

See discussions, stats, and author profiles for this publication at: <https://www.researchgate.net/publication/230892776>

Type A Behavior Pattern and Coronary Heart Disease: Philip Morris's "Crown Jewel"

Article in *American Journal of Public Health* · September 2012

DOI: 10.2105/AJPH.2012.300816 · Source: PubMed

CITATIONS

10

READS

73

3 authors, including:



Kelley Lee

Simon Fraser University

281 PUBLICATIONS 2,502 CITATIONS

[SEE PROFILE](#)



Martin Mckee

London School of Hygiene and Tropical Medi...

1,258 PUBLICATIONS 30,258 CITATIONS

[SEE PROFILE](#)

Some of the authors of this publication are also working on these related projects:



Tobacco companies, public policy and global health [View project](#)



Innovation and Global Health Governance [View project](#)

All content following this page was uploaded by **Kelley Lee** on 27 March 2015.

The user has requested enhancement of the downloaded file. All in-text references [underlined in blue](#) are added to the original document and are linked to publications on ResearchGate, letting you access and read them immediately.



http://apps.who.int/gb/ctc/PDF/cop3/FCTC_COP3_8-en.pdf. Accessed February 1, 2011.

29. Alamar B, Glantz SA. Effect of increased social unacceptability of cigarette smoking on reduction in cigarette consumption. *Am J Public Health*. 2006;96(8):1359–1363.

30. Chapman S, Freeman B. Markers of the denormalisation of smoking and the

tobacco industry. *Tob Control*. 2008;17(1):25–31.

31. Cleveland Clinic. Occupational Health Screening (pre-placement physical exam). Available at: <http://portals.clevelandclinic.org/gme/IncomingResidentsFellows/MyNextSteps/MyChecklist/HealthScreening/tabid/4944/Default.aspx>. Accessed April 5, 2011.

32. Bayer R. Stigma and the ethics of public health: not can we but should we. *Soc Sci Med*. 2008;67(3):463–472.

33. Bayer R, Stuber J. Tobacco control, stigma, and public health: rethinking the relations. *Am J Public Health*. 2006;96(1):47–50.

34. Stuber J, Galea S. Who conceals their smoking status from their health care provider? *Nicotine Tob Res*. 2009;11(3):303–307.

35. Stuber J, Galea S, Link BG. Stigma and smoking: the consequences of our good intentions. *Soc Serv Rev*. 2009;83:585–609.

36. Major B, O'Brien LT. The social psychology of stigma. *Annu Rev Psychol*. 2005;56:393–421.

37. Stuber J, Galea S, Link BG. Smoking and the emergence of a stigmatized social status. *Soc Sci Med*. 2008;67(3):420–430.

Type A Behavior Pattern and Coronary Heart Disease: Philip Morris's "Crown Jewel"

Mark P. Petticrew, PhD, BA, Kelley Lee, DPhil, DLitt, MPA, and Martin McKee, MD

The type A behavior pattern (TABP) was described in the 1950s by cardiologists Meyer Friedman and Ray Rosenman, who argued that TABP was an important risk factor for coronary heart disease. This theory was supported by positive findings from the Western Collaborative Group Study and the Framingham Study.

We analyzed tobacco industry documents to show that the tobacco industry was a major funder of TABP research, with selected results used to counter concerns regarding tobacco and health. Our findings also help explain inconsistencies in the findings of epidemiological studies of TABP, in particular the phenomenon of initially promising results followed by negative findings.

Our analysis suggests that these "decline effects" are partly explained by tobacco industry involvement in TABP research. (*Am J Public Health*. 2012;102:2018–2025. doi:10.2105/AJPH.2012.300816)

THE TYPE A BEHAVIOR

pattern (TABP)—typically characterized by individuals who are highly competitive, ambitious, work-driven, time-conscious, and aggressive—has been the subject of research for more than 50 years. The concept was developed in the late 1950s by American cardiologists Meyer Friedman and Ray Rosenman, who argued that TABP was a risk factor for coronary heart disease (CHD), notably among White middle-class men.¹ This theory appeared to be supported by findings from the Western Collaborative Group Study in 1970,² 1974,³ and 1976,⁴ and the Framingham Study in 1980.⁵ However, these positive findings proved the exception, and many subsequent reviews have not found strong or consistent evidence that TABP is causally associated with CHD onset or outcome.^{6,7} For example, a 2002 systematic review, which summarized the findings of 18 etiologic and 15 prognostic studies, showed that studies reporting

a significant association were in the minority in both groups. Subsequent studies also have shown no association with mortality: for example, the PRIME study, which examined psychosocial risk factors for cardiovascular disease in France and Northern Ireland⁸; the GAZEL study, which found no association between type A behavior and mortality in French men, and actually found it to be protective of all-cause mortality in women⁹; and the JHPC study, which found type A not to be predictive of CHD in a Japanese population.¹⁰

Despite the lack of evidence that it really is a risk factor for CHD, the concept of type A behavior has continued to enjoy public appeal, fostered through popular books by Friedman and Rosenman that describe "how to recognize the deadly Type A pattern in your own personality."¹¹ TABP has also remained the subject of contemporary health research, including epidemiological investigations of CHD^{8,9,12} and the

featuring of TABP in discussions on the psychosocial causes of health inequalities.^{9,13,14} It is also possible to assess type A personality type on a popular Web site "to see if your heart health is at stake by taking this test."¹⁵

We examined the extent to which the enduring popularity of the TABP concept can be explained, in part, by its interest to the tobacco industry. It is now well documented that the industry has sought over many decades to undermine the scientific evidence on smoking and health. Scientists were paid as consultants and expert witnesses in litigation to defend and promote smoking, and to give the impression of "a chorus of seemingly authoritative voices from respected institutions around the world spreading damaging arguments designed to benefit the tobacco companies and damage health."^{16(p979)} The industry also commissioned wide-ranging research to challenge scientific evidence of the harmful health effects of tobacco



use and offer alternative explanations.^{16–20} Under “Project White-coat,” for example, “groups of scientists [were recruited that] should be able to produce research or stimulate controversy in such a way that public affairs people in the relevant countries would be able to make use of or market the information.”^{21,22} In at least 1 case, a senior health researcher directed a secret but extensive testing program designed to identify the conditions in which desired results could be obtained before independent scientists were commissioned to replicate them.²³

In this context, the value of TABP as a potential risk factor for CHD, cancer, and other conditions was not lost on the tobacco industry. It has been previously shown how the industry funded research on individual health risks such as genetics and “addictive personalities” to suggest alternative explanations for the relationship between smoking, cancer, and CHD.^{16,24,25} This includes research on the “prophylactic and curative” aspects of smoking to relieve stress.^{16,24}

By analyzing internal tobacco industry documents from the 1950s onward, we describe the involvement of the tobacco industry in TABP research.

