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The power of a drug: how nicotine influenced cigarette addiction

by

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THESIS

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## **Abstract**

In 1964, the United States Surgeon General published a report “Smoking and Health” that stated cigarette smoking was causally related to lung cancer and the magnitude of the effect far outweighed all other factors. In the report, the Surgeon General specifically characterized “smoking as a habituation rather than addiction”. For the next twenty years, research investigating how smoking affected the body as well as the pathology of smoking behavior culminated in another Surgeon General’s report. The 1988 report titled, “The Health Consequences of Smoking: Nicotine Addiction”, classified the act of smoking and more specifically the ingestion of nicotine as an addictive process with not only deleterious physiologic consequences but psychological as well. These two reports loosely bind a critical 25 year time period in which the taxonomy used with relation to smoking went through a significant shift. This paper analyzes the role nicotine played in that shift. Specifically, through basic science reports, physician testimonies, and the development of quantifiable objective measures it is argued that the development and use of nicotine as a therapeutic to alleviate symptoms associated with smoking cessation was necessary for the change in classification of smoking from habituation to addiction. The use of therapeutic nicotine not only helped individuals overcome the difficulties associated with smoking cessation, but the intervention led to the development of criteria used to define and treat tobacco dependence and addiction. Nicotine replacement defined the disease for which it was developed to treat.

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## Introduction

By the mid-20<sup>th</sup> century, population surveys found that more than half of all men and about one-third of all women smoked cigarettes.<sup>1</sup> Those who did smoke consumed about one pack per day.<sup>2</sup> By 1950, the cigarette was a celebrated part of mainstream American culture,<sup>3</sup> but that was about to change. That year three important studies were published linking the incidence of lung cancer to cigarette consumption.<sup>4</sup> It has been argued that these three studies collectively marked “the end of the age of innocence about the blithe charms of the cigarette.”<sup>5</sup> By analyzing patient data through retrospective and small-scale prospective epidemiological methodologies, these landmark studies were able to report statistically significant measures correlating the act of smoking with increased potential for bronchogenic carcinoma.

By 1964, the United States Surgeon General published a report “Smoking and Health” that stated cigarette smoking was causally related to lung cancer and the magnitude of the effect far outweighed all other factors.<sup>6</sup> This was significant as the report was not a single study illustrating this conclusion but a detailed analysis of published scientific data that investigated smoking and

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<sup>1</sup> Richard Kluger, *Ashes to Ashes: America's Hundred-Year Cigarette War, the Public Health, and the Unabashed Triumph of Philip Morris* (New York, NY: Vintage Books, 1996), 132

<sup>2</sup> Ibid, 132

<sup>3</sup> Ibid

Allan Brandt, *The Cigarette Century: The rise, fall, and deadly persistence of the product that defined America* (New York, NY: Basic Books, 2006)

<sup>4</sup> R. Doll, A.B. Hill, “Smoking and carcinoma of the lung: preliminary report”. *British Medical Journal* 30 Sep (1950), 739-48

M.L. Levin, H. Goldstein, PR Gerhardt, “Cancer and tobacco smoking; a preliminary report”. *JAMA* (1950) 143:4, 336-338

E. Wynder, E.A. Graham, “Tobacco smoking as a possible etiologic factor in bronchiogenic carcinoma; a study of 684 proved cases” *JAMA* (1950) 143:4, 329-336,

<sup>5</sup>Richard Kluger, *Ashes to Ashes: America's Hundred-Year Cigarette War, the Public Health, and the Unabashed Triumph of Philip Morris* (New York, NY: Vintage Books, 1996, 132-5

<sup>6</sup> United States Public Health Service (USPHS), *Smoking and Health: Report of the Advisory Committee to the Surgeon General of the Public Health Service* (Washington D.C, 1964), 196

cancer as well as overall morbidity and mortality.<sup>7</sup> In the report, the Surgeon General specifically characterized “smoking as a habituation rather than addiction”.<sup>8</sup> For the next twenty years, research investigating how smoking affected the body as well as the pathology of smoking behavior culminated in another Surgeon General’s report. In a 1988 report titled, “The Health Consequences of Smoking: Nicotine Addiction”, the act of smoking and more specifically the ingestion of nicotine was defined as an addictive process with not only deleterious physiologic consequences but psychological as well.<sup>9</sup> These two reports loosely bind a critical 25 year time period in which the taxonomy used with relation to smoking went through a significant shift. This paper will analyze the role nicotine played in that shift. Specifically, through basic science reports, physician testimonies, and the development of quantifiable objective measures it will be argued that the development and use of nicotine as a therapeutic to alleviate symptoms associated with smoking cessation was necessary for the change in classification of smoking from habituation to addiction. The use of therapeutic nicotine not only helped individuals overcome the difficulties associated with smoking cessation, but the intervention led to the development of criteria used to define and treat tobacco dependence and addiction. Nicotine replacement therapy fulfilled a clinical need and was significant to disease classifications. Nicotine replacement defined the disease for which it was developed to treat.

In the following analysis tobacco consumption and smoking are referred to synonymously. In practice there are many forms of tobacco consumption, but for this narrative the most common form of consumption will be referenced. Additionally nicotine use refers to therapeutic nicotine.

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<sup>7</sup> Ibid, Foreword, v

<sup>8</sup> Ibid, 351

<sup>9</sup> United States Department of Health and Human Services (USDHHS), “*The Health Consequences of Smoking: Nicotine Addiction: A Report of the Surgeon General*” (Washington, D.C., 1988), 8 and 46

The author is not aware of cases in which nicotine is consumed outside of a therapeutic paradigm, but this clarification should be noted for the validity of the argument presented.

A note on methodology. In order to fully understand the nuances and changes of habituation and addiction labels from 1950 forward, an analysis of a subcommittee of the World Health Organization (WHO) was completed. This committee primarily discussed drugs that were illegal or prescription only agents that had high abuse potential. This is relevant to the smoking analysis as these frameworks were used to classify smoking by the Surgeon General in both 1964 and 1988. The minutes of all the meetings were accessed from the WHO directly.<sup>10</sup> After the 1964 Surgeon General's report was published there were only a small number of investigators using nicotine gum to alleviate smoking cessation symptoms. This methodology was also used to study nicotine pharmacology with relation to smoking. For this reason a PubMed search of 'nicotine chewing gum' was conducted (time period 1970-1985) to determine what was published on the subject at the time. Scientists that had published heavily in this field were profiled. Information about each scientist was obtained from memo documents found in the Legacy Tobacco Documents Library, personal interviews, and web searches. For those without financial ties to the industry, documents found only pertained to their individual research. Here it should be noted that the tobacco industry kept a long standing library of nicotine research with relation to smoking. In order to understand how Nicorette<sup>®</sup> was used by physicians as well medical opinion a PubMed search for the term 'Nicorette<sup>®</sup>' was conducted (time period 1984-1996). The number of articles and publishing journals were noted. Merrell-Dow Pharmaceuticals published newsletters to promote physician involvement with Nicorette<sup>®</sup>. These newsletters were found in

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<sup>10</sup> Accessed from [http://www.who.int/substance\\_abuse/right\\_committee/en/](http://www.who.int/substance_abuse/right_committee/en/)



the Legacy Tobacco Documents Library. There were two volumes published and the newsletters were sent to general practice physicians. This information was obtained by searching other documents near these in the archive to understand who published the documents as well as the intended audience. No information was found about how extensive the readership was<sup>11</sup>.

