they're addicted and there's no need to keep on using a cigarette, but someone says, here's a way to make it less hazardous, a smoker might say, well, I'll smoke those, and I'll feel better because I'm not hurting myself as much. Without knowing that there really is no difference in exposure at all, but they think that because that's what advertising looks like. It looks like they're low-yield brands that have less of tar and less of nicotine --

Mr. Carlton: objection, your honor. Preemption ...

The court: this isn't a question of preemption. ... overruled.

Focus Point: The objection is based on the defendant's counsel's interpretation of the Federal Cigarette Labeling and Advertising Act. The Act preempts states from mandating health warnings for cigarettes, even if the state warning is more effective than current warnings. While it does not preempt tobacco litigation, the Act limits somewhat the legal claims available to plaintiff and can constrain some areas of testimony.

Q. Do people who are hooked, addicted, on any substance -- let's not even talk about nicotine right now -- any substance, sometimes tell themselves stories, rationalize things to themselves?

A. Yes.

Q. To what end, for what purpose?

A. Well, if you're not suicidal, and if you think you're a rational person, you have to find some way to be able to keep on doing what you're doing despite obvious or apparent harm. So the way that that occurs is people minimize the risk. They say, the risk is not as great as I've been told. So what I'm doing is not really as nonsensical as it seems. So smokers tend to minimize the risk to themselves. They may acknowledge it in general, but they say, for me, I know I'm not going to be harmed, so it's okay that I do this, it makes sense that I do this.

Q. If there is a reason -- and I'm going to get to the reason quickly -- but if there is a reason or a straw, a rationale given to someone who's hooked on a drug, whether it's nicotine or whatever, does someone who's hooked tend to reach out and grasp at straws as a rationalization or a reason for continuing?

A. Anything that will allow a person addicted to a drug to keep on using the drug, they will embrace.

Q. Now, I want to show you a document from 1972. And this is document 330.00, and on the blowup version, it's 8057.00. And this -- can you read that from where you are, the big print here? Because that's what I'm interested in.

A. If you turn it toward me a little bit, I could. Yes. (I.D. 330.00 - 5-1-72 memo)

Q. By Mr. Piuze: now, the language I'm interested in is this:

"it has always" -- this is from a group that contains all the tobacco companies, including Philip Morris. "it has always been a holding strategy consisting of creating doubt about the health charge without actually denying it." and that's the phrase that I want you to -- I'm going to ask you about. . . . "creating doubt about the health charge without actually denying it," okay?

A. Yes.

Q. In Mr. Boeken's deposition, did you see testimony from him about seeing, among other things, seeing the CEO's before congress saying they didn't know -- including the CEO of Philip Morris -- "to my knowledge, it has not been proven that cigarette smoking causes cancer." you saw him talk about things like that?

A. Yes.

Q. You saw where Mr. Boeken said, he believed that, he believes in big business, he believed that kind of thing?

A. Yes.

Q. Is that a rationalization?

Focus Point: Cigarette manufacturers have denied nicotine addiction for decades. In fact, Philip Morris publicly denied the nicotine in smoking was addictive until 2000, the year the United States filed a lawsuit against the leading cigarette manufacturers under the Racketeering Influenced Corrupt Organizations Act. U.S. v. Philip Morris USA, Inc., 449 F.Supp.2d 1 (D.D.C. 2006). Professor Benowitz's testimony supports the plaintiff's counsel's conclusion that smokers and potential smokers were precluded from exercising ordinary care in evaluating the risk of nicotine addiction because, in part, they were misled by manufacturers.

A. Yes. If one has choices of two conflicting opinions, the health community says smoking is bad for you, the tobacco industry says it's not been proven, if you want to keep on smoking, what you will do is choose the one that says it's not been proven,

because that allows you to keep on smoking and still be a reasonable person. So any addict faced with that sort of choice would choose the opinion that would help them keep on using the drug.

The defendant's counsel asks the plaintiff's expert whether smoking inhibits the smoker's ability to read and understand health warnings. Cross Examination of Neal Benowitz (Plaintiff), *Boeken v. Philip Morris*, April 10, 2001, Pp. 2294 -95.

Q. Smoking doesn't prevent someone from reading the warnings on the side of a cigarette packet, does it?

A. No.

Q. Doesn't prevent someone from understanding the words on the side of a cigarette package, does it?

Focus Point: This cross examination responds to previous testimony that the defendant's public denial as the addictiveness of nicotine has caused smokers to underestimate the addiction. Note that this line of questioning also suggests that the judge and jury adopt the position that the health warnings on cigarette packages should be deemed sufficient. The defendant's counsel wants the judge and jury to assume the health warnings work and blame smokers for ignoring them.

A. It does -- not the drug itself. As we talked about before, addiction can affect perception of warnings with respect to one's self, but it does not interfere with reading it or understanding the words.

Q. Or understanding what they mean.

Nicotine doesn't affect a smoker's ability to hear what parents or doctors or friends are saying about stopping smoking, does it?

A. Well, again, let me just separate out. Nicotine as a drug does not interfere with those things. When one becomes addicted, then it does influence how one processes that or the decisions one makes based on that information.

Q. Well, they can certainly hear the information, right?

A. They can hear it, yes.

Q. They can take the information in?

A. Yes.

Q. And the presence of nicotine doesn't deprive a person of the ability to reason, does it?

A. No. Again, nicotine does not do that. Nicotine addiction does influence the decisions that a person makes.

Q. Just like everything in a person's life influences the decisions they make?

A. Right. Except no one needs to ever have nicotine, whereas, other things are part of life that people face unavoidably.

Q. And if a person has smoked and if a person is addicted to nicotine, that's another factor they have to take into consideration in making the decisions they make, right?

A. Yes. It's a very strong one, and again, one which no one ever needs to have to deal with.

The defendant's counsel has the plaintiff's expert acknowledge that personal motivation is an essential part of successfully quitting. Cross Examination of Professor Neal Benowitz (Plaintiff), *Boeken v. Philip Morris*, April 10, 2001, Pp. 2295-97

Q. Now, I want to ask you a few questions about the importance of motivation to quit. Motivation is a very important factor in quitting smoking, isn't it?

A. Yes.

Q. It's more important than patches or inhalers or clinics; isn't that right?

A. Well, it's hard to compare those things. But certainly, motivation is critical to quitting smoking.

Q. Well, isn't it true that a person who is sufficiently motivated can quit without patches or inhalers?

A. That's correct.

Q. A person without motivation is highly unlikely to quit even with patches or inhalers?

A. That is correct.

Q. So is it fair to say, then, that for the 50 million people who have quit, there came a time when their desire to smoke was outweighed by their desire to quit?