METHODS

We systematically searched the Legacy Tobacco Documents Library (<http://legacy.library.ucsf.edu>) to identify documents from 1959 to 2011 related to funding of research on type A behavior. The search used keywords derived from relevant terms and

acronyms—notably, “stress,” “heart disease,” “personality,” “TABP,” “type A behavior,” and the names of key individuals identified through retrieved documents using a snowballing technique. This initial search identified 2770 documents, and from those we identified a subset of 66 tobacco industry documents on TABP research.

RESULTS

Tobacco industry interest in type A behavior lasted at least 40 years, from the late 1950s until the late 1990s. It involved providing substantial funding to key researchers in the field, including supporting a university chair.

Early Industry Interest in Type A Behavior

Tobacco industry interest in type A behavior was early and prolonged, and involved very significant funding to key researchers in the field. Documents suggest that the tobacco industry first became interested in the concept of TABP as early as 1959, when the Tobacco Institute Research Committee (TIRC) received a funding application from Thomas Jenkins and George Vetter of New York University to investigate the relationship between smoking and personality. The TIRC, forerunner of the Council for Tobacco Research, funded research with significant “adversary value” against public health advocates.²⁴ The apparently unsuccessful²⁶ application cited a 1959 article on TABP by Friedman and Rosenman, which

reported a causal relationship between behavior patterns and coronary artery disease.²⁷ Jenkins and Vetter suggested that high rates of coronary artery disease and cancer found in smokers may be due to the association of particular personality types with smoking, and that the relationship between smoking and cancer could therefore be noncausal.²⁸

The following year, a memorandum from Robert Hockett, associate scientific director of the TIRC, was sent to the TIRC’s Committee on Psychophysiological Aspects of Smoking, drawing attention to a further article by Friedman and Rosenman on TABP and heart disease²⁹ highlighting findings “relevant to the interests of this committee.” It also noted that previous articles by the authors were relevant.³⁰ These articles proved useful in 1962, when the TIRC compiled quotations from medical journals, experts, and other sources that disputed a role for smoking in CHD³¹:

It seems probable that heavy cigarette smokers have more clinical coronary artery disease than non-smokers. Does this mean that excess nicotine is responsible? Or does it mean that persons exhibiting the behavior pattern I described above tend to smoke more? In other words, are we mistaking a concomitant for a cause? I am positive we are.³²

The same year, Friedman was included in a list of experts described as “serious workers in their respective fields who have not appeared as protagonists in the debates on tobacco and health.” The list was compiled by Hill and Knowlton, a public

relations firm that promoted the interests of the tobacco industry and played a role in creating the TIRC’s successor, the Council for Tobacco Research.^{33,34} Extracts from the compilation of quotes were then used in a 1963 TIRC leaflet entitled “What Every Cigarette Smoker Should Know,”³⁵ and in a “Legislative Briefing Kit” containing material for discussion with public officials and the media.³⁶ The possible role of TABP in heart disease was further promoted in a TIRC 1964 press release, describing how “The hard-driving, pressure-ridden person seems most susceptible,”³⁷ and in a 1968 film produced by the Tobacco Institute for lay audiences.³⁸ This film discussed the Rosenman and Friedman studies, as well as research on the brainwaves of type A and type B smokers.^{38,39} The film concluded that “Smoking is a symptom—not a cause—of cancer.” TABP was also promoted as an alternative explanation for heart disease in a 1974 article by Council for Tobacco Research advisor Domingo Aviado,^{40,41} which was reprinted by the Tobacco Institute under the title, “THE CASE AGAINST TOBACCO IS NOT CLOSED . . . Why smoking may not be dangerous to your health!”⁴² Aviado was a long-time recipient of tobacco industry funding. The industry particularly valued his involvement in government committees, including the Environmental Protection Agency’s Clean Air Advisory Committee.⁴³

Rosenman appeared in *The Answers We Seek*, a film made in



1976 by the Tobacco Institute⁴⁴ for free circulation to community and civic organizations.²⁴ An internal memo from the time notes that “the film’s message is quite clear without being obvious about it—a controversy exists concerning the etiologic role of cigarette smoking in cancer.”⁴⁵

NARRATOR: This is America today—the pace fast, the competition great. We live with more tension, more emotion, more concern about our health, more everything than ever before.

DR. ROSENMAN: In our type of socioeconomic environment, if you want to achieve more and you have more obstructions, traffic, persons, things, what do you do today? Well, either you become more frustrated—or you hurry.⁴⁶

This theme is taken up by other Council for Tobacco Research grantees in the film, including Hans Selye²⁴ and Rune Cederlof (National Institute of Public Health in Stockholm and Karolinska Institute), the latter making the case that

Smokers tend to be more aggressive, out-going, extroverted people, hard-driving, full of tension. . . . I would sum up what we have found here that smoking does not seem to cause heart disease. . . . It’s not likely.⁴⁶

Overall, the industry’s strategy regarding TAPB from the late 1950s to the early 1980s was to suggest that the risks of smoking were caused by the psychological characteristics of individual smokers rather than tobacco products. It was argued that the causes of cancer were deemed to be multifactorial, with psychological stress being a key contributing factor.^{16,24,25,47}