### **Smoking Cessation**

By 1975, almost 38 percent of the US population had quit smoking, but 6 out of 10 of the remaining smokers had seriously attempted to quit and were unsuccessful.<sup>12</sup> Smokers needed help quitting. As smoking rates began to decline, a growing number of interventions aimed at alleviating the discomforts of smoking cessation had been introduced to the active smoker.<sup>13</sup> A systematic review of over 100 methods used in Europe, Australia, and North America illustrated that “no single method works uniformly well with large numbers of individuals”.<sup>14</sup> Furthermore even though “much has been learned about the behavioral and addictive components of smoking during the last decade, cessation remains a complex multivariate outcome. Both the physiological and psychological components of smoking need to be considered in framing protocols for cessation”.<sup>15</sup>

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<sup>11</sup> Ronget C. THE SMOKING CESSATION NEWSLETTER. 00. 1982. Philip Morris. Bates Number 1000082017. <http://legacy.library.ucsf.edu/tid/tkm97e00>

Ellis BJ. THE SMOKING CESSATION NEWSLETTER. 00. 1981. Philip Morris. Bates Number 2021539714-2021539721. <http://legacy.library.ucsf.edu/tid/qwy25e00>.

<sup>12</sup> Jerome L. Schwartz “Review and evaluation of methods of smoking cessation, 1969-77. Summary of a monograph” *Public Health Rep* (1979): Nov-Dec 94 (6): 558-6

<sup>13</sup> *Ibid*, 559

<sup>14</sup> *Ibid*, 562-3

<sup>15</sup> *Ibid*, 563

As smoking cessation interventions began to increase, scientists in Sweden were developing a well-tolerated smoking substitute.<sup>16</sup> Ove Ferno, who is now known as the father of nicotine replacement therapy (NRT),<sup>17</sup> received a personal letter from a colleague asking for help in developing a tobacco free alternative to smoking.<sup>18</sup> The result was a nicotine polacrilex gum, an orally administered product that delivered nicotine through the buccal cavity, similar to chewing tobacco.<sup>19</sup> The gum was registered and approved for pharmaceutical use in over 56 countries by 1999, including the United States in 1984.<sup>20</sup> Under the trade name Nicorette<sup>®</sup>, nicotine gum became the first Food and Drug Administration (FDA) approved smoking cessation pharmaceutical. This class of drugs known as NRTs would later include lozenges, inhalers, and transdermal patches.<sup>21</sup> The gum itself had been developed by 1975 and was being used in both clinical and animal studies prior to FDA approval in 1984.<sup>22</sup> This is known from an interview with Ove Ferno stating that the gum was developed in its final form by the early 1970s and collaborations with other scientists allowed for extensive use in clinical studies. Well-known nicotine researchers Michael Russell and Martin Jarvis<sup>23</sup> were among those using nicotine gum as early as 1975. Ferno recounts that Russell started conducting studies looking into the absorption and action of nicotine chewing gum and wrote to him that he “believed that the chewing gum represented a major breakthrough for the treatment of heavy smokers”.<sup>24</sup>

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<sup>16</sup> Fernö O. “Conversation with Ove Fernö” *Addiction* (1994): Oct 89(10): 1215-26

<sup>17</sup> *Ibid*, 1215

<sup>18</sup> *Ibid*, 1216

<sup>19</sup> *Ibid*, 1218

<sup>20</sup> *Ibid*, 1223

<sup>21</sup> *Ibid*, 1215

<sup>22</sup> *Ibid*, 1219

<sup>23</sup> Michael Russell and Martin Jarvis are introduced briefly in this section but will be further discussed in detail throughout the chapter

<sup>24</sup> *Ibid*, p. 1223

By 1982, Russell and Jarvis published the first randomized, double blind study assessing the efficacy of nicotine gum as a tool to improve smoking cessation rates.<sup>25</sup> Published in the *British Medical Journal*, the study presented data in which smoking cessation rates improved significantly with the use of nicotine chewing gum compared to placebo. Success rates, based on different criteria including abstinence for one year and decrease in physical withdrawal, were more than double those obtained by placebo.<sup>26</sup> The overwhelming conclusion of the study was that nicotine chewing gum, given to well-motivated smokers acted as a substitute oral activity during cigarette withdrawal and provided nicotine by an alternative route to allay withdrawal symptoms attributable to smoking cessation.<sup>27</sup> The following section will detail withdrawal and smoking cessation in two ways. First is nicotine's relationship to withdrawal symptoms. Second is the manner in which such withdrawal symptoms facilitated the definition and study of tobacco use as a form of nicotine dependence.

### Tobacco Withdrawal

Despite increasing scientific study in smoking and health by 1979, little was known about the pathology of smoking behavior, specifically what factors affected smoking initiation and propagation.<sup>28</sup> Understanding smoking behavior was particularly relevant to cessation interventions. If a therapeutic paradigm could address the physical difficulties associated with smoking cessation successfully, abstinence from smoking could be achieved.<sup>29</sup> There were a number of physiological changes associated with smoking cessation, including decreased blood

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<sup>25</sup> M.J. Jarvis, M. Raw, M.A. Russell. C. Feyerabend, "Randomized control trial of nicotine chewing gum" *BMJ*. (1982): August 21: 285 (6341): 537-40

<sup>26</sup> *Ibid*, 539

<sup>27</sup> *Ibid*, 537

<sup>28</sup> Krasnegor NA, ed. "Cigarette smoking as a dependence process." NIDA Research Monograph v. 23 (Washington D.C.: DHEW: 1979), 2-3

<sup>29</sup> *Ibid*, 2-3

pressure, decreased heart rate<sup>30</sup>, nausea, headache, increased appetite, fatigue, and insomnia.<sup>31</sup> The wide range and individual variability of these symptoms made it difficult to establish what exactly tobacco withdrawal was. The following is from a chapter that surveyed published studies on tobacco withdrawal: “An examination of various studies reveals large differences in the frequency with which particular symptoms are reported...While this has left some to conclude that there is no abstinence syndrome, this conclusion is contradicted by a mass of data. A simpler conclusion is that the abstinence syndrome is quite variable. This impels us to tease out the causes of this variability.”<sup>32</sup> The authors did just that and the result was the development of a questionnaire that quantified the physical symptoms associated with smoking cessation (known as the Shiffman-Jarvik scale).<sup>33</sup> The importance of this scale and other tests used to quantify tobacco withdrawal will be further discussed.

#### *The nicotine effect on withdrawal*

Once a subset of symptoms was associated with smoking cessation, these were collated and termed tobacco withdrawal syndrome.<sup>34</sup> There were several hypotheses of what specifically caused this syndrome but the most objective explanation was nicotine deprivation.<sup>35</sup> If a specific set of symptoms was caused by a pharmacologic deprivation, then a pharmacologic intervention would present the best treatment option.<sup>36</sup> Until this point most studies on tobacco withdrawal had

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<sup>30</sup> H.B. Murphee, R.E. Schultz “Abstinence effects in smokers”. *Fed Proc* (1968): 27, 220

<sup>31</sup> J.S. Guilford “*Factors Related to Successful Abstinence from Smoking*”. (Pittsburgh, Pa.: American Institutes for Research, 1966)

<sup>32</sup> S. Shiffman. “The tobacco withdrawal syndrome”. In: Krasnegor NA, editor. “Cigarette smoking as a dependence process.” NIDA Research Monograph v. 23 (Washington D.C.: DHEW: 1979). pp. 158–184

<sup>33</sup> S. Shiffman, M. Jarvik “Smoking withdrawal symptoms in two weeks of abstinence” *Psychopharmacology* 50 (1976),:35-39

<sup>34</sup> S. Shiffman. “The tobacco withdrawal syndrome”. In: Krasnegor NA, editor. “Cigarette smoking as a dependence process.” NIDA Research Monograph v. 23 (Washington D.C.: DHEW: 1979). pp. 158–184