A. Yes.

Q. Now, in addition to motivation, persistence is also very important, isn't it?

A. Yes.

Q. And you've testified that a lot of the former smokers, a lot of those 50 million former smokers, might not have succeeded the first time they tried to quit?

A. That's correct.

Q. And even if a smoker fails two or three or four times, you would urge them to keep trying, wouldn't you?

Focus Point: The defendant's counsel focuses attention on the plaintiff with this line of questioning, and distracts the jury from the conduct of the defendant. Note also that the defendant's counsel uses this line of questioning to leave an opening for its expert to question whether the plaintiff really wanted to quit. In asking the plaintiff's expert whether he tells his patients to keep trying, the defendant's counsel is preparing to tell the jury that the plaintiff probably ignored similar advice coming from his own doctor.

A. Yes.

Q. Some people quit after one or two tries, others have to try more often; isn't that right?

A. Most have to try more often. But, yes, that's correct.

Q. But a fact that a person was unsuccessful in the past doesn't mean they'll be unsuccessful in the future?

A. That's correct.

Q. In fact, the odds of successfully quitting increase the more times one tries?

A. Yes.

Q. Now, if a smoker engages in multiple quit attempts, the odds of succeeding go up to about 50 percent, don't they?

A. Something like that.

Q. So when you advise your patients, you don't tell them to quit trying after the first time?

A. No.

Q. Or the second time?

A. No.

Q. You keep telling them, keep trying?

A. Yes.

Q. You would advise a person who you believed to be highly addicted to keep trying?

A. Yes.

The expert reviews the use of pharmacological cessation aids and counseling patients to quit. Direct Testimony of Mace Beckson (Defendant), *Williams v. Philip Morris*, Feb. 26, 2006, Pp. 39-48

THE COURT: All right. Counsel would you step to chambers, please.

(In chambers:)

MR. THOMAS: I can tell you why I objected. Out in the courtroom, Mr. Cofer showed me a Philip Morris document we referred to this morning in which Philip Morris made the finding that a number of the available smoking cessation aids are not effective and that was a document that we discussed with Dr. Benowitz. So then he showed me an advertisement for Nicorette gum and told me that he is going to impeach Dr. Benowitz with an advertisement for Nicorette gum, but the fact of the matters is he is trying to impeach his own people in their statements in the exhibit that is in front of the jury.

THE COURT: So what is your evidentiary objection?

MR. THOMAS: (A) not on the exhibit list, (B) improper impeachment, and (C) hearsay.

MR. COFER: Let me tell you what I was trying to do. It is plaintiff's Exhibits 140, the highlighted portion is the applicable part of the testimony. Basically it says, quote, "Available data suggests" -- let me emphasize that, "Available data suggests that nicotine gum, patches, are only minutely effective in helping smokers quit unless combined with behavioral therapy." The Court may remember in documents yesterday, Dr. Benowitz was asked did Philip Morris ever tell Jesse Williams that these patches and gum that he brought that they needed

other therapy, and he said, "No, I am not aware of that."

5 Well, we learned this morning that in 1989, Mr. Williams, in fact, was prescribed Nicorette gum. Here is the package inserts that goes with the Nicorette gum. It says, "You must really want to quit smoking, to be used together with a support program. See Page 3 for

11 details." Page 3, "You are more likely to quit smoking by using Nicorette by using a support program that helps you break your smoking habits. There may be support groups in your area. Call your local chapter of the American Lung Association, American Cancer Society, American Heart Association for further information," et cetera.

* * *

(Before the Jury:)

Q. This is your list on attempts to quit, and you told the jury in September '89, he was prescribed Nicorette chewing gum, right?
A. Yes.
Q. That is a prescription from a physician, correct?
A. It was at that time.
Q. Is it your experience as a physician that you when you prescribe medication you give the patient instructions how to use it or tell them to read the package inserts?
A. Hopefully.
Q. Do you ever prescribe Nicorette or nicotine chewing gum?
A. Yes.
Q. Do you tell your patients how to use it?
A. Yes.
Q. Do you tell them to read the package inserts?
A. Yes, I do, but unfortunately many physicians don't do a very good job of doing this.
Q. Right. And you, of course, have no idea what Mr. Williams' physicians told him, right?
A. That's correct.
Q. But you are familiar with Nicorette gum as a product, right?
A. Yes.
Q. Do the manufacturers of Nicorette gum have package inserts where they advise the patient that in order to quit, you must really want to?
A. Yes.

Focus Point: The best chance to quit is to use pharmacological aids in conjunction with counseling. The defendant's counsel uses this line of questioning to infer that the plaintiff's failure to complete or take advantage of full cessation treatment reveals that the plaintiff was not really serious about quitting. The defendant's counsel might imply that such "half-hearted" quit attempts were just meant to appease concerned family members and no more. The defendant's counsel may also imply that the plaintiff was himself negligent in his failure to really try to quit.

* * *

Q. Do you have a recollection at any time that in the package inserts the patient was instructed that they were more likely to stop smoking by using Nicorette with a support program that helps you break your smoking habit?
A. Yes, that has been in the package insert.
Q. And in addition, in the package insert, isn't it true that the insert would advise the patient they can call their local chapter of the American Lung Association or the American Cancer Society or the American Heart Association for further information about those programs?
A. Yes.
Q. Are you aware, Doctor, that Portland has long had smoking cessation clinics?
A. I am familiar with the Kaiser program. That's the only one I am familiar with in Portland.

The plaintiff's counsel asks the defendant's expert about the overall number of successful and unsuccessful quit attempts in the United States. Cross Examination of Doctor Mace Beckson (Defendant), *Boeken v. Philip Morris*, May 14, 2001 Pp. 5678-5681

Q. Did Mr. Boeken have same incapacity to quit as the greater than 50 million people who have not done so?

Q. What's your answer to that one?

A. That question does not address the fact that of the people who continue to smoke, there's a large percentage of people who are not trying to quit, in fact, as I said yesterday, 40 percent in a recent study said that they have no intention to quit in the foreseeable future, and 40 percent have mixed feelings. So that question reads as if those, and I think it's only 45 million people who smoke currently, that the people who are smoking currently are actively just putting their nose to the grindstone trying to quit and just can't. So that's the best way I can answer that question. I think that, you know, you are looking at a mixed population.