The Coronary/Cancer Prevention Project

With the tobacco industry’s strategy established, it proceeded to provide substantial support to generating scientific evidence to support its claims. One of the most important studies to investigate the role of TABP was the Recurrent Coronary Prevention Project, a 5-year trial to alter type A behavior in post-myocardial infarction patients to reduce the recurrence of acute cardiac events.⁴⁸ Although this initial study was not funded by the tobacco industry, its follow-up study, the Coronary/Cancer Prevention Project, was largely funded by Philip Morris, which provided US \$4.76 million in 1988 to cover the first 5 years of the trial,⁴⁹ an additional \$2.39 million in 1991, and \$3.6 million in 1995.^{50,51} Friedman also sought funding from non-tobacco industry sources (including banks and Kaiser Foundation hospitals) “so that no one could or ever would say that only Philip Morris financed this research project.”⁵² In the end, however, Philip Morris provided most of the funding⁵³ to the Meyer Friedman Institute, to a total of nearly \$11 million up to 1997.^{54,55} This included funding for an endowed chair in preventive medicine at the University of California, San Francisco Medical School.^{56,57} Friedman reported that the chair was accepted by cardiologist William Grossman in 1998.⁵⁸ It has been noted “that a tobacco company would finance a cancer prevention project or endow a chair in preventive medicine doubtless strikes some

people as bizarre.”⁵⁹ It was also the view of Richard Carchman, Philip Morris’s director of scientific affairs research and development, that the funding to Friedman “wouldn’t be credible in other countries.”⁶⁰

Described as Philip Morris’s “crown jewel,”⁶¹ the Coronary/Cancer Prevention Project was a 10-year clinical trial of the effectiveness of counseling to reduce TABP.⁶² The expected benefits were outlined in a 1991 report of a Philip Morris site visit to the Meyer Friedman Institute (a research center at the University of California, San Francisco dedicated to studying the relationship between cardiovascular disease and stress⁶³): “If the counseling group has significantly fewer cases of heart disease and cancer . . . the tobacco industry could argue that studies that fail to consider and control for Type A behavior are confounded and that the actual risks associated with smoking must be lower than reported.”⁵³ Philip Morris Vice President Jetson Lincoln was also clear about the value of funding Friedman:

It is very valuable to the cigarette defense to establish firmly that unsuccessfully managed stress plays a dominating role in the etiology of cancer. Additionally, success for the Friedman project will have a strong tendency to discredit the major prospective mortality studies that appear to indict smoking but fail to discover, and adjust for, a very large effect on mortality from negative mental states.⁶⁴

From such research, Lincoln believed there was “really large potential for shifting blame away from smoking.”⁶⁵

Although it was recognized that “Due in part to Dr. Friedman’s tireless efforts, the Type A concept currently enjoys widespread acceptance in quasi scientific (i.e., behavioral sciences) and lay circles as a description of aggressive, time-conscious people,”⁵³ there was also concern about Friedman’s advancing years. Following the 1991 site visit, Patrick Sirridge of the tobacco industry law firm Shook, Hardy and Bacon expressed concern that “a new director could be less open minded than Dr. Friedman about the issue of smoking and health.”⁵³ Philip Morris therefore made approval of any further funding “contingent upon identification and acceptance of the individual that will succeed you at the Institute.”⁴⁹ In 1998, Friedman informed Richard Carchman, vice president of scientific affairs at Philip Morris, that William Grossman, director of cardiology at University of California, San Francisco, had been chosen as Friedman’s successor and had accepted the chair, noting also that “we have carried out our part.”⁶⁶

Philip Morris was not the only tobacco company interested in TABP. RJ Reynolds supported a wide range of scientific activities related to the subject, including research on psychological predictors of myocardial infarction at Yale University.^{67,68} Yale had received similar funding indirectly channeled through the Meyer Friedman Institute to circumvent Yale’s ban on accepting tobacco industry funding.^{69,70} One key event was the 1984 Tampa Bay Workshop on Stress, Heart



Disease and Cancer organized by Charles Spielberger (University of South Florida), Robert Ader (University of Rochester), and Hans Eysenck (University of London).⁷¹ The RJ Reynolds Research Committee liaised closely with the organizers regarding the content of the workshop report, recommending that an ad hoc committee help with its production. This review committee was made up of RJ Reynolds grantees Paul Black of Boston University,⁷² Stevo Julius of the University of Michigan, who had industry funding for a study on personality and risk of hypertension,⁷³ and Rosenman; it was advised by tobacco industry consultants Alvan Feinstein of Yale University, a prominent epidemiologist,^{74,75} and medical toxicologist Leon Goldberg of Duke University.⁷⁶ This committee met in the offices of tobacco industry lawyers to draft the workshop's conclusions and recommendations.⁷¹

Although Friedman was not an official advocate or paid consultant for the industry, he wrote to the US Occupational Safety and Health Administration in 1994 criticizing proposed restrictions on indoor smoking to reduce the risk of CHD. His letter supported the industry claim that the scientific evidence remained unreliable. He argued, first, that only 5 of 11 studies were statistically significant; second, that they were observational; and third, that they did not control for a significant confounder, type A behavior. In fact, by this date TABP itself had been shown to be a significant predictor of CHD in only 3 of 12 studies, themselves all observational

studies.⁷ Subsequent reviews have found no convincing evidence of a causal association between TABP and CHD.⁶

Importantly, Friedman's letter to the Occupational Safety and Health Administration was approved by the legal firm Covington and Burling before it was sent, and was blind-copied to Philip Morris directors.⁷⁷ Covington and Burling helped organize Philip Morris's "Project Whitecoat," which was designed to obscure the health risks of secondhand smoke.^{78,79} His letter was consistent with his firm view that smoking is the major cause of lung cancer, but not of CHD.⁸⁰ Although Friedman appears to have given his testimony without payment,⁸¹ he notes in his letter that "most of my research activities have been funded by the National Heart Lung and Blood Institute," without mentioning his substantial funding from Philip Morris.⁸²

The alleged toxicity of hostility and the risk to industry profits.