American Psychiatric Association, “*Diagnostic and Statistical Manual of Mental Disorders (Third Edition)*”. (First Printing, February 1980), 176-179

<sup>35</sup> *Ibid*, p. 179

<sup>36</sup> D. Hatsukami, J.R. Hughes, R.W. Pickens, “Characterization of nicotine dependence and abstinence: Physiological and subjective effects”. In: H. Grabowski, S. Hall (eds) “Pharmacological adjuncts in the treatment of tobacco

been retrospective, so nicotine deprivation was difficult to prove.<sup>37</sup> Once nicotine gum was developed it was the ideal tool to investigate the theory of nicotine deprivation.<sup>38</sup> Therapeutic nicotine gum was used by several researchers to further understand the pathology of tobacco withdrawal syndrome.<sup>39</sup> The conclusion of all these studies was that the use of nicotine gum decreased both self-reported and observed symptoms of tobacco withdrawal.<sup>40</sup> These results supported the theory of nicotine deprivation.<sup>41</sup> If the discomfort of smoking cessation was decreased with the use of nicotine, it can be extrapolated that the symptoms themselves were a result of nicotine loss.<sup>42</sup> The pathology of tobacco withdrawal syndrome as a function of nicotine deprivation would later be substantiated and codified with the determination of the American Psychiatric Association (APA) that continued smoking behavior was a result of an addiction to nicotine. The classification of tobacco use as an addiction was predicated on the theory of nicotine deprivation. This theory was only able to be tested once a therapeutic form of nicotine had been

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dependence” NIDA Research Monograph (Washington, D.C.: US Government Printing Office, 1984), 56-67

<sup>37</sup> Ibid, 56

J.R. Hughes, D. Hatsukami, “Short term effects of nicotine gum” In: H. Grabowski, S. Hall (eds) “Pharmacological adjuncts in the treatment of tobacco dependence” NIDA Research Monograph (Washington, D.C.: US Government Printing Office, 1984), 68-82

<sup>38</sup> O. Fernö, “Conversation with Ove Fernö” *Addiction* (1994): Oct 89(10): 1215-26 1218

<sup>39</sup> M.A. Russell, “Smoking problems: an overview” NIDA Res Monograph. (Washington, D.C.:US Government Printing Office, 1977):13-33

R. Kumar, E.C. Cooke, M.H. Lader, M.A. Russell, “Is nicotine important to tobacco smoking?” *Clin Pharmacol Ther.* (1977): May 21(5):520-9

M.J. Jarvis, M. Raw, M.A. Russell. C. Feyerabend, “Randomized control trial of nicotine chewing gum” *BMJ.* (1982): August 21: 285 (6341): 537-40: 538

J.R. Hughes, S.A. Miller, “Nicotine gum to help stop smoking” *JAMA* (1984): Nov 23-30; 252(20): 2855-8

<sup>40</sup> J.R. Hughes, D. Hatsukami, “Short term effects of nicotine gum” In: H. Grabowski, S. Hall (eds)

“Pharmacological adjuncts in the treatment of tobacco dependence” NIDA Research Monograph (Washington, D.C.: US Government Printing Office, 1984), 68-82: 75

<sup>41</sup> American Psychiatric Association, “*Diagnostic and Statistical Manual of Mental Disorders (Fourth Edition)*” (First Printing, 2002), 244

<sup>42</sup>J.H. Jaffe, M.E. Jarvik, “Tobacco use disorder” In: M.A.Lipton, A. DiMascia, K.F. Killam, eds.

“*Psychopharmacology: A Generation of Progress*” (New York: Raven press, 1978): 1665-1676

S. Shiffman. “The tobacco withdrawal syndrome”. In: Krasnegor NA, editor. “Cigarette smoking as a dependence process.” NIDA Research Monograph v. 23 (Washington D.C.: DHEW: 1979). pp. 158–184: 158-9

J.R. Hughes, D. Hatsukami, “Short term effects of nicotine gum” In: H. Grabowski, S. Hall (eds) “Pharmacological adjuncts in the treatment of tobacco dependence” NIDA Research Monograph (Washington, D.C.: US Government Printing Office, 1984), 68-82: 82

developed. In this case, nicotine gum was necessary to prove that nicotine deprivation caused smoking withdrawal symptoms.

### *Measuring Nicotine and Withdrawal*

During the formulation of nicotine buffered gum, Ove Ferno and his team developed a gas chromatographic method that measured blood nicotine levels. This was done to establish an objective assessment of nicotine absorption and to begin to understand the pharmacology of nicotine and smoking. This test was important for two reasons: one, it was the first test to measure absorption of nicotine and two, it was adopted by other researchers to understand the action of nicotine in the body.<sup>43</sup> The most notable study in which blood nicotine levels were an important part of methodology was in the field of compensatory smoking. Compensatory smoking is the theory that when smokers switch to a low nicotine cigarette they will change the rate of cigarette consumption in order to maintain their individual baseline nicotine level.<sup>44</sup> Compensatory smoking was a key component to the tobacco addiction classification and will be discussed in further detail.

In addition to the development of blood nicotine tests, withdrawal symptoms also became codified once they were used regularly in studies analyzing the effect of systemic nicotine on smoking cessation. In 1976, while studying the efficacy of nicotine gum, the Shiffman-Jarvik scale was developed.<sup>45</sup> The Shiffman-Jarvik scale is a 23 item scale that assesses tobacco

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<sup>43</sup> M.J. Jarvis, M. Raw, M.A. Russell, C. Feyerabend, "Randomized control trial of nicotine chewing gum" *BMJ*. (1982): August 21: 285 (6341): 537-40: 538

J.R. Hughes, D. Hatsukami, R.W. Pickens, D. Krahn, S. Malin, A. Luknic. "Effect of nicotine on the tobacco withdrawal syndrome" *Psychopharmacology* (1984): 83(1): 82-7: 84

D. Hatsukami, J.R. Hughes, R.W. Pickens, D. Svikis. "Tobacco withdrawal symptoms: an experimental analysis" *Psychopharmacology* (1984): 84(2): 231-6: 231

<sup>44</sup>M.A. Russell, M. Jarvis, R. Iyer, C. Feyerabend, "Relation of nicotine yield of cigarettes to blood nicotine concentrations in smokers" *BMJ* (1980): Apr 5,280(6219): 972-6: 972

<sup>45</sup>S. Shiffman, M. Jarvik, "Smoking withdrawal symptoms in two weeks of abstinence" *Psychopharmacology* (Berl) (1976): Oct 20; 50(1): 35-9: 38

withdrawal.<sup>46</sup> The scale was developed to understand the role of nicotine on smoking cessation symptoms.<sup>47</sup> As the basic science research progressed and it was determined that withdrawal symptoms associated with smoking cessation were attributable to nicotine deprivation, the checklist of symptoms became more clinically relevant to nicotine withdrawal.<sup>48</sup> This list of symptoms also appears in the diagnostic criteria of tobacco withdrawal as outlined in the Diagnostic and Statistical Manual of Mental Disorders-III (DSM-III).<sup>49</sup> The list of symptoms in the Shiffman-Jarvik scale and the newer Minnesota scale were tabulated as a result of studies investigating the efficacy of nicotine gum as a therapeutic aid to smoking cessation.<sup>50</sup>

### *Withdrawal and Addiction*

The language used in the classification of smoking in the latter half of the 20<sup>th</sup> century shifted from habitual process to addictive behavior. The World Health Organization's (WHO) Committee on Addiction Producing Drugs (current name), the Surgeon General's Committee, and the American Psychiatric Association (APA) were three primary groups of medical experts that outlined disease classifications and diagnostic criteria, and put forth recommendations for clinical practice and regulation.<sup>51</sup>