Q. Well, let me see if I can chop up your answer a bit. According to a graph that Philip Morris itself showed over 75 million smoke, about 45 million, where do you get your 45 million?

Mr. Carlton: objection to the characterization of the evidence.

The court: sustained as to the characterization, continue as to the question.

Mr. Piuze: hang on a second, please, your honor.

Focus Point: The defendant's counsel does not want the jury to hear information regarding the aggregate effects of tobacco use. In this excerpt of cross-examination, the plaintiff's counsel deftly questions the defense's expert on the number of nicotine addicted smokers in the United States. The defendant's counsel may be able to convince a jury to blame a single plaintiff for the smoking-related harm he or she has suffered. But, the same argument fails when applied to describe all smokers. Aggregated information about smoking is admissible because it helps the jury understand the strength of nicotine addiction and assess the credibility of an expert witness.

Note that the numbers are somewhat off in this following series of questions and answers. The examination is nevertheless very effective.

Q. By Mr. Piuze: how many people are in the country now?

A. About 250 million.

Q. We heard from a historian here from Philip Morris there was 300 million. Do you want to say could be 250 to 3?

A. I haven't kept up on the exact population of the United States. So, you know, I can't really comment on the veracity of that.

Q. If I told you a quarter of the people in the country are smoking, does that sound right to you or wrong to you?

A. I think it's a little bit less. But it's close to that.

Q. Close to that?

A. Uh-huh.

Q. What's a quarter of 300 million?

Mr. Carlton: I will object to this as mischaracterizing the evidence.

The court: overruled.

Mr. Carlton: adults?

The court: the jury can make up its own mind.

The witness: as far as the 45 million, that's CDC. estimates.

Q. By Mr. Piuze: so what's a quarter of 300 million?

A. That would be 75 million, including children, infants and elderly folks.

Q. Regardless of whether there's 45 million smokers or 75 million smokers and regardless of how you want to chop it up, did Mr. Boeken have the same incapacity to quit as the more than, pick one, 5 million, 10 million, 18 million, I don't care, people who haven't been able to?

A. My answer is that those people have the capacity to quit. What you are telling me is that they have not done so. That's all you are telling me in that question. You are making an assumption about incapacity that I don't agree with.

Q. Okay. So just so we know exactly where you stand, if you are not brain damaged, and if no one is holding a gun to your head threatening to pull the trigger, any one American can stop smoking if they absolutely, 100 percent, want to; right?

A. I don't think that's exactly what I said.

Q. I know it isn't, but I am asking you, do you agree with that? Let me say it again.

A. Sure.

Q. If you haven't gone through the windshield of a car, if you are not developmentally -- you didn't say disabled, you said developmentally something, what did you say?

A. Something equivalent, mentally retarded.

Q. If you haven't gone through the car windshield, if you are not mentally retarded and if no one is holding a gun to your head promising to kill you on the spot if you stop, then, from a psychiatric point of view, you are simply saying, anyone can physically stop, 250 million, 75 million, 45 million, 35 million, 10 million, whatever the number is?

A. You actually happened to leave out a very important group, which is the people who have mental disorders that impair their ability to think and that's a significant part of the population, they tend to smoke at a higher rate.

Q. I will give that to you. What is the answer to my question?

Everyone, ever single person in America?

A. There's a mention of capacity for people unless it can be demonstrated that that capacity does not exist.

Q. Okay. So unless someone meets one of these narrow exceptions, you are simply saying that every single person in America [can] stop smoking?

A. That's the presumption.

Q. Period; right?

A. That's a presumption, yes.

Q. Okay. So Mr. Boeken's like every other person in America who isn't brain damaged or gone through a car windshield or developmentally disabled or with a gun to his head, no better, no worse?

A. You know, grossly, that's true. Certainly I think he may have greater comfort with taking risks than some of the other people in that group, you know, as a reflection of personality, but, you know, on a very gross level, I would agree with that.

The plaintiff's counsel questions whether knowing the risk involved in smoking is an important part of quitting. Cross Examination Testimony of Doctor Mace Beckson (Defendant), *Boeken v. Philip Morris*, May 14, 2001 Pp. 5700-5714

Q. Didn't doctor -- let me phrase it this way. Do you think a person's odds of being able to stop an addictive behavior can be influenced by misinformation, disinformation or counter-information?

A. In what context? Odds of --

Q. Do you think a person's ability to stop an addictive behavior can be influenced by misinformation or disinformation or counter-information?

A. It's possible that, you know, it's possible that if the person has absolutely no idea about anything pertaining to it, I could see that. If you are talking about an addiction, generally, someone is aware of the effects of addiction on what's going on in their life.

Q. I asked a bad question.

A. Okay.

Q. I am talking about adults who know what they are doing, they are smoking. And I was going to start with addiction, generally, but they are smoking cigarettes, and they are addicted to cigarettes. And out there is misinformation, disinformation, and counter-information. And I am asking you, do you think that if there is misinformation put out there or disinformation put out there or counter-information that's put out there, it effects a person's ability to stop the addictive behavior of smoking?

A. Well, I know there are people who study these issues, and essentially, it's outside of my area of expertise. And I am not -- I don't think I am qualified to offer an opinion on that.

Q. Okay. So let me be more specific so we can be sure what you are not going to offer an opinion on.

A. Okay.

Q. I want you to assume that after Mr. Boeken, at the age of 13 years old, in 1957, got hooked on a two-pack a day habit of Marlboros, and as the beneficiary of his getting hooked; namely, Philip Morris, that was getting his money for those two packs a day -- Mr. Carlton: objection to the argument.

The court: sustained, as to "beneficiary." proceed.

Q. By Mr. Piuze: -- knew that there were very serious health risks associated with their product, but put out misinformation, disinformation, and counter-information, you are unable to tell us whether or not that might have affected Mr. Boeken's ability to stop smoking?

Mr. Carlton: object to the hypothetical as argument.

The court: it is a hypothetical. This is an expert. Overruled.

Focus Point: The rules of evidence allow hypothetical questions to be posed to expert witnesses. Hypothetical questions may not be posed to other witnesses. Hypothetical questions allow the litigants to explore the credibility of the expert's conclusions.

Q. By Mr. Piuze: okay. Let me try this. This is something from 1972, may 1st. Just in theory, do you think that someone who was addicted to nicotine might have a greater chance of quitting, a lesser chance of quitting or the same chance of quitting if the people

who made the addictive substance created doubt about the bad effects of the nicotine in that person's mind?

A. Are you asking me about the document?

Q. No. I am just asking you exactly what I asked.

A. So don't look at the document. Okay. I have never seen that document. I was distracted looking at that. Could you repeat the question, please.