When subsequent studies of TABP failed to support previous positive findings, researchers turned to examine what was sometimes called the "toxic component" of type A behavior: hostility.⁸³ For this purpose, Philip Morris provided its "largest funding to date" to Redford Williams of Duke University, totaling \$5 million from 1985 to 1989,⁸⁴ to examine the effects of TABP and hostility on coronary artery disease.⁸⁵ RJ Reynolds had previously funded Williams to undertake research on this subject at Duke in 1983 with Rosenman and others.^{86,87} Philip Morris's "mission" in funding Duke's Behavioral

Medical Research Center⁸⁸ was described as

to contribute to the scientific defense of the industry. The assumption is that we remain vulnerable unless we can break down the near unanimity in the medical research community that cigarette smoking causes several hundred thousand premature deaths a year in the United States alone. . . . This leads me smoothly, I hope, to our external funding which is aimed, almost entirely, at promoting the role of psychosocial stresses in mortality. This seems by far the most promising area for us at this time. . . . [Williams] emphasizes that individuals who react to life experiences with hostility and cynicism are prone to premature mortality.⁸⁹

Philip Morris wanted to act quickly to fund the establishment of the center:

There is a special reason why we should go ahead quickly and quietly. The climate for acceptance of tobacco money by research institutions is worsening. . . . I believe we would be wise to keep a low profile after the grants were made.⁹⁰

Consistent with the approach of channeling funds to Yale via Meyer Friedman, Lincoln outlined the wider strategy:

[I]n view of the gigantic profits at risk, it is not too late to dedicate affordable quantities of money and manpower to a self serving but nevertheless honorable attempt to contribute to the general good. . . . The core point in the proposed strategy is for PM [Philip Morris] to maintain, discreetly at first, that regardless of whether PM or the health authorities are correct with respect to the degree that the latter's conclusions about smoking have been validated, a great many human lives would be lengthened if the health community would shift its emphasis from discouraging smoking to stress management training.⁹¹

In a letter in the *American Journal of Epidemiology*, Lincoln also argued that the effects of passive smoking on mortality shown in the MRFIT trial might actually be caused by type A behavior and hostility:

The effect measured . . . may be caused by stress rather than by passive exposure to cigarette smoke. There is considerable evidence that psychologic stress is capable of increasing the risk of developing diseases that are major causes of death. Both Type A behavior and high levels of hostility have been shown in prospective studies of human populations to predict increased risk of coronary heart disease and death due to all causes. . . . [It is] stressful to the nonsmoking spouse to be told constantly that the smoking spouse is "killing herself (or himself)" by smoking cigarettes.⁹²

The close relationship between TABP research and the tobacco industry can be shown by examining the published studies. The most recent systematic review of studies of type A behavior and CHD shows clearly the limited role played by type A behavior in the etiology or prognosis of CHD.⁷ Of 13 etiologic studies in the review, only 4 reported positive findings, and of the 11 prognostic studies, only 1 found type A behavior to be predictive of subsequent disease. Moreover, 3 of the 4 etiologic studies with positive findings had a direct or indirect link to the tobacco industry.³⁻⁵ These studies involved analyses of Framingham and Western Collaborative Group Study data. Boston University School of Medicine received funding from the Council for Tobacco Research to cover part of the Framingham data collection and analysis,⁹³⁻⁹⁶



and several analyses of Western Collaborative Group Study data were funded by RJ Reynolds, such as an analysis of TABP and cancer incidence.⁹⁷

The use of type A behavior pattern in litigation. It has previously been shown that the concept of psychosocial stress, as a supposed cause of cancer and CHD, was used in litigation by the industry to defend its interests.²⁴ TABP was similarly used, for example, in a case brought against Philip Morris and Lorillard by the Northwest Laborers–Employers Health and Security Trust Fund.⁹⁸ Part of the tobacco company’s defense was that TABP is a factor leading smokers to indulge in risky behaviors that may increase CHD risk.⁹⁸ A similar case was made in *Bridge & Iron Workers Insurance Fund v Philip Morris Inc.*⁹⁹

Meyer Friedman died in 2001. The Meyer Friedman Institute last filed Internal Revenue Service records in 2003, although it appears to be still in existence.¹⁰⁰

DISCUSSION

TABP has been the subject of hundreds of studies and reports in the popular media since the 1950s, but the close relationship between TABP and the tobacco industry has not been previously described. The characteristics of industry funding of TABP research were similar to those of the industry’s influence on other areas of tobacco and health research, such as review by industry lawyers and support of epidemiological and social science research explicitly to generate scientific controversy.^{20,101} The tobacco industry’s support of

TABP research allowed the industry to extend its strategy to undermine public health policy by arguing that the causes of cancer and heart disease were multifactorial and that any observed relationships with smoking could be a result of confounding with TABP.²⁴

Although it proved nonproductive, Philip Morris’s substantial investment in TABP research is notable. By the early 1980s, the few early positive findings were being outweighed by numerous negative studies, and TABP and hostility have rarely been shown to be implicated in either the etiology or the prognosis of CHD.⁷ The validity of the scales used to assess TABP has also been questioned.^{102,103} One frequently used instrument, the Jenkins Activity Survey, has low reliability, and a factor analysis has found that what it measures as type A behavior is actually the traits of authoritarianism and dominance, along with slight extraversion.¹⁰² The authors of the evaluation concluded that the scale should not continue to be used for predictive tasks.¹⁰² Subsequent work has supported these concerns, finding low internal consistency, low test–retest reliability, and problems with the scoring scheme.¹⁰⁴ Furthermore, later work has shown that the 2 main type A measurement instruments, the Jenkins Activity Survey and the Framingham Scale, correlate poorly with each other and seem to be measuring different constructs.¹⁰⁵

The inconsistent findings in epidemiological studies of TABP have puzzled researchers for some time, in particular the phenomenon of initially promising results,

followed by mostly negative findings. “Decline effects” like this have also been documented in other fields.¹⁰⁶ Our analysis suggests that, in the case of TABP, this effect may be partly explained by the extent to which the tobacco industry was intertwined with research into TABP.

Although we have focused on TABP, other documents indicate that the industry was engaged in a much wider quest to identify psychological factors that may affect diseases known to be associated with smoking. Thus, one British American Tobacco employee wrote of finding a “preliminary review of possible mechanisms underlying the significant association between depression and heart disease,” noting, however, that “it’s not particularly useful for suggesting any causality . . . although I’m hoping that some of the papers I’ve ordered from the British Library may come up with something.”¹⁰⁷ In the early 1980s, RJ Reynolds sought to support research on the psychosocial determinants of cardiovascular disease.¹⁰⁸ In another internal note, a consultant to Philip Morris drew attention to a study that appeared to show that psychosocial risk factors might be associated with lung cancer, pointing out that “if they could be definitely taken as true, they would have a profound effect on thinking about the relative importance of smoking and of psychosocial factors on risk of cancer, heart disease and death generally,” before cautioning that “the results are basically implausible.”¹⁰⁹ These formed part of an ever-wider search for any factor, no matter

how unlikely (such as keeping pet birds or inadequate consumption of green tea) that might serve as an independent risk factor for smoking-related diseases.^{110,111}

TABP continues to be a subject of scientific research today. In this respect, type A behavior research exhibits the characteristics of so-called “zombie science”: research that continues to be published despite repeatedly negative findings.¹¹² Most TABP research has had no relationship to the tobacco industry, but most of the positive findings relating to CHD derive from studies, or researchers, with funding links to the tobacco industry.