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<sup>46</sup> Ibid., 35-39

<sup>47</sup> S. Shiffman. "The tobacco withdrawal syndrome". In: Krasnegor NA, editor. "Cigarette smoking as a dependence process." NIDA Research Monograph v. 23 (Washington D.C.: DHEW: 1979). pp. 158-184: 158-9

<sup>48</sup> J.R. Hughes, D. Hatsukami, "Short term effects of nicotine gum" In: H. Grabowski, S. Hall (eds) "Pharmacological adjuncts in the treatment of tobacco dependence" NIDA Research Monograph (Washington, D.C.: US Government Printing Office, 1984), 68-82: 68

<sup>49</sup> American Psychiatric Association, "*Diagnostic and Statistical Manual of Mental Disorders (Third Edition)*". (First Printing, February 1980): 159-179

<sup>50</sup> J.R. Hughes, D. Hatsukami, "Short term effects of nicotine gum" In: H. Grabowski, S. Hall (eds) "Pharmacological adjuncts in the treatment of tobacco dependence" NIDA Research Monograph (Washington, D.C.: US Government Printing Office, 1984), 68-82: 68

<sup>51</sup> Allan Brandt, "*The Cigarette Century: The rise, fall, and deadly persistence of the product that defined America*" (New York, NY: Basic Books, 2006): 131-159

Richard Kluger, "*Ashes to Ashes: America's Hundred-Year Cigarette War, the Public Health, and the Unabashed Triumph of Philip Morris*" (New York, NY: Vintage Books, 1996)" 223-237

S. Shiffman. "The tobacco withdrawal syndrome". In: Krasnegor NA, editor. "Cigarette smoking as a dependence process." NIDA Research Monograph v. 23 (Washington D.C.: DHEW: 1979). pp. 158-184: 158-9

A brief history of the World Health Organization's committee on Drugs Liable to Produce Addiction (also known as the Committee of Addition Producing Drugs) is noteworthy as this group was responsible for outlining definitions of habituation, addiction, and dependence (Please refer to Methodology section for further details). According to minutes of the committee itself, the WHO developed a subgroup in 1947 to determine the semantic distinction between dependence and addiction.<sup>52</sup> The committee changed nuances in language for these definitions several times over the next seven years, but always agreed an addiction producing drug was significantly different than a habit forming drug. Addiction-producing drugs were agents that produced a physical dependence and were not only detrimental to the individual but to society as a whole.<sup>53</sup>

By 1964, the Advisory Committee to the Surgeon General of the Public Health Service published a report declaring the tobacco habit should be characterized as a habituation rather than addiction.<sup>54</sup> This is elaborated more in the report:

*[While] the smoking habit becomes compulsive in some heavy smokers the drive to compulsion appears to be solely psychogenic since physical dependence does not develop to nicotine or to other constituents of tobacco... either during its use or following withdrawal.*<sup>55</sup>

To further explain the distinction between habituation and addiction, the following chart was taken from the report.

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<sup>52</sup> WHO Expert Committee on Drugs Liable to Produce Addiction: report on the second session (1950): 3

<sup>53</sup> WHO Expert Committee on Addiction-Producing Drugs: seventh report (1957)

<sup>54</sup> United States Public Health Service (USPHS), "*Smoking and Health: Report of the Advisory Committee to the Surgeon General of the Public Health Service*" (Washington, D.C, 1964): 34

<sup>55</sup> *Ibid*, p. 352



<b>Drug Addiction</b>	<b>Drug Habituation</b>
Drug addiction is a state of periodic or chronic intoxication produced by the repeated consumption of a drug. Its characteristics include:	Drug habituation (habit) is a condition resulting from the repeated consumption of a drug. Its characteristics include:
1) an overpowering desire or need ( <b>compulsion</b> ) to continue taking the drug and to obtain it by any means;	1) a desire (but <b>not a compulsion</b> ) to continue taking the drug for the sense of improved well-being which it engenders;
2) a tendency to <b>increase the dose</b> ;	2) little or <b>no tendency to increase the dose</b> ;
3) a <b>psychic (psychological) and generally a physical dependence</b> on the effects of the drug;	3) some degree of psychic dependence on the effect of the drug, but <b>absence of physical dependence</b> and hence of an abstinence syndrome [withdrawal]:
4) detrimental effect on the individual and on society.	4) detrimental effects, if any, primarily to the individual.

\*This chart was taken from United States Public Health Service (USPHS), *Smoking and Health: Report of the Advisory Committee to the Surgeon General of the Public Health Service*, Washington D.C.: 1964, p. 354

The report cites evidence that smoking is not a compulsive act, is not subject to dose increasing, and has little to no physical dependence. Both the increase in dose and the presence of physical dependence, as evidenced by compensatory smoking and physical withdrawal symptoms, were only made known in the scientific literature as nicotine was used to improve smoking cessation.<sup>56</sup> Specifically, studies that administered nicotine and investigated the pathology of smoking cessation were only conducted once therapeutic nicotine gum was developed.<sup>57</sup> Similarly, studies in which smokers would change their behavior in order to increase the dose of nicotine to achieve their desired baseline were only conducted once a therapeutic form of nicotine was available.<sup>58</sup>

<sup>56</sup> M.A. Russell, M. Jarvis, R. Iyer, C. Feyerabend, "Relation of nicotine yield of cigarettes to blood nicotine concentrations in smokers" *BMJ* (1980): Apr 5,280(6219): 972-6: 972

<sup>57</sup> D. Hatsukami, J.R. Hughes, R.W. Pickens, D. Svikis. "Tobacco withdrawal symptoms: an experimental analysis" *Psychopharmacology* (1984): 84(2): 231-6: 231  
M.J. Jarvis, M. Raw, M.A. Russell. C. Feyerabend, "Randomized control trial of nicotine chewing gum" *BMJ*. (1982): August 21: 285 (6341): 537-40: 537

<sup>58</sup> M.A. Russell, M. Jarvis, R. Iyer, C. Feyerabend, "Relation of nicotine yield of cigarettes to blood nicotine concentrations in smokers" *BMJ* (1980): Apr 5,280(6219): 972-6: 972

The culmination of this scientific data came in 1988, when the Surgeon General labeled tobacco use addicting. “The Health Consequences of Smoking: Nicotine Addiction” report concluded that the difficulties that a smoker may experience when trying to quit are attributable to the addictive properties of nicotine.<sup>59</sup> Prepared by the Department of Health and Human Services under the editorship of the Office of Smoking and Health, the Surgeon General’s report contended that “new pharmacological evidence in both human and animals indicated that indeed smoking is an addictive process.”<sup>60</sup> The classification of nicotine as an addictive drug by the Surgeon General was predicated on a large compendium of basic science research linking the administration of nicotine to alleviating symptoms associated with smoking cessation.<sup>61</sup> The development of nicotine gum was the primary way to study the action of nicotine on tobacco withdrawal symptoms at the time. This was necessary to indeed show the role that nicotine played in compulsive smoking. In the 1988 report it states, “Nicotine is the key agent to serve as a re-inforcer to motivate tobacco-seeking and tobacco-using behavior. Furthermore, nicotine always causes physical dependence characterized by a withdrawal syndrome following cessation”.<sup>62</sup> Published in the treatment section of the report, “In treating the tobacco user, health professionals must address the tenacious hold that nicotine has on the body. More effective interventions must be developed to counteract pharmacologic addictions that accompany tobacco use”.<sup>63</sup> As smoking was classified