Q. Sure. You have got a person or 50 million people who are addicted to a product, and I want to know, if you have any opinion about whether that person's ability or anyone within that 50 million population's ability to stop the addictive behavior is made greater, in other words, a greater ability to stop, is less, a lesser ability to stop, or stays the same, if the people manufacturing the addictive product purposely go out and create doubt in that person's mind and all 50 million people's minds about whether or not the product is really bad for you?

A. Well, I will try to breakdown, you know, how I would think about that. Certainly, if there was someone who was not having any health consequences, cigarettes were not seeming to affect their lives and all they knew about were claims that there wouldn't be any problems, then that person would have little motivation to change, perhaps, but still would possess the capacity to do so if they so choose for any reason.

Q. Creating doubt about the health charge without actually denying it. Is that your whole answer?

A. I believe so, yes.

Q. So someone who is perfectly healthy might fall for that; right?

A. No. What I said was that if someone were not having any problems resulting from their cigarette smoking, they are healthy, it's not destroying their work life, their family life, so forth, and the person has, you know, no belief that there's a risk for any future things to happen, even in the distant future, then that person could conceivably be less motivated to make a change but certainly would still possess the capacity to do so if he or she so chose.

Q. The person you have already told us, everyone in the whole country who smokes, except those brain damaged, with a gun to their head, or whatever the other one was, has the capacity to stop?

Focus Point: The plaintiff's counsel is making the obvious point that misinformation from the defendant intended to minimize the public's understanding of the health effects of smoking led to an increase in smoking rates as well as reduced the plaintiff's motivation to quit. Indeed, this was the basis for the Medicaid reimbursement lawsuits of the 1990s, in which every state sued the tobacco industries for using misinformation to increase smoking rates above what that would otherwise would have been had the manufacturers not tried to obfuscate the dissemination of smoking and health research. In this case, the plaintiff's counsel makes the defendant's expert all but admit that misinformation by the defendant probably affected how the plaintiff thought about smoking and decreased his motivation to quit.

A. I said that people have a presumption of capacity unless it can be demonstrated that they have some co-existing problem that interferes with their ability to think and act, yes.

Q. So that's not, I guess, actually part of my question. Because we have established now, you have said, people have the ability to stop. So be it.

A. Generally correct, yes.

Q. So that's not part of the question. The question was, someone who is addicted, Richard Boeken, tens of millions of other people, if the manufacturer of the product that's got them addicted goes out and purposely creates a doubt in their mind about the health risk, do you think that helps their ability to quit the addiction, hurts their ability to quit the addiction, or you got no opinion on this issue?

A. I could just offer my opinion that I wouldn't think it would help. It would depend on what else is going on. If the person is sick, they are having illness, their doctor is talking to them, no, I think people tend to trust their physicians more than the information that might come over airwaves, for example. I think people tend to trust people. And so it's not necessarily clear that it would hurt. Depends on the person.

Q. It's not clear to you that that would hurt someone's ability to quit?

A. Again, as I said, it would depend on the person. If the person, you know, were smoking, had no problems, and believed that there would be no problem in the future, they may not be motivated to quit.

Q. When you say people trust people, the first one the people, let's make them Mr. Boeken and the smokers, okay, people, smokers, trust people, who are the other people on the other side of this equation?

A. Well, I think that generally, the important people tend to be one's own family physician, who's usually the person that people consult. First, of course, we are talking pre-internet. Nowadays people get information from the internet that they add to their knowledge base. But I think, traditionally, people have gotten their health information from their physicians. And then there is sort of the family culture as well that tends to, you know, effect someone, an individual.

Q. And you say people trust people, the second people, is does that include the people that go on the airwaves, famous athletes, and say, I like this product, use it?

A. I think -- I mean, again, I am not an expert on advertising. I can -- you know, I have heard people say that, you know, advertisers, you know, use family people to help sales. But beyond that, you know, I really hadn't focused on advertising psychology.

Q. When you say people trust people, the first group is always Mr. Boeken and the other smokers. I am concentrating on the second group, "trust people."

Mr. Carlton: I will object to this as being beyond the scope.

The court: overruled.

Q. By Mr. Piuze: do these other people include famous celebrities who are paid to go out and advertise?

Mr. Carlton: objection, lack of expertise.

Mr. Piuze: I will withdraw then.

Q. By Mr. Piuze: does the second group of people include manufacturers who put out misinformation, disinformation, and counter-information about the health risks of their products?

Mr. Carlton: same objection, argumentative.

The court: overruled. What you had in mind, sir, when you used the term.

The witness: you are talking about companies which, you know, generally, we are not familiar with most of the individuals involved in the companies except on rare occasion like someone like Lee Iacocca, but I think, generally, we don't even know who people in these companies are. So it's not -- that's not personal connection.

Q. So when you say "people trust people," that doesn't include people trust manufacturers?

A. I think people tend to trust people that they know and have a trusting relationship with. And in the context of that relationship, if they receive information, they tend to put a lot of stock into it. That's really all I was saying.

Focus Point: This is a very effective line of questioning. Not only does it refocus attention on the defendant's conduct, it also undermines the "blame the victim" defense and to some extent the expert's credibility.

On redirect, the defendant's counsel may try to move the jury's attention back onto the plaintiff, as follows:

Q. Now, as a doctor you advise your patients to quit smoking, don't you?

A. Yes.

Q. And one reason you do -- well, let me back up. Basically, these days, all doctors advise their patients to quit smoking; correct?

A. They should.

Q. That has been true for some time?

A. Yes.

Q. And the reason, one reason that doctors advise their patients to quit is because they know they can quit; right?

The plaintiff's counsel asks the defendant's expert whether a higher prevalence of smoking would encourage or discourage a smoker to try to quit. Cross Examination Testimony of Mace Beckson (Defendant), *Boeken v. Philip Morris*, May 14, 2001, Pp. 5701-5702

Q. Yes. In the '50's and '60's, 60 percent of the guys in America smoked?

A. More than 50 percent -- 50 or 60 percent, I think, of men sort of counter-balanced by maybe something like 30 percent of women.

Focus Point: The prevalence of smoking when the plaintiff started and when he or she attempted to quit is an important question. The social norms of today regarding smoking, including the number of clean indoor air laws, are probably more conducive to quitting than when the plaintiff started smoking and attempted to quit. The social norms and other tobacco control efforts, such as increasing tobacco taxes, all make smoking less attractive than in the past.