This analysis shows the extent to which the tobacco industry has shaped major themes in contemporary public health research. Even when scientific evidence is lacking, the industry has proved expert at exploiting thin evidence for its own purposes, using concepts that appeal to popular thinking. ■

About the Authors

Mark P. Petticrew is with the Social and Environmental Health Research Department, Kelley Lee is with the Global Health Department, and Martin McKee is with the Department of Health Services Research and Policy and ECOHOST (European Centre on Health of Societies in Transition), Faculty of Public Health and Policy, London School of Hygiene and Tropical Medicine, London, UK.

Correspondence should be sent to Mark P. Petticrew, SEHRD, PHP, London School of Hygiene and Tropical Medicine, 15-17 Tavistock Place, London, UK, WC1E 9SH (e-mail: mark.petticrew@lshtm.ac.uk; <http://www.lshtm.ac.uk/people/petticrew.mark>). Reprints can be ordered at <http://www.ajph.org> by clicking the “Reprints” link.

This article was accepted March 21, 2012.



Contributors

The idea for the study was developed by M. P. Petticrew in collaboration with the other authors. All authors contributed to the interpretation of the data and to the preparation and writing of the article, and contributed to and approved the final version.

Acknowledgments

When the project was initiated, M. P. Petticrew was funded by the Scottish Executive Department of Health's Chief Scientist Office and the UK's Medical Research Council. K. Lee is supported in part by funding from the National Cancer Institute and the National Institutes of Health.

We thank Lisa Dove, who assisted with indexing the documents while paid by the Medical Research Council and Social and Public Health Sciences Unit in Glasgow, UK, and Suzanne Taylor and Nathaniel Wander for additional information on links between Meyer Friedman and the tobacco industry.

Human Participant Protection

No institutional review board approval was required because all data were obtained from secondary sources (documents).