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<sup>59</sup> United States Department of Health and Human Services (USDHHS), “*The Health Consequences of Smoking: Nicotine Addiction: A Report of the Surgeon General*” (Washington, D.C., 1988)

<sup>60</sup> *Ibid.* 215

<sup>61</sup> D. Hatsukami, J.R. Hughes, R.W. Pickens, D. Svikis. “Tobacco withdrawal symptoms: an experimental analysis” *Psychopharmacology* (1984): 84(2): 231-6: 231-2

M.J. Jarvis, M. Raw, M.A. Russell. C. Feyerabend, “Randomized control trial of nicotine chewing gum” *BMJ*. (1982): August 21: 285 (6341): 537-40: 537-8

S. Shiffman. “The tobacco withdrawal syndrome”. In: Krasnegor NA, editor. “Cigarette smoking as a dependence process.” NIDA Research Monograph v. 23 (Washington D.C.: DHEW: 1979). pp. 158–184: 158-9

<sup>62</sup> United States Department of Health and Human Services (USDHHS), “*The Health Consequences of Smoking: Nicotine Addiction: A Report of the Surgeon General*” (Washington, D.C., 1988): 215

<sup>63</sup> *Ibid.*, 10

as a nicotine addiction, nicotine replacement offered a targeted therapeutic intervention and was shown to improve withdrawal symptoms and long-term smoking cessation.<sup>64</sup>

In 1980 the APA classified tobacco dependence from cigarette smoking as an organic mental disorder and addiction in the DSM-III.<sup>65</sup> The new categories defined two related tobacco induced disorders. The first, “tobacco withdrawal”, an organic mental disorder that some smokers experience when they attempt to stop smoking.<sup>66</sup> The second, “tobacco dependence”, a disorder that afflicts many and sets the stage for difficulties that arise if an individual tries to stop smoking.<sup>67</sup> The logic behind the designation as a mental disorder lies in the presence of physical withdrawal. In the case of ‘tobacco withdrawal’, the DSM states, “The essential feature is a characteristic withdrawal syndrome due to recent cessation of or reduction in tobacco use that has been at least moderate in duration and amount. The syndrome includes craving for tobacco, irritability, anxiety, difficulty in concentration, restlessness, headache, drowsiness, and gastrointestinal disturbances”.<sup>68</sup> The same criteria that describe tobacco withdrawal are found in the Shiffman-Jarvik scale.<sup>69</sup> The next set of diagnostic criteria, ‘tobacco dependence’ appears under the larger category of ‘substance use disorders’.<sup>70</sup> Tobacco dependence is defined as “continuous use of tobacco for at least one month with either (1) unsuccessful attempts to stop or significantly reduce the amount of tobacco use on a permanent basis, (2) the development of ‘tobacco withdrawal’ or (3) the pressure of a serious physical disorder that the individual knows is exacerbated by tobacco

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<sup>64</sup> Ibid, 215

<sup>65</sup> American Psychiatric Association, “*Diagnostic and Statistical Manual of Mental Disorders (Third Edition)*”. (First Printing, February 1980): 159-179

<sup>66</sup> Ibid, 159

<sup>67</sup> Ibid, 176

<sup>68</sup> Ibid, 159

<sup>69</sup> D. Hatsukami, J.R. Hughes, R.W. Pickens, D. Svikis. “Tobacco withdrawal symptoms: an experimental analysis” *Psychopharmacology* (1984): 84(2): 231-6: 231-2

<sup>70</sup> Ibid, 176

use”.<sup>71</sup> The DSM-III goes on to identify at-risk smokers and labels the most common form of tobacco dependence as associated with the inhalation of cigarette smoke.

*The difficulty in giving up tobacco use on a long-term basis, particularly with cigarettes, may be due to the unpleasant nature of the withdrawal syndrome, the highly overlearned nature of the habit that stems from the repeated effects of nicotine, which rapidly follow the inhalation of cigarette smoke, and the likelihood that a desire to use tobacco is elicited by environmental cues, such as the ubiquitous presence of other smokers and the widespread availability of cigarettes.*<sup>72</sup>

Dr. Robert Spitzer, the chair of the task force for the DSM-III, identified that as the medical nosology changed with relation to smoking, physicians and the medical complex could further influence smoking cessation rates in the following quote, “the new addictive designation may be of help to individuals attempting to quit the habit and the physicians who assist them in this effort”.<sup>73</sup> The isolation of nicotine in the form of nicotine gum not only was a successful pharmacological tool for smoking cessation<sup>74</sup>, but the intervention itself allowed for a standardized smoking cessation therapeutic for physicians to use and improve long term abstinence rates.

### Physicians and Nicotine Replacement Therapy

After the approval of nicotine gum in 1984, there were several other NRTs approved by the FDA.<sup>75</sup> The following section will outline physicians’ response to nicotine buffered gum, which was the first approved intervention and still holds the largest market share over all other

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<sup>71</sup> Ibid, 176

<sup>72</sup> Ibid, 177

<sup>73</sup> “The Smoking Cessation Newsletter” (1982). Philip Morris. Bates Number 1000082017. <http://legacy.library.ucsf.edu/tid/tkm97e00>. (For more information about this citation please refer to Methodology section)

<sup>74</sup> D. Hatsukami, J.R. Hughes, R.W. Pickens, D. Svikis. “Tobacco withdrawal symptoms: an experimental analysis” *Psychopharmacology* (1984): 84(2): 231-6: 231-2

<sup>75</sup> “Smoking Cessation Companies” (1996): Apr. Philip Morris. Bates Number 2078862916-2078862917. <http://legacy.library.ucsf.edu/tid/anl96c00>

NRTs.<sup>76</sup> The analysis is not dependent on the mode of intervention (for example between buffered resin gum or the transdermal patch), but rather the overall use of therapeutic nicotine to aid smoking cessation efforts.

### *Scientific Personnel*

This following section is not directly related to the central argument of this paper, but is necessary for a complete narrative. During the time period in question there were a small number of scientists investigating the efficacy and pharmacology of nicotine gum (for further details refer to the Methodology section). Background information for each scientist is provided here. The investigators in this section are heavily cited throughout this analysis. The motivations for these researchers are particularly important as it has been established previously that many physicians and scientists were compensated by the tobacco industry and therefore bias of such research should be noted.<sup>77</sup>

Michael Russell was a psychiatrist working at the Addiction Research Unit of London's Institute of Psychiatry. By the 1960s, Russell had made nicotine his primary research concern and began to examine smoking and addiction from every angle possible.<sup>78</sup> This research led to an important set of studies highlighting the theory of compensatory smoking.<sup>79</sup> The results of his study convinced Russell that education was not the sole answer to reducing smoking rates; he postulated the cigarette itself could be changed to become safer without reducing nicotine levels.<sup>80</sup>

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<sup>76</sup> The Lewin Group, "Market Barriers to the development of Pharmacotherapies for the treatment of Cocaine abuse and addiction: Final Report". (1997): September 12.