Q. Here. Didn't you tell me when I took your deposition, 60 percent of men in America smoked in the '50's and '60's?

A. I said it was pushing 60 percent by my recollection of the history of smoking. Yes.

Q. It was cool to smoke then; right? Mr. Carlton: objection, relevance, beyond the scope. The court: overruled.

The witness: in some people's minds, yes.

Q. By Mr. Piuze: it was a normal behavior in society?

A. I think back then, of course, not having been alive during some of that, my impression of the history is that smoking was well integrated into the social fabric.

Q. People are going to tend to smoke when they get together because it was made part of the social custom?

A. For a lot of people, that was exactly true.

Q. So there will be effects where you are at and a point in time when it is considered cool to smoke?

Mr. Carlton: is there a question?

Mr. Piuze: yes.

Q. By Mr. Piuze: you agree with that, don't you?

A. I agree with that.

Q. That's exactly when Mr. Boeken was a teen and a young man; right?

A. I think that's actually correct, yes.

The expert's experience in treating nicotine addiction is discussed. Cross Examination Testimony of Mace Beckson (Defendants), *Boeken v. Philip Morris*, May 14, 2001, P. 5700

Q. Tell us the addictions that you treat.

A. I pretty much treat the spectrum of chemical addictions. I also treat behavioral addictions, particularly sexual addictions -- sometimes other types that are co-morbid but generally that's the behavioral addiction and then I treat a wide spectrum, opiate, cocaine, alcohol, pills, whatever comes in.

Q. Spending most of your time on sexual addiction?

A. It's a significant part of my practice.

Q. You never treated anyone, at least as of March 2001, in your entire life, solely, for nicotine addiction?

A. As I said, people who come to psychiatrists generally have a serious complaint that they think requires a psychiatrist and so the average person is not going to go to a psychiatrist. Of course, everyone coming to me is coming to see a psychiatrist. No one is coming to me and saying I want to come in and get seen for my cigarette smoking or I want to quit.

Q. All of which equals yes?

A. That is correct.

Q. You never treated anyone solely for nicotine addiction?

A. I have only treated them in conjunction with other issues, that is correct.

The defendant's counsel asks the plaintiff's expert whether nicotine affects the taste and feel of the smoke, apart from the addictive effects. Cross Examination of Neal Benowitz (Plaintiff), *Boeken v. Philip Morris*, April 10, 2001, Pp. 2297-2300 & Cross Examination of Neal Benowitz (Plaintiff), *Williams v. Philip Morris*, February 26, 1999, Pp. 15-33

Q. Now, I think you testified last week that smokers -- maybe you didn't. Do you think a smoker will smoke a cigarette without nicotine?

A. No. Well, not for very long. They might smoke a few, but they won't keep smoking them.

Q. Now, nicotine has effects for the smokers other than pharmacological effects, doesn't it?

A. Well, I think I understand what you're driving at. But it's not exactly correct. All the things nicotine does are pharmacologic. Even its taste is a pharmacologic effect. I think you're trying to separate out systemic pharmacological effect as compared to a local pharmacologic effect.

Focus Point: The defendant's counsel will try to distinguish "taste" and "feel" from nicotine addiction. The term "feel" as used by the defendant's counsel apparently means the feeling cigarette smoke creates in the mouth of the smoker. The defendant's counsel appears to be arguing that the plaintiff smoked, at least in part, because he liked the "taste" and "feel" of cigarettes. The defendant's counsel refers to a deposition of the plaintiff, in which he discussed smoking Marlboros because he liked the taste.

This argument also suggests to the jury that cigarettes are engineered to achieve the best taste and feel, as opposed to increase the addictiveness of the cigarette. The defendant's counsel knows that he must give the jury a reason for all of the defendant's research and design work.

Q. You would define taste as a pharmacological effect?

A. It's an effect of nicotine on receptors that are related to taste, taste buds.

Q. So that being the case, anything we eat has a pharmacological effect -- a local pharmacological effect?

A. To some extent, yes.

Q. Then let's just focus on the local effect. It is important to many smokers, isn't it, that smoke have a certain taste and feel in the mouth?

A. Yes.

Q. And you would agree that it's important that nicotine or the nicotine is important to that taste and feel?

A. Yes.

Q. And you've heard of free nicotine?

A. Yes.

Q. Can you describe what free nicotine is?

A. Well, nicotine, when it's in smoke, can be present in two forms. And that depends on the acid base balance of the smoke, how much is in which form. One form is what's called charged, so it's -- ionized, and it tends to stay with water. It dissolves in water. The other part of it is what's called free nicotine or free-base nicotine. It's sort of like the concept of free-base cocaine. So it's not charged. It goes into the gas phase of smoke. And it's what gets absorbed through the mouth. And it's what influences the receptors that are involved with the taste of smoke, with the scratchiness in the throat, with the impact of smoke.

Focus Point: The defendant's counsel offers a relatively harmless reason for why it increased the acidity of tobacco. Research into internal tobacco industry documents shows that the acidity of cigarette tobacco was increased to increase the addictiveness of cigarettes by increasing the amount of free nicotine, which is form of nicotine that is easily absorbed into the smoker's body. See Geoffrey Ferris Wayne, et al., Brand Differences of Free-Base Nicotine Delivery in Cigarette Smoke: the View of the Tobacco Industry Documents, 15 TOBACCO CONTROL 189 (2006). In this line of questioning, the defendant's counsel suggests that increased acidity is related to "taste" and "feel" and that is the why the research was conducted.

Q. So the presence of free nicotine has an impact on taste and feel?

A. Yes.

Q. Most of that is absorbed in the mouth and the throat, right?

A. Yes.

Q. So that is, the physical impact of the smoke is affected by the free nicotine?

A. Yes.

Q. That's part of the overall sensation, then, that a smoker gets when smoking?

A. Yes.

Q. Now, both the taste and the feel of smoke are important to consumers; isn't that right?

A. Yes.

Q. Smokers won't choose to smoke a cigarette that doesn't taste or feel right to them?

A. Well, if they do -- if they do switch -- and this has happened, I think I mentioned before, when filtered cigarettes came in. People found them to be very weak in the beginning and, over time, they did learn to smoke them. But certainly, when you change cigarette characteristics in the short-term, a smoker does not like a cigarette that tastes different.

Q. So they choose their cigarettes based on, largely, on the way they taste and feel?

A. Usually, it's what they're used to. It's a taste that they associate with a cigarette and know the effects of nicotine, so they like to smoke cigarettes that they've smoked before.