References

- Friedman M, Ulmer D. *Treating Type A Behaviour and Your Heart*. London, UK: Michael Joseph; 1985.
- Rosenman R, Friedman M, Straus R, et al. Coronary heart disease in the Western Collaborative Group Study: a follow-up experience of 4.5 years. *J Chronic Dis*. 1970;23(3):173–190.
- Jenkins CDRR, Zyzanski SJ. Predictions of clinical coronary heart disease by a test for the coronary prone behavior pattern. *N Engl J Med*. 1974;290(23):1271–1275.
- Rosenman R, Brand R, Sholtz R, et al. Multivariate prediction of coronary heart disease during 8.5 year follow-up in the Western Collaborative Group Study. *Am J Cardiol*. 1976;37(6):903–910.
- Haynes S, Feinleib M, Kannel W. The relationship of psychosocial factors to coronary heart disease in the Framingham Study, III: eight-year incidence of coronary heart disease. *Am J Epidemiol*. 1980;111(1):37–58.
- Bunker S, Colquhoun D, Esler M, et al. "Stress" and coronary heart disease: psychosocial risk factors. *Med J Aust*. 2003;178(6):272–276.
- Kuper H, Marmot M, Hemingway H. Systematic review of prospective cohort studies of psychological factors in the etiology and prognosis of coronary heart disease. *Semin Vasc Med*. 2002;2(3):267–314.
- Sykes D, Arveiler D, Salters C, et al. Psychosocial risk factors for heart disease in France and Northern Ireland: The Prospective Epidemiological Study of Myocardial Infarction (PRIME). *Int J Epidemiol*. 2002;31(6):1227–1234.
- Nabi H, Kivimäki M, Marmot M, et al. Does personality explain social inequalities in mortality? The French GAZEL cohort study. *Int J Epidemiol*. 2008;37(3):591–602.
- Ikedo A, Hiroyasu I, Kawachi I, et al. Type A behaviour and risk of coronary heart disease: The JPHC Study. *Int J Epidemiol*. 2008;37(6):1395–1405.
- Friedman M, Rosenman R. *Type A Behavior and Your Heart*. New York, NY: Random House; 1974.
- Cohen J, Reed D. The type A pattern and coronary heart disease among Japanese men in Hawaii. *J Behav Med*. 1985;8(4):343–352.
- Gallacher J. Commentary: personality and health inequality: inconclusive evidence for an indirect hypothesis. *Int J Epidemiol*. 2008;37(3):602–603.
- Gallacher J. Commentary: type A behaviour and heart disease: no less inscrutable in Japan. *Int J Epidemiol*. 2008;37(6):1406–1407.
- Queendom. Type A Personality Test. Available at: http://www.queendom.com/tests/access_page/index.htm?idRegTest=1126. Accessed December 14, 2011.
- Landman A, Cortese D, Glantz S. Tobacco industry sociological programs to influence public beliefs about smoking. *Soc Sci Med*. 2008;66(4):970–981.
- Grüning T, Gilmore A, McKee M. Tobacco industry influence on science and scientists in Germany. *Am J Public Health*. 2006;96(1):20–32.
- Chapman S, Carter S, Peters M. "A deep fragrance of academia": the Australian Tobacco Research Foundation. *Tob Control*. 2003;12(suppl 3):iii38–iii44.
- Ciresi M, Walburn R, Sutton T. Decades of deceit: document discovery in the Minnesota tobacco litigation. June 18, 1999. Bates no. 2071641621/1711. Available at: <http://legacy.library.ucsf.edu/tid/uhn26c00>. Accessed October 4, 2009.
- Muggli M, Forster J, Hurt R, et al. The smoke you don't see: uncovering tobacco industry scientific strategies aimed against environmental tobacco smoke policies. *Am J Public Health*. 2001;91(9):1419–1423.
- Friends of the Earth. BAT in its own words. Action on Smoking and Health (ASH) 2005. Available at: <http://www.foe.co.uk/resource/reports/bat2005.pdf>. Accessed October 4, 2009.
- Boyce S. Notes on a special meeting of the UK Industry on Environmental Tobacco, February 17, 1988. Bates no. 202314245–202314250. Available at: <http://legacy.library.ucsf.edu/tid/qhr54a99>. Accessed October 4, 2009.
- Diethelm P, Rielle J-C, McKee M. The whole truth and nothing but the truth? The research that Philip Morris did not want you to see. *Lancet*. 2005;366(9479):86–92.
- Petticrew M, Lee K. The "Father of Stress" meets "Big Tobacco": Hans Selye and the tobacco industry. *Am J Public Health*. 2011;101(3):411–418.
- Smith E. "It's interesting how few people die from smoking": tobacco industry efforts to minimize risk and discredit health promotion. *Eur J Public Health*. 2007;17(2):162–170.
- Letter from R. C. Hockett, associate scientific director of TIRC, to Edwin B. Wilson. November 17, 1959. Bates no. 50074755/4755. Available at: <http://legacy.library.ucsf.edu/tid/czb9aa00>. Accessed November 22, 2011.
- Friedman M, Rosenman R. Association of specific overt behavior pattern with blood and cardiovascular findings; blood cholesterol level, blood clotting time, incidence of arcus senilis, and clinical coronary artery disease. *JAMA*. 1959;169(12):1286–1296.
- Application for research grant project no. 1. May 14, 1959, from Dr. George B. Vetter and Dr. Thomas N. Jenkins. Bates no. 1003537208/7210. Available at: <http://legacy.library.ucsf.edu/tid/zdt02a00>. Accessed July 1, 2010.
- Friedman M, Rosenman R. Overt behavior pattern in coronary heart disease: detection of overt behavior pattern A in patients with coronary disease by a new psychophysiological procedure. *JAMA*. 1960;173:1320–1325.
- Hockett R. Memo on paper by Friedman and Rosenman, September 19, 1960. Bates no. HK2327007/7007. Available at: <http://legacy.library.ucsf.edu/tid/dgu2aa00>. Accessed July 1, 2010.
- Selected quotations. 1962. Bates no.04408146/8147. Available at: <http://legacy.library.ucsf.edu/tid/kva20e00>. Accessed July 8, 2010.
- Friedman M. Quote from Medical Times, 89/6. 1961. Bates no. 11305031/5031. Available at: <http://legacy.library.ucsf.edu/tid/vfb6aa00>. Accessed July 8, 2010.
- Summary of important documents in John W. Hill Collection. Available at: <http://tobaccodocuments.org/ness/39840.html>. Accessed July 1, 2010.
- Hoyt W. Memo to Ken Austin. July 17, 1962. Bates no. CTR0023222–CTR0023225. Available at: <http://legacy.library.ucsf.edu/tid/fge66b00/pdf>. Accessed July 1, 2010.
- What every cigarette smoker should know. 1963. Bates no. TIMN0081628/1629. Available at: <http://legacy.library.ucsf.edu/tid/cqs92f00>. Accessed July 1, 2010.
- Legislative briefing kit. August 9, 1962. Bates no. 1005038778–1005038812. Available at: <http://legacy.library.ucsf.edu/tid/hzf56b00>. Accessed July 5, 2010.
- Behavior patterns may help identify high disease risks in young men. May 26, 1964. Bates no. 500032349/2351. Available at: <http://legacy.library.ucsf.edu/tid/xjf99d00>. Accessed July 1, 2010.
- Tobacco Institute Film Project for Lay Audiences. Suggested content outline. June 6, 1968. Bates no. CORTI0003693/3697. Available at: <http://legacy.library.ucsf.edu/tid/zhn30c00>. Accessed July 1, 2010.
- Brown B. *New Mind, New Body: Bio Feedback: New Directions for the Mind*. New York, NY: Harper Collins; 1974.
- Sourcewatch. Biography of Domingo M. Aviado. Available at: http://www.sourcewatch.org/index.php?title=Domingo_M_Aviado. Accessed July 1, 2010.
- Lancaster T, Stead LF. *Interventions for Preventing Tobacco Sales to Minors*. Oxford, UK: Cochrane Review; 1999.
- Aviado D. The case against tobacco is not closed. Why smoking may not be "dangerous to your health." Executive