Accessed at <http://aspe.hhs.gov/health/reports/cocaine/xscocmkt.htm>

<sup>77</sup> B. Shamasunder B and L. Bero. "Financial ties and conflicts of interest between pharmaceutical and tobacco companies" *JAMA*.(2002) 288: 738-744

S.G. Mars, P.M. Ling "Meanings and motives. Experts debating tobacco addiction" *Am J Public Health*. (2008) Oct;98(10): 1793-802

<sup>78</sup> "Dr. MAH Russell" Memo from the British American Tobacco collection. Bates number 103509594

<sup>79</sup>M.A. Russell, M. Jarvis, R. Iyer, C. Feyerabend, "Relation of nicotine yield of cigarettes to blood nicotine concentrations in smokers" *BMJ* (1980): Apr 5,280(6219): 972-6

<sup>80</sup> "Smoking Cessation Companies" (1996): Apr. Philip Morris. Bates Number 2078862916-2078862917. <http://legacy.library.ucsf.edu/tid/anl96c00>

This idea caught the attention of the British-American Tobacco Company (BATCo), who in 1975 approached Russell with an offer to collaborate research efforts.<sup>81</sup> An internal memo authored by a scientist from BATCo indicated that the tobacco company had provided “a considerable amount of technical assistance” to Russell from 1976 to 1979 in relation to three of his smoking behavioral experiments, but had not provided direct financial support. Despite this association, his research overwhelmingly showed that nicotine was the addictive component of smoking.<sup>82</sup>

Martin Jarvis was a part the smoking research team housed at the Addiction Research Unit with Russell. After studying at the London University of Psychology, Jarvis trained as a Clinical Psychologist and worked with Russell studying the role of nicotine in smoking maintenance and cessation, smoking and gender, and passive smoking. He also was an addiction expert with the International Cancer Research Fund, with no financial ties to the tobacco industry.<sup>83</sup>

Murray Jarvik was a US based research scientist who primarily studied the psychopharmacology of drugs. In the later part of his career, he began research on the effect of nicotine on smoking behavior and the brain. This work continued through the late 1960s and early 1970s. He was said to have been personally motivated in nicotine research as his wife had been a long-term smoker. Additionally, Jarvik was one of the scientists given access to nicotine buffered gum directly from Ove Ferno, well before it was made publically available.<sup>84</sup> There were no financial ties found between Jarvik and the tobacco industry.

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<sup>81</sup> Dr. MAH Russell” Memo from the British American Tobacco collection. Bates number 103509594

<sup>82</sup> M.J. Jarvis, M. Raw, M.A. Russell. C. Feyerabend, “Randomized control trial of nicotine chewing gum” *BMJ*. (1982): August 21: 285 (6341): 537-40: 537-8

M.A. Russell, M. Jarvis, R. Iyer, C. Feyerabend, “Relation of nicotine yield of cigarettes to blood nicotine concentrations in smokers” *BMJ* (1980): Apr 5,280(6219): 972-6: 972

<sup>83</sup>“ Martin Jarvis, PhD”. Memo from the British American Tobacco collection. Bates number 32204867.

<sup>84</sup> “Conversation with Murray Jarvik” *Addiction*. (2001): 96 (9): 1241–1252

psychopharmacology of nicotine and the treatment of nicotine addiction. Along with a team at her home university, Hatsukami was responsible for identifying key criteria used for tobacco withdrawal and nicotine addiction definitions. An extensive search in the Legacy Tobacco Documents Library did not yield any documents showing ties with the tobacco industry.<sup>85</sup>

### *Physician Marketing*

In order to promote their product Merrell-Dow Pharmaceuticals, the sponsoring company of nicotine gum (Nicorette<sup>®</sup>) in the United States, published a set of physician newsletters outlining a new smoking cessation program. This focused on a standardized intervention to alleviate withdrawal symptoms associated with smoking cessation.<sup>86</sup> The first newsletter was published in 1982. The following is an excerpt from the introduction, an interview with Michael Russell highlighting compensatory smoking and the role of nicotine:

*Once a person has played around with cigarettes for a little time [he] has learned to inhale and started to ingest nicotine, I think that nicotine then dominates the smoking behavior over and above psychological factors. I don't think that many people, even those who work in smoking cessation research, realize the extent to which smoking for most smokers is really a very finely adjusted drug-taking activity...Smokers modify and adjust that nicotine self-dosage by the puffs they take, the rate at which they puff, and how deeply they inhale. They seem to regulate that intake of nicotine when smoking different strengths of cigarettes. We have shown that people on cigarettes with a nicotine yield of 0.6, which is fairly low in England, can get blood nicotine levels that are very similar to the levels of people who are smoking cigarettes with two and three times that nicotine level. When you get people to switch to low tar and nicotine cigarettes, they do self-regulate that nicotine intake. In addition, there seems to be a bottom end of the cigarette market. In Britain, once you get below a certain nicotine yield, the cigarettes don't sell, and I am sure if psychological aspects were the predominant motive for smoking, very low nicotine cigarettes and nicotine free cigarettes would have some sale.<sup>87</sup>*

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<sup>85</sup> <http://www.tobaccoresearch.umn.edu/staff.html>. Accessed April 2014

<sup>86</sup> "Smoking Cessation Companies" (1996): Apr. Philip Morris. Bates Number 2078862916-2078862917. <http://legacy.library.ucsf.edu/tid/an196c00>, 1-2

<sup>87</sup> *Ibid*, 2

Russell encouraged his fellow physicians to use their time with the patient as a “teachable moment” and take advantage of the expanding number of cessation resources. In the next volume of the newsletter, behavioral science researcher Ellen Gritz, who had authored several studies on the subject of addiction<sup>88</sup> stated: “I think there is a lot of evidence that it [smoking] is addictive, whether this is a physiological addiction or rather a psychological or behavioral addiction is controversial. Physiological is supported by withdrawal symptoms but despite this cigarette smoking is not treated in the same fashion as addiction to heroin or morphine”.<sup>89</sup> This observation illustrated the need for a paradigm change in smoking cessation. The use of an FDA approved and standardized prescription was the answer. Nicotine gum was first used to alleviate the discomfort of smoking cessation and through its use determined those symptoms were due to nicotine deprivation.

Merrell-Dow Pharmaceuticals also took an aggressive stance on advertisement when Nicorette<sup>®</sup> was made available in the United States. Nicotine resin gum had been available in Europe for four years and in Canada for two years before it went on sale in the United States. In one advertisement found in the *Archives of Internal Medicine*<sup>90</sup> the text read, “Now, for the first time, you can prescribe an effective pharmacological adjunct to help patients stop smoking”. The illustrations also highlight the importance of nicotine in this paradigm. At this time it was not conclusive that nicotine deprivation caused the unpleasant symptoms associated with cessation,

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<sup>88</sup> E.R. Gritz, “Cigarette smoking by adolescent females: implications for health and behavior” *Women Health* (1984): 9(2-3):103-15

E.R. Gritz, J.E. Rose, M. Jarvik, “Regulation of tobacco smoke intake with paced cigarette presentation” *Pharmacol Biochem Behav.* (1983) Mar 18(3):457-62

<sup>89</sup> “The Smoking Cessation Newsletter” (1982). Philip Morris. Bates Number 1000082017.

<http://legacy.library.ucsf.edu/tid/tkm97e00>

<sup>90</sup>The Nicorette<sup>®</sup> advertisement was published in the *Annals of Internal Medicine*, Volume 144, April 1984. The *Archives of Internal Medicine* is a publication geared to primary care physicians published by the American Medical Association. The two paged advertisement stressed the importance of nicotine in the continued use of tobacco.



yet the administration of nicotine gum yielded a positive effect. Despite the pathway, the advertisement introduces the idea that nicotine is key to alleviating the difficult physical symptoms associated with tobacco withdrawal.