Q. And you've read Mr. Boeken's deposition transcript, haven't you?

A. Yes.

Q. So you know that he smoked Marlboros because he liked their taste?

A. Yes.

* * *

Q. Are you aware, Doctor, that there were others at Philip Morris at the same time who disagreed with Dr. Dunn about the role of nicotine in smoking?

A. I don't recall specifically who those people were, but there may well be.

Q. Let me just show you a couple of examples. This is Defendant's 630 from Wakeham to Seligman. First paragraph, "The program reviewed by Dr. Dunn on smoking behavior once again prompts me to express the opinion that the total emphasize of our research on the psychopharmacology of nicotine is wrong. "I do not deny that many smokers maintain the habit for psychopharmacological reasons but other factors must come into play. To ignore them almost completely, as the present program does, is a mistake we have made too long. As a consequence, for example, the industry is facing a dearth of good, basic information which will support the positive aspects of cigarette smoking." And the last paragraph on this page, "The often-repeated marketing concept that smokers smoke for flavor is surely not entirely a figment of marketing imagination. Too many smokers express taste preferences for it to be an insincere gesture. Flavor must be one of

the motivating factors, so how can it all be nicotine when there are many other flavor contributors." The point is even Dr. Wakeham recognizes that nicotine plays an important role, but says there are other things, too, right?

A. Yes. I am sure that Dr. Dunn would -- just as I did in my testimony, talked about other factors that interact with nicotine in smoking behavior.

* * *

Q. Dr. Benowitz, you're aware, are you not, that within Philip Morris there were really opposing views about the importance of nicotine?

A. I am not sure if there were opposing views about the importance of nicotine, but rather whether there were also other things that were important.

Q. Okay. Let me clarify it a little. The first view is that nicotine is the primary reason people smoke, and without a certain level of nicotine, smokers will quit. You are familiar with that view, are you not?

A. Yes.

Q. In addition, there was a view that really people smoked primarily out of habit and for taste and that removal of nicotine really would not have a big effect on the habit, that people may well smoke without nicotine. Are you aware of that?

A. I -- no. I don't doubt that that may not have existed, but I have never read that.

Q. Okay. Well, yesterday, and I think even today, you made the point that, in your view, people don't smoke without nicotine, right?

A. Yes.

Q. That basically cigarettes without nicotine would not be successful in the marketplace?

A. Right.

Q. Now, the fact is Philip Morris actually introduced a cigarette without nicotine into the market, right? It was a product called Next, N-e-x-t. And what Philip Morris did was they used technology that is used for taking caffeine out of coffee, and they were able to extract basically all the nicotine from cigarettes, correct?

A. Yes.

Q. And they spent a bunch of money and a bunch of time and a bunch of effort coming up with that product, correct, Doctor?

A. Probably.

Q. Would it surprise you to learn that they spent 300 million dollars trying to develop a denicotized cigarette?

A. I wouldn't know how to guess at that. If you tell me that, I believe it.

Q. Okay. And the fact is they did bring it to market, right?

A. Yes.

Q. People didn't buy it, right?

A. Yes.

Q. And people reported that it tasted bad, right?

A. Yes.

* * *

Q. There was a document that Mr. Thomas showed you that talked about impact. Remember that?

A. Yes.

Q. And there was discussion about what impact really means in cigarettes, correct, Doctor?

A. Yes.

Q. Impact is a term that refers to what the smoke feels like in the back of the mouth or throat, right?

A. Yes.

Q. Another word for impact is something that is called throat scratch?

A. Yes. It is similar. It is a similar concept.

Q. And for whatever reason, it appears that a lot of people prefer cigarettes that have impact or throat scratch, right?

A. Yes.

The defendant's counsel has its expert describe the process by which nicotine affects smokers' mood and performance. Direct Examination of Peter Rowell (Defendant), *Scott v. Philip Morris*, June 18, 2001, Pp. 19301-302, 19306-307, 19313, 19315-316, 19318.

Q. And that is a neurotransmitter, I'm inferring from looking at the second part of the chart that affects learning and memory?

A. Correct.

Q. In other words, that neurotransmitter fires when your brain is trying to learn or to memorize?

A. Yes. That's an important neurotransmitter. In fact, that -- those are the nerves, the acetylcholine nerves, that degenerate in patients that have Alzheimer's disease. They lose their acetylcholine neurotransmitters, so they have problems with memory and learning.

Q. All right. We're going to get into this a bit more, but is that the neurotransmitter that nicotine mimics?

A. Yes.

That's an important one, and I have it on top, because that's where nicotine acts to mimic the action of acetylcholine in the body.

* * *

A. Okay. If we're talking about nicotine, nicotine always works by mimicking the natural neurotransmitter, acetylcholine. That's the only place it really works in the body, so --

Q. Can I stop you for a moment? When you say "mimic," does nicotine have a chemical structure somewhat like acetylcholine?

A. Yes.

Q. And when it comes into the body, the body thinks that it is acting like acetylcholine? That's what you mean by "mimic"?

A. Right. These nicotine molecules, which I have here in green, come in. And they can fit into the acetylcholine receptor, which is sometimes called the nicotinic receptor, in the same way that the normal acetylcholine molecule. So this is where nicotine works, then this would be an acetylcholine-containing neuron.

Q. Okay. And so since nicotine can mimic acetylcholine, whatever acetylcholine is doing in the body, nicotine can do?

A. Right.

Q. I think we saw a moment ago that acetylcholine helps to improve learning and memory; correct?

A. Yes.

Q. And, therefore, would you expect and is it the case, Doctor, that nicotine mimics that effect?

A. Yes.

* * *

Q. All right. And it comes into the bloodstream, eventually reaches the nerves, and acts in this fashion that you're about to describe. Now, tell us what does nicotine do when it gets in the synapse.

A. Nicotine, let's say, comes in from the outside and then interacts with those acetylcholine/ nicotinic type receptors and produces the same kind of signal that acetylcholine would have had it been released. So the receptors don't tell the difference. The main difference is the fact that nicotine lasts longer in the synapse because it's not removed.

Q. All right. Now, we heard a moment ago that when neurotransmitters come out across the synapse, they're taken home by these uptake pumps?

A. Right.

Q. Does that happen with the nicotine?

Focus Point: The defendant's expert makes the effects of nicotine seem temporary. This testimony ignores the fact that the body changes to adjust for the mood and performance changes caused by smoking. The withdrawal symptoms result from this change. Additionally, research has shown that smoking causes permanent detrimental changes in the smoker's brain.