- Health, vol X, no. 11. 1974. Bates no. TIMN0086356/6361. Available at: <http://legacy.library.ucsf.edu/tid/nir92f00>. Accessed July 1, 2010.
43. Glantz S, Slade J, Bero L, et al. *The Cigarette Papers*. Berkeley: University of California Press; 1996.
44. The answers we seek. Tobacco Institute Film, 1976. Bates no. 966091350/1352. Available at: <http://legacy.library.ucsf.edu/tid/xje70a00>. Accessed October 5, 2009.
45. Fagan R. Letter to R. B. Seligman. July 15, 1977. Philip Morris inter-office correspondence. Film on smoking and health. Bates no. 1000753811. Available at: <http://legacy.library.ucsf.edu/tid/frv44e00>. Accessed October 5, 2009.
46. Transcript of "The Answers We Seek," 1975. Bates no. T116590187/0196. Available at: <http://legacy.library.ucsf.edu/tid/iku76d00>. Accessed July 1, 2010.
47. Smoking and health—the twenty most asked questions—and answers. The Tobacco Institute, 1975. Bates no. 502111604/1618. Available at: <http://legacy.library.ucsf.edu/tid/uuc29d00>. Accessed July 1, 2010.
48. Thoresen C, Friedman M, Gill J, et al. The recurrent coronary prevention project. Some preliminary findings. *Acta Med Scand Suppl*. 1982;660:172–192.
49. Sirridge P. Memorandum re: Meyer Friedman Institute Site visit, November 18–19, 1991. Bates no. 2021528609/8625. Available at: <http://legacy.library.ucsf.edu/tid/afp87e00>. Accessed July 1, 2010.
50. Funding letter to Meyer Friedman. 1991. Bates no. 2047953752. Available at: <http://legacy.library.ucsf.edu/tid/dip07e00>. Accessed July 1, 2010.
51. Discussion regarding the requested fund for the continuation of the Coronary Cancer Prevention Project, July 12, 1995. Bates no. 2050762248. Available at: <http://legacy.library.ucsf.edu/tid/ual79e00>. Accessed July 1, 2010.
52. Friedman M. Letter to Attorney Charles R. Wall, vice president and associate general counsel, Philip Morris Companies, Inc. December 17, 1991. Bates no. 2021528579/8580. Available at: <http://legacy.library.ucsf.edu/tid/oca54e00>. Accessed April 7, 2011.
53. Sirridge P. Site visit to Meyer Friedman Institute, November 27, 1991. Bates no. 2021528586/8602. Available at: <http://legacy.library.ucsf.edu/tid/xep87e00>. Accessed July 8, 2010.
54. Letter to Richard Carchman, group director, scientific affairs at Philip Morris, from Barton Sparagon, medical director, Meyer Friedman Institute. Bates no. 2063612645/2647. Available at: <http://legacy.library.ucsf.edu/tid/dal67e00>. Accessed July 1, 2010.
55. Handwritten note, June 6, 1995. Bates no. 2057993797A. Available at: <http://legacy.library.ucsf.edu/tid/fom13e00>. Accessed July 1, 2010.
56. Check to Meyer Friedman Institute to establish a permanent chair in preventive medicine. January 23, 1997. Bates no. 2063612657. Available at: <http://legacy.library.ucsf.edu/tid/lok67e00>. Accessed July 1, 2010.
57. Letter from dean of medicine, University of California, San Francisco, acknowledging funding from Meyer Friedman Institute. April 21, 1997. Bates no. 2063612649. Available at: <http://legacy.library.ucsf.edu/tid/fal67e00>. Accessed July 1, 2010.
58. Letter from Meyer Friedman to Richard Carchman. October 14, 1998. Bates no. 2063592165/2167. Available at: <http://legacy.library.ucsf.edu/tid/obq67e00>. Accessed June 29, 2011.
59. Anne Landman's Collection. Available at: <http://tobaccodocuments.org/landman/2063612566-2567.html>. Accessed June 26, 2011.
60. Ellis C. Memo to Gloria Morris, May 30, 1996. Bates no. 2057992740. Available at: <http://legacy.library.ucsf.edu/tid/dqm13e00>. Accessed July 1, 2010.
61. Transcript of presentation, Philip Morris collection. August 3, 1991. Bates no. 2023050837/0845. Available at: <http://legacy.library.ucsf.edu/tid/ygw44e00>. Accessed 1st July 2010.
62. Coronary Cancer Prevention Project. Status report and budget. September 9, 1994. Available at: <http://legacy.library.ucsf.edu/tid/ygg73e00>. Accessed March 23, 2010.
63. Encyclopedia Britannica. Meyer Friedman. Available at: <http://www.britannica.com/EBchecked/topic/761187/Meyer-Friedman>. Accessed April 7, 2011.
64. Lincoln J. Memo to Charles Wall, July 1, 1991. Bates no. 2050762300. Available at: <http://legacy.library.ucsf.edu/tid/nxg87e00>. Accessed July 1, 2010.
65. Lincoln J. Memo and accompanying report, August 3, 1991. Bates no. 2023050862, 2023050863/0871. Available at: <http://legacy.library.ucsf.edu/tid/qxg87e00> and <http://legacy.library.ucsf.edu/tid/zgw44e00>. Accessed July 1, 2010.
66. Friedman M. Letter to Richard Carchman, October 14, 1998. Bates no. 2063592165/2167. Available at: <http://legacy.library.ucsf.edu/tid/obq67e00>. Accessed November 25, 2011.
67. Marceau E. Letter to Dolph Adams. April 14, 1988. Bates no. 508261161. Available at: <http://legacy.library.ucsf.edu/tid/dnj61c00>. Accessed July 1, 2010.
68. Hayes A. Letter to Lynda H Powell, December 13, 1990. Bates no. 508238114. Available at: <http://legacy.library.ucsf.edu/tid/ncc04d00>. Accessed July 1, 2010.
69. Lincoln J. Memo to Charles Wall. February 11, 1991. Bates no. 2026335082. Available at: <http://legacy.library.ucsf.edu/tid/dhk14e00>. Accessed July 1, 2010.
70. Powell LH. Letter to Jetson E. Lincoln. January 22, 1991. Bates no. 2026335083. Available at: <http://legacy.library.ucsf.edu/tid/mhe58d00>. Accessed July 1, 2010.
71. Ader R, Eysenck H, Spielberger C. Report on the International Research Workshop on Stress Heart Disease and Cancer. May 1984. Bates no. 502231499/1514. Available at: <http://legacy.library.ucsf.edu/tid/ppq19d00>. Accessed July 5, 2010.
72. Agenda Item 6B. Dr. Paul Black Boston University School of Medicine. Bates no. 508265667/5668. Available at: <http://legacy.library.ucsf.edu/tid/foz93d00>. Accessed June 29, 2011.
73. Grant renewal request for Dr. Julius, University of Michigan Medical Center. 1986. Bates no. 508456804/6808. Available at: <http://legacy.library.ucsf.edu/tid/sqn93d00>. Accessed June 26, 2011.
74. Sourcewatch. Biography of Alvan R. Feinstein. Available at: http://www.sourcewatch.org/index.php?title=Alvan_R._Feinstein. Accessed June 26, 2011.
75. Morabia A. The controversial controversy of a passionate controversialist. *J Clin Epidemiol*. 2002;55(12):1207–1213.
76. Tobacco Pesticide Working Group. Meeting at North Carolina State University—April 20, 1983. Bates no. 100383774–100383776. Available at: <http://legacy.library.ucsf.edu/tid/zlz52a99>. Accessed June 26, 2011.
77. Friedman M. Letter to Occupational Safety and Health Administration. August 1, 1994. Bates no. 2024707588/7591. Available at: <http://legacy.library.ucsf.edu/tid/doe42d00>. Accessed July 5, 2010.
78. Sourcewatch.org. Covington and Burling. Available at: http://www.sourcewatch.org/index.php?title=Covington_%26_Burling. Accessed April 11, 2011.
79. Drope J, Chapman S. Tobacco industry efforts at discrediting scientific knowledge of environmental tobacco smoke: a review of internal industry documents. *J Epidemiol Community Health*. 2001;55(8):588–594.
80. Friedman M. Letter to Carl Seltzer, October 12, 1984. Bates no. 2025858814/8815. Available at: <http://legacy.library.ucsf.edu/tid/cwl14e00>. Accessed July 1, 2010.
81. Woodson W. Supplemental 1994 budget request. Memo to Samuel D. Chilcote, Jr., September 6, 1994. Bates no. T114140395–T114140398. Available at: <http://legacy.library.ucsf.edu/tid/fcw03b00>. Accessed July 5, 2010.
82. Friedman M. Letter to the Occupational Safety and Health Administration, August 1, 1994. Bates no. 2050750064/0067. Available at: <http://legacy.library.ucsf.edu/tid/ck22e00>. Accessed November 22, 2011.
83. Dembroski T, Costa P. Coronary prone behavior: components of the type A pattern and hostility. *J Pers*. 1987;55(2):211–235.
84. Wall C. Letter to Murray H Bring. April 1, 1992. Bates no. 2023137226/7230. Available at: <http://legacy.library.ucsf.edu/tid/hxn87e00>. Accessed July 1, 2010.
85. Abstracts of projects and list of grantees. March 8, 1991. Bates no. 2050762341/2378. Available at: <http://legacy.library.ucsf.edu/tid/hof53e00>. Accessed July 2, 2010.
86. Grant request summary, 1983. Bates no. 508457425/7426. Available at: <http://legacy.library.ucsf.edu/tid/tjf61c00>. Accessed July 2, 2010.