### *Physician Response*

Following the availability of nicotine chewing gum in the US market, several articles were published in a wide variety of journals stating that nicotine gum was a novel therapy that gave physicians a new power to change their patients' smoking behaviors.<sup>91</sup> In further detail, one article stated that nicotine gum "offers physicians the kind of tangible intervention that has been missing from previous attempts to help patients stop smoking. The advent of nicotine gum offers the opportunity to study how physicians adopt pharmacological innovation that also requires behavioral intervention".<sup>92</sup> In another study, the lead authors summarized their results with the following,

*We conclude that after more than 20 years of unsuccessful research into all kinds of treatment methods for smokers, nicotine chewing gum given to well-motivated smokers in a clinical setting is the first treatment to have been developed that has a specific effect over and above that attributable to an attention-placebo response. That it is also the first treatment to provide effective nicotine substitution has important implications for the role of nicotine in cigarette dependence.*<sup>93</sup>

The conclusion of a physician survey published two years after Nicorette<sup>®</sup> was available in the US market, showed medical practitioners had been looking for new techniques to help their patients

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<sup>91</sup>A.R. Page, D.J.Walters, R.P. Schlegel, J.A. Best, "Smoking cessation in family practice: the effects of advice and nicotine chewing gum prescription" *Addict Behav.* (1986): 11(4): 443-6: 443

B.K. Rimer, V.J. Strecher, M.K. Keintz, P.F. Engstrom, "A survey of physicians' views and practices on patient education for smoking cessation" *Prev Med.* (1986) Jan 15(1): 92-8

<sup>92</sup> D.P. Sachs, "Treatment of cigarette dependency. What American pulmonary physicians do?" *Am Rev Respir Dis.* (1984) Jun; 129(6): 1010-3

<sup>93</sup> M.J. Jarvis, M. Raw, M.A. Russell. C. Feyerabend, "Randomized control trial of nicotine chewing gum" *BMJ.* (1982): August 21: 285 (6341): 537-40: 537-8, 540

stop smoking.<sup>94</sup> Additionally an independent research group also stated that Nicorette<sup>®</sup> has “high levels of physician awareness and usage compared with most new drugs entering the US prescription market”.<sup>95</sup> Overall physicians seemed to respond favorably to prescribing Nicorette<sup>®</sup> gum. Moreover, the standardized pharmacological agent filled a void for intervention that gave physicians more authority than behavioral advice.

A PubMed search of the term ‘Nicorette<sup>®</sup>’ (for further details refer to the Methodology section) yielded 169 articles in a range of medical journals. A majority appeared in internal medicine and psychiatry journals. Appearing less often, studies regarding Nicorette<sup>®</sup> were published in dental, cardiovascular, pharmacological, and public health journals. Topics that were covered included long term cessation success, impact on environmental health (as second smoke became a large public health concern), and long term effects of nicotine gum on oral cavities and tissue.

### **Social and Industry influence on smoking definitions**

By the end of the 1980’s nicotine addiction and smoking were synonymous.<sup>96</sup> Smoking as a behavior was shifting from an individual to a health choice, one that could be treated. The availability of a pharmaceutical intervention not only defined how doctors treated smoking behavior but also re-defined how smoking was classified, as a nicotine addiction. The central argument of this paper is that the development of nicotine buffered gum was necessary not only to treat the symptoms associated with smoking cessation, but that the study of these treatments was key to the reclassification of smoking as an addictive process. While the basic science in this

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<sup>94</sup> B.K. Rimer, V.J. Strecher, M.K. Keintz, P.F. Engstrom, “A survey of physicians' views and practices on patient education for smoking cessation” *Prev Med.* (1986) Jan 15(1): 92-8

<sup>95</sup> The Lewin Group, “Market Barriers to the development of Pharmacotherapies for the treatment of Cocaine abuse and addiction: Final Report”. (1997): September 12

<sup>96</sup> United States Department of Health and Human Services (USDHHS), “*The Health Consequences of Smoking: Nicotine Addiction: A Report of the Surgeon General*” (Washington, D.C., 1988)

narrative is important, it is not the only factor which had an impact on the addiction classification. The following section references previously published research that shows several factors were necessary to explain how and why tobacco was defined as an addiction.

### Social Aspects of Addiction

A large area of social addiction research, with relation to tobacco and other substances, has argued that addiction classifications are largely dependent on social and national contexts as well as substance.<sup>97</sup> Specifically that taxonomy when dealing with behaviors, wanted or unwanted, is dependent on our objectives.<sup>98</sup> Research conducted by Virginia Berridge illustrates the importance of national context in the historical trajectory of a given substance. In 18<sup>th</sup> and early 19<sup>th</sup> century England, opium was sold in grocery shops. At the time it was used for a wide variety of ailments and as the population lacked formal health care, self-medication was a common practice. During this time period opium use was considered normal.<sup>99</sup> The importance of national context is particularly evident for the case of smoking. Previous narratives have argued that only when the smoker was socially marginalized could tobacco be labeled as addicting.<sup>100</sup> Allan Brandt argues, “In the last half century the cigarette has been transformed...Not only has the meaning of the cigarette been transformed, but even more, the meaning of the smoker...[The smoker] has become a pariah, the object of scorn and hostility”.<sup>101</sup> Additionally the science of addiction, including the

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<sup>97</sup>V. Berridge V, “Two tales of addiction: Opium and Nicotine” *Human Psychopharmacology*. 12 (1997) S45-S52

V. Berridge, S Mars, “History of Addictions” *J Epidemiol Community Health* 58 (2004): 747-750

<sup>98</sup> J.H. Jaffe, “Trivializing dependence” *Br J Addict.* (1990) Nov 85(11): 1425-7

<sup>99</sup> V. Berridge, G. Edwards, “*Opium and the People: Opiate Use in Nineteenth-Century England*”, (New Haven, CT: Yale University Press, 1987), 49

<sup>100</sup>A. Brandt, “Blow Some Smoke My Way: Passive Smoking, Risk, and American Culture.”164–91 in “Ashes to Ashes: The History of Smoking and Health, edited by Stephen Lock, Lois Reynolds, and E. M. Tansey. (Amsterdam: Rodopi, 1999)

A. Brandt, “*The Cigarette Century: The rise, fall, and deadly persistence of the product that defined America*” (New York, NY: Basic Books, 2006): 19-69

<sup>101</sup> A. Brandt, “Blow Some Smoke My Way: Passive Smoking, Risk, and American Culture.”164–91 in “Ashes to Ashes: The History of Smoking and Health, edited by Stephen Lock, Lois Reynolds, and E. M. Tansey. (Amsterdam: Rodopi, 1999): 176

manner in which research is conducted, is also influenced by the social context. This includes an agent's perception of normalcy, harm, and regulation.<sup>102</sup>

### Industry Influence

Another major source of influence over the changing semantics around tobacco, smoking, and addiction was the tobacco industry itself. In an expansive analysis that charted the actions of the tobacco industry for almost an entire century, historian Allan Brandt illustrates the power of the tobacco industry:

*Not only did the tobacco industry effectively thwart tobacco regulation, they also shaped the public meanings of smoking to their benefit. Even as the health risks of smoking came to be more widely recognized and understood, it was still possible to argue that to smoke or not to smoke was simply an issue of personal agency...the decision should be left to the individual.<sup>103</sup>*

The power of the tobacco industry to keep smoking a personal choice has clear implications on semantics of smoking and addiction. By distancing smoking from medicalization, smoking was not a health choice but a personal one. The tobacco industry also sought to create doubt in the growing scientific research that linked smoking and negative health outcomes. This was done through the creation of a collaborative research entity called the Tobacco Industry Research Committee (TIRC).<sup>104</sup> The CEO of Brown and Williamson stated that the obligation of the TIRC was to remind the public of three points “1. There is no conclusive scientific proof of a link between smoking and cancer. 2. Medical research points to many possible causes of cancer, and 3. The millions of people that derive pleasure and satisfaction from smoking can be reassured that every scientific means will be used to get all the facts as soon as possible”.<sup>105</sup> The TIRC allowed

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<sup>102</sup> S.G. Mars, P.M. Ling “Meanings and motives. Experts debating tobacco addiction” *Am J Public Health*. (2008) Oct;98(10): 1793-802, 1794

<sup>103</sup> A. Brandt, “*The Cigarette Century: The rise, fall, and deadly persistence of the product that defined America*” (New York, NY: Basic Books, 2006): 170

<sup>104</sup> *Ibid*, 170

<sup>105</sup> *Ibid*, 173

the tobacco industry to manipulate the science of smoking and cancer. By casting doubt on the smoking-cancer link the TIRC also changed the course of future scientific inquiry away from determinants of smoking behavior.<sup>106</sup> In addition to scientific research, the TIRC published materials printed in mainstream publications such as the *New York Times* and *Wall Street Journal*. These articles further articulated the position that smoking did not impact health negatively.<sup>107</sup>

Examining these previous arguments it is evident that many factors influenced the classification of smoking as an addiction. This analysis only adds to this growing body of research. While social and industry influences played a large role in smoking and addiction semantics, the development and use of nicotine as a therapeutic aid for smoking cessation was key. Nicotine gum was not only necessary for smoking to be labeled as an addiction but led to several objective measures that also influenced the way in which the addiction was ultimately classified.