A. No, nicotine doesn't get taken up by the uptake pumps.

Q. Does it eventually dissipate from the synapse?

A. Yes. It's metabolized fairly quickly.

Q. All right. Now, Doctor, can other substances other than drugs like, for example, food products, can food products act on our nerves in this way?

A. Yes.

* * *

Q. All right. So separate and apart from any drug, let's just talk about acetylcholine for a moment. Acetylcholine nerves can lead to the release of dopamine in other nerves through its action?

A. Right.

Q. And nicotine can also have that effect?

A. Yes.

Q. Can caffeine have that effect?

A. Yes.

* * *

Q. All right. So nicotine comes into the body, works on the receptors on this dopamine nerve, and ends up causing a release of dopamine?

A. Right.

Q. Which will lead to some pleasurable feeling?

A. Right.

Q. Now, how about caffeine? Does it do something similar?

A. Yes.

* * *

Q. And, Doctor, ultimately all of the discussion that you're doing here today, is that going to help us compare nicotine, caffeine, cocaine and heroin in terms of how much effect they have?

A. Yes. Because the point here is that caffeine and nicotine work through a natural system of the body, that the body already has in place for releasing adenosine or releasing acetylcholine to work on those specific receptors as opposed to the other psychostimulant drugs like cocaine and amphetamine, which we'll talk about how they work in a minute.

* * *

Q. Now, you said that caffeine and nicotine sort of mimic natural chemicals in the body and work on natural processes; correct?

Focus Point: Note that use of the term "natural" to describe nicotine addiction and that it is constantly compared to caffeine. This line of questioning makes nicotine addiction seem relatively mild. This line of questioning might also suggest to the judge and jury that the amount and form of nicotine in cigarettes occur naturally, which is false.

A. Right.

Q. But cocaine and amphetamine block uptake pumps. Is that a natural process?

A. No.

Q. That's doing something different than what the body normally does?

A. Yes. There's no system in the body that we have that blocks those uptake pumps.

The defendant's counsel has its expert describe the levels of dopamine released by smoking, as compared to other forms of drug use. Direct Examination of Peter Rowell (Defendant) *Scott v. Philip Morris*, June 18, 2001, Pp. 19292, 19318- 319.

Q. Okay. Dr. Rowell, based on your education, your training, your experience, do you have an opinion as to whether nicotine is as addictive or dependence-producing as cocaine, heroin and alcohol?

A. Yes, I do.

Q. And what is your opinion?

A. My opinion is based on all the scientific studies and evidence that I've seen, nicotine is very much on the low end of the spectrum compared to the other typical drugs like heroin, cocaine, amphetamine.

* * *

Q. All right. Well, we've seen that nicotine, caffeine, cocaine, amphetamine can all lead to a release or at least a buildup of dopamine in the synapse. Is there any way to compare these drugs?

A. Yes.

Q. Is there a way to compare them to determine how much dopamine is released by nicotine, caffeine, cocaine and other drugs?

A. Yes. You can actually do experimental studies to measure the amount of dopamine that's released in response to those drugs.

Q. Does it matter how much is released in terms of comparing them? Why do we care how much?

A. Well, because the more dopamine that you get in the synapse, the greater pleasure or positive reinforcement effect you would expect that drug to produce.

Q. Well, would it be fair to say, Dr. Rowell, that if a drug ends up increasing the dopamine in the synapse a great deal, it is a drug that has much more of a dependence potential than a drug that increases dopamine release slightly?

A. Right. Of the number of factors that you could measure, that would be an important determinant of what you would expect the drug to produce as far as its potential for dependence, right.

Q. All right. So what we're actually talking about here is we're going to figure out some way to measure the amount of dopamine in the synapse?

A. That's correct.

Q. Now, have scientists done studies that actually enable them to test the amount of dopamine released by these various chemicals?

A. Yes.

Q. Have you yourself done that kind of research?

A. Yes.

Q. Does it involve animals?

A. Yes.

* * *

A. Okay. These are -- This is the microdialysis experiment where you measure the dopamine levels in the synapse that comes out with these various drugs. This is a measure of the percent increase that occurs with the dopamine that goes up over a one-hour period after the drug is injected. And so it simply compares in -- These studies were done in rats, experimental laboratory rats. The probes were inserted down in the nucleus accumbens area. And when these drugs were administered, this is the percent increase that was produced by various drugs.

Q. All right. So down at the bottom, you listed the various drugs that were tested and reported in the literature; correct?

A. Correct.

Q. And amphetamine there, if I'm reading this chart correctly, when it was administered, it increased the amount of dopamine in the synapse over normal levels by 550 percent?

A. That's right.

Q. Is that what that chart is showing?

A. Yes.

Q. And cocaine increased the level of dopamine in the synapse by 350 percent?

A. About, right.

Q. Right. And morphine was slightly more than 300 percent?

A. About 320, right.

Q. And then if you go down to nicotine and caffeine, they're in the range of 100 percent or less?

A. Right. 104 percent and then 68 percent, I think it is.

Focus Point: Note that the defendant's counsel does not have the expert describe the rate of increase in dopamine. The amount of time it takes a drug to produce the desired feeling can have a significant affect on the drug's addictiveness. The nicotine in cigarette smoke impacts the smokers' mood and performance almost immediately.

Q. Okay. In terms of the information presented in this chart, what does it tell you about the relative strength of nicotine and caffeine compared to these other drugs?

A. Well, this demonstrates that there's a spectrum of activity with all drugs, as you would expect. Some drugs are very strong drugs, very active drugs; and some drugs are relatively weak. And on the ability of drugs to increase the levels of dopamine in the pleasure center of the brain, I think I can see from this that nicotine and caffeine are on the low end of the spectrum for the ability to increase the levels.

Q. Okay. And dopamine is the substance that is studied by pharmacologists to predict how dependence-producing a chemical might be; correct?

A. Yes.

Q. And based on this chart and the data in this literature, what does it lead you to conclude about the relative dependence-producing ability of nicotine and caffeine versus these other drugs?

A. Well, even if you had no other information, with this you would expect that nicotine would have a low potential for producing a drug dependence in relationship to amphetamine, cocaine and morphine.

The defendant's counsel uses the self-reporting test of intoxication as if this were an accurate predictor of addiction potential. Direct Examination of Peter Rowell (Defendant), *Scott v. Philip Morris*, June 18, 2001, Pp. 19328-329, 19331, 19340-342.

Q. And how are those studies performed?

A. Okay. Well, when you're dealing with human beings, you obviously can't insert a microdialysis probe down in their brain and do these kind of surgical studies. So the quantification of the drug effect has to be much more subjective. You basically just ask the individual, compare different drugs and see how they compare to a placebo effect. Which would be basically saltwater injection, let's say. So you say, "Does this feel good?" And then here's a drug. The studies, by the way, are done what's called blind in the fact that the humans don't know whether they're giving an injection -- getting an injection of, let's say, nicotine or cocaine or saline, saltwater, so --

Q. All right.

A. But it's a subjective scale.

Q. Now, Doctor, this graphic is entitled "How 'Good' Do These Drugs Make You Feel?" Correct?

A. Yes.

Q. And it's hard to see, but the source at the bottom of that is an article written by Dr. Henningfield; correct?

A. Right. This was an article by Jack Henningfield.

Q. And Dr. Henningfield is one of the witnesses who have testified in this case. Are you aware of that?

A. Yes.

Focus Point: An expert's testimony will be compared with his prior research, deposition testimony and testimony in previous cases. The comparison may happen during the cross-examination of the expert or through direct testimony of the opposing side's expert.

Q. All right. Now, we talked about dopamine levels compared to behaviors, we talked about the extent of euphoria. Is there any other concept in the pharmacologic field that pharmacologists use to evaluate the strength of substances? And what I'm referring to here is reinforcement.

A. Yeah, reinforcement is kind of the process of trying to evaluate in animal studies how good things feel. Because you can't ask an animal, "Does it make you feel good?" So you put on a term called reinforcement.

* * *

Q. All right. Now, all of these factors we've looked at so far, the degree of dopamine release, the comparison of dopamine release from nicotine to behavior dopamine release, the reported euphoria or euphoric feelings of each chemical, and this reinforcing data, does all of that factor into how a pharmacologist evaluates the dependence-producing potential of a substance?

A. Yes.

Q. And in terms of a drug like cocaine, for example, does it score higher in all of those areas than nicotine?

A. Yes.

Q. And is it substantially higher?

A. That's my reading of the information, yes.

* * *

Q. Now, Doctor, this is a graphic entitled "Dependence Potential of Drugs." Can you walk us through the entries in this demonstrative and tell us what it means?

A. Okay. This actually comes right out of a medical pharmacology textbook called Integrated Pharmacology by Page, 1997. And they have a chart which compared the drug dependence potential of a number of compounds. And there are two columns here. Drugs can have a dependence potential by virtue of them having a lot of reinforcing value; in other words, you get a big high, it makes you feel really great. For example, cocaine would do that. It's a very strong drug. Or -- Actually, and/or a drug could have a dependence potential because it has a lot of what's called physical dependence or physiological dependence, which means that you continue to take the drug because you have to take it to not suffer withdrawal symptoms. So there's pronounced physical dependence on the drug. It may not make you feel as great as some other drug like cocaine; but if you don't take it, you have very severe withdrawal symptoms and tolerance. So we have more or less reward or psychological dependence is what it's called in this textbook and physical dependence. And, normally, it's thought that for a drug to be -- to have a large dependence potential, it would have to be at least moderate or high in one of these categories and perhaps both.

So basically from this textbook, they categorized morphine and heroin, the two major opioid type responses, methadone, which is another little bit weaker opioid, alcohol, cannabinoids, which is the marijuana, cocaine, amphetamine, PCP, the barbiturates and benzodiazepines, which are like Valium, with their dependence potential for either physiological reward, euphoria, let's say, or feeling good with pronounced physical dependence. And nicotine and caffeine were also on the table. And they -- and I agree with this -- they produce rather weak euphoria. You don't really get a big high if you

inject someone with nicotine. And the physical dependence, the withdrawal is, I would categorize it again, as they do, as mild or weak compared to these other drugs that have strong physical dependence like the heroin compound.

Q. And when we talk about dependence, this is talking about substances that cause or exhibit in their users a craving and a repeated use of that substance?

A. Right.

The defendant's counsel has its expert describe the ritualistic aspect of smoking. Direct Examination of Peter Rowell (Defendant), *Scott v. Philip Morris*, June 18, 2001, Pp. 19731-372.

Q. Now, Doctor, you've taken out all the other bars. And what we show is the yellow bar there are people who are just getting pure nicotine with no smoking?

A. There's no behavior. That's the pure nicotine effect.

Q. And then the other bar is they're not getting any nicotine at all?

A. No nicotine.

Q. And they're smoking a denicotinized cigarette?

A. They're getting no nicotine, but they're going through all of the behavioral aspects of smoking a cigarette.

Q. And you're saying which one do you like better, in effect?

A. Right.

Q. And the result is that they're reporting more satisfaction with just smoking even without nicotine than they do over pure nicotine?

A. Right.

Q. And is the bottom line of this, Doctor, if you go back to [Exhibit] 2053 a moment, is the bottom line of this is that these smokers stated they preferred a cigarette with nicotine over a cigarette without nicotine but they greatly preferred smoking over pure nicotine?

Focus Point: Note that the pharmacological effects of nicotine absorbed during smoking and the nicotine received via injection are not addressed in this excerpt of testimony. Query whether the experiments continued long enough for nicotine withdrawal to set in.

A. Right. The bottom line to me is that when these individuals who are overnight abstinent, they're cigarette smokers, what they want to do is smoke. They want to go through the act of smoking. And that's what they find satisfying in this situation. Giving somebody who wants to smoke, they're craving the smoke, nicotine does not substitute, pure nicotine does not substitute for that as well as just the behavior of smoking.

Q. All right. So in this particular study, people who smoked denicotinized cigarettes reported to be more satisfied than getting a pure injection of nicotine?

Focus Point: This experiment discussed by the defendant's expert is meant to support the possible conclusion that the difficulty encountered by smokers in trying to quit is a result of smoking being habit forming. The implication is that smoking is just a habit that smokers choose not to change.

A. Right. And these other charts in here and, actually, other studies have shown similar things.

Q. All right. And what conclusions, if any, do you draw from that, Doctor?

A. Well, my conclusion is -- and I've had this conclusion for a long time based on what I know about how reinforcing or lack thereof nicotine is -- is that cigarette smoking is very much a behavioral dependence reinforced by a little bit of drug effect. But that it is not a drug addiction to a drug like cocaine or heroin; that it is behavioral. Because of the very repetitive nature of smoking, the ritualistic nature of smoking, there are a lot of behavioral aspects to smoking which make it -- You have to understand -- You have to appreciate the behavioral aspects of smoking and not just say because it's got a drug in it that nobody uses by itself.