## **Conclusion**

*Recognizing tobacco use as an addiction is critical both for treating the tobacco user and for understanding why people continue to use tobacco despite the known health risks. Nicotine is a psychoactive drug with actions that reinforce the use of tobacco. Efforts to reduce tobacco use in our society must address all major influences that encourage continued use, including social, psychological, and pharmacologic factors. Tobacco use is a disorder which can be remedied through medical attention: therefore it should be approached by health care providers just as other substance-use disorders are approached: with knowledge, understanding, and persistence.*<sup>108</sup>

In the twenty-six years between the Surgeon General's first report on smoking and health and the 1988 report, medical views of smoking shifted. The shift towards addiction is not

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<sup>106</sup> B. Shamasunder B and L. Bero. "Financial ties and conflicts of interest between pharmaceutical and tobacco companies" *JAMA*. (2002) 288: 738-744

<sup>107</sup> R. Proctor R. "Tobacco and Health" : Expert Witness Report Filed on behalf of plaintiffs in "The United States of America v. Philip Morris, Inc. et al." *The Journal of Philosophy, Science, and Law*. (2004); Mar (4): 1-32

<sup>108</sup>United States Department of Health and Human Services (USDHHS), "*The Health Consequences of Smoking: Nicotine Addiction: A Report of the Surgeon General*" (Washington, D.C., 1988): 345

attributable to one single entity. The use of therapeutic nicotine to increase smoking cessation rates and prolong abstinence was key to the transition to addiction. Pharmacological studies provided evidence that nicotine deprivation was the cause of tobacco withdrawal symptoms and the use of nicotine replacement therapy consequently led to the development of blood tests and withdrawal scales that measured and quantified tobacco dependence. These study findings and objective measures determined the diagnostic criteria for tobacco withdrawal and tobacco dependence. While the use of therapeutic nicotine is by no means the singular explanation for shifting semantics of smoking, the use of nicotine gum as a cessation therapeutic was key to the classification and definition of tobacco withdrawal, tobacco dependence, and nicotine addiction. Nicotine replacement both treated and defined a disease. The implications of this go beyond the scope of this narrative and additional historical research in nicotine replacement therapy beyond this time period would be of interest. This analysis adds to a large compendium of research on tobacco, health, and addiction that all illustrate smoking classifications are subject to a myriad of factors.

### **Additional References of Interest**

Berridge, Virginia and Mars, Sara “History of Addictions” *J Epidemiol Community Health* 58 (2004): 747-750

Brandt, Allan “From Nicotine to Nicotrol: Addiction, Cigarettes, and American Culture” in “*Altering American Consciousness: The History of Alcohol and Drug Use in the United States, 1800-2000*.” ed. SW Tracy and CJ Acker. (Amherst, MA: University of Massachusetts Press, 2004)

Badger, Anthony “*Prosperity Road: the New Deal, Tobacco, and North Carolina*” (Chapel Hill, NC: University of North Carolina. 1980)

Bum, A "AMA rewrites tobacco history." *Lancet* 346 (1995): 261

Bero, D “The Unsung Public Health Hero who Helped Launch the War on Tobacco. *JAMA* 12 (1990): 1597-1598

“Curbing the Epidemic: Governments and the Economics of Tobacco Control”. The World Bank, Washington, D.C., 1999.

Chase, S.L. “OTC products help smokers quit” *RN*. (1996) Sep; 59(9):7

Chilcote, S. “Memo: Pending FDA Action on Nicotine Chewing Gum” Accessed from Tobacco Archives. December 27, 1982. Bates # TIMN 224605

Fagerstrom, K. and Schneider, N.G. “Measuring Nicotine Dependence: A Review of the Fagerstrom Tolerance Questionnaire”. *Journal of Behavioral Medicine*. 12: 2 (1989): 159-182

Feldman, E. and Bayer, R. “*Unfiltered: Conflicts over Tobacco Policy and Public Health*” (Boston, MA: Harvard University Press, 2004)

Fisher, R.A. “Lung Cancer and Cigarettes?” *Nature*, 182:108

Federal Drug Administration, Summary Basis of Approval for Nicotine Resin Complex, NDA #18-612, February 1984. Obtained from Tobacco Archives, Bates #: 50423 8285-8300

FDC Report “Merrell-Dow Rx Chewing Gum to reduce smoking” Accessed from Tobacco Archives Bates Number # 1005061909

Gardner, M. and Brandt, A “The Doctors’ Choice Is America’s Choice”: The Physician in US Cigarette Advertisements, 1930-1953,” *American Journal of Public Health* 96: 2 (2006): 222-32.

Gately, I “*Tobacco: A Cultural History of How an Exotic Plant Seduced Civilization*” (New York,

NY: Grove Press, 2001)

Glantz, S. and Balbach, E. *"Tobacco War: Inside the California Battles"*. (Berkeley, CA: University of California Press, 2000)

Harkness, J.M. "The U.S. Public Health Service in the 1950s" *American Journal of Public Health* 91, no. 2 (2001): 196-206.

Harvard Institute for the Study of Smoking Behavior and Policy. *"Policy Implications of the 1986 Surgeon General's Report on Involuntary Smoking"* (Boston, MA: Harvard University Press, 1987)

Levine, H.G. "The Discovery of Addiction: Changing conceptions of habitual drunkenness in America" *Journal of Studies on Alcohol*. 39 (1978): 413-417

National Institute on Drug Abuse. Info Facts: Cigarettes and other Tobacco Products. Accessed at: [www.nida.nih.gov/infofacts/tobacco.html](http://www.nida.nih.gov/infofacts/tobacco.html)

Ostrowski, D.L. and DeNelsky, G.Y. "Pharmacologic management of patients using smoking cessation aids" *Dent Clin North Am.* (1996) Jul;40(3):779-801

Porter, R. "The drinking man's disease" the pre-history of alcoholism in Victorian Britain" *British Journal of Addiction*. 80: 385-396

Proctor, R. "The Nazi War on Tobacco: Ideology, Evidence, and Public Health Consequences," *Bulletin of the History of Medicine* (1997): 435-88.

Robbins, Lewis C. "Position Statement of Surgeon General on Smoking and Cancer" Washington, D.C.: Public Health Service Cancer Control Program, 1956

Rose, J.E. "Nicotine addiction and treatment" *Annu Rev Med.* (1996)47:493-507

Talbot, J.H. "Smoking and Lung Cancer" *JAMA* 171 (15): 2104

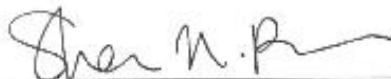


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