87. Horrigan E. Letter to R. Williams. December 23, 1983. Bates no. 508457250/7254. Available at: <http://legacy.library.ucsf.edu/tid/zm93d00>. Accessed July 2, 2010.
88. BMRC Behavioral Medicine Research Center pamphlet. 1991. Bates no. 2023223778/3781. Available at: <http://legacy.library.ucsf.edu/tid/wlv34e00>. Accessed July 24, 2012.
89. Presentation, May 25, 1989. Bates no. 2024264399–2024264414. Available at: <http://legacy.library.ucsf.edu/tid/vyd56b00>. Accessed July 5, 2010.
90. Re: Behavioral Medicine Research Center at Duke. Bates no. 2025876254–2025876261. Available at: <http://legacy.library.ucsf.edu/tid/nww56b00>. Accessed July 2, 2010.
91. Presentation by JEL (possibly Jet E. Lincoln). 1992. Bates no. 2026335006/5011. Available at: <http://legacy.library.ucsf.edu/tid/aqu85e00>. Accessed July 5, 2010.
92. Gantt R, Lincoln J. Letter to the editor re: “Effects of passive smoking in the MRFIT trial.” 1988. Bates no. 2015006343. Available at: <http://legacy.library.ucsf.edu/tid/lee33e00>. Accessed July 5, 2010.
93. Seltzer C. Letter to R. C. Hockett of Council for Tobacco Research. February 28, 1973. Bates no. 50092725/2726. Available at: <http://legacy.library.ucsf.edu/tid/sqq59c00>. Accessed July 8, 2010.
94. Council for Tobacco Research grant 826R2. October 24, 1974. Bates no. 01188366. Available at: <http://legacy.library.ucsf.edu/tid/xvz40e00>. Accessed July 8, 2010.
95. Hockett R. Letter to T. R. Dawber. June 29, 1970. Bates no. 50092807/2807. Available at: <http://legacy.library.ucsf.edu/tid/cgk46d00>. Accessed April 11, 2011.
96. Grant 826R2S, smoking classes, risk factors and cardiovascular disease. January 24, 1975. Bates no. 01188348. Available at: <http://legacy.library.ucsf.edu/tid/evz40e00>. Accessed April 11, 2011.
97. Swan G, Carmelli D. Letter to A. Wallace Hayes, RJR Nabisco. March 12, 1992. Bates no. 508043554/3558. Available at: <http://legacy.library.ucsf.edu/tid/hmu04d00>. Accessed July 8, 2010.
98. Northwest Laborers-Employers Health and Security Trust Fund, and its trustees, et al., plaintiffs, vs Philip Morris, Inc et al. September 29, 1998. Bates no. VERHALENR092998. Available at: <http://legacy.library.ucsf.edu/tid/pjq07a00>. Accessed July 5, 2010.
99. Compiled exhibits of Robert D. Verhalen, DR.P.H., November 23, 1998, Local No. 17 Bridge & Iron Workers Insurance Fund v. Philip Morris Inc. Bates no. VERHALENR112398EXH. Available at: <http://legacy.library.ucsf.edu/tid/smj36b00>. Accessed July 5, 2010.
100. Yelp. Meyer Friedman Institute. Available at: <http://www.implu.com/nonprofit/942826452>. Accessed June 26, 2011.
101. Muggli M, Hurt R, Blanke D. Science for hire: a tobacco industry strategy to influence public opinion on second-hand smoke. *Nicotine Tob Res.* 2003;5(3):303–314.
102. Ray J, Bozek R. Dissecting the A-B personality type. *Br J Med Psychol.* 1980;53(2):181–186.
103. Eysenck H, Fulker D. The components of type A behaviour and its genetic determinants. *Pers Individ Dif.* 1983;4(5):499–505.
104. Boyd D, Begley T. Assessing the type A behaviour pattern with the Jenkins Activity Survey. *Br J Med Psychol.* 1987;60(pt 2):155–161.
105. Langeluddecke P, Tennant C. Psychological correlates of the type A behaviour pattern in coronary angiography patients. *Br J Med Psychol.* 1986;59(pt 2):141–148.
106. Ioannidis J. Contradicted and initially stronger effects in highly cited clinical research. *JAMA.* 2005;294(2):218–228.
107. “Depression & CHD—a bizarre [sic] association!” Email from Anna-Lisa Westergreen (BATCo) to Scott Appleton. September 12, 1997. Bates no. 321010065–321010068. Available at: <http://legacy.library.ucsf.edu/tid/ikm34a99>. Accessed December 14, 2011.
108. Tuffs A. Public health scientists accused of soft peddling the dangers of passive smoking after taking grants from tobacco related organisations. *BMJ.* 2005;331(7508):70.
109. Paper by P. N. Lee dated February 20, 1986. Bates no. 104745545–104745548. Available at: <http://legacy.library.ucsf.edu/tid/rej46a99>. Accessed December 14, 2011.
110. Review 896 by P. N. Lee dated December 18, 1996. Bates no. 517405050/5052. Available at: <http://legacy.library.ucsf.edu/tid/nan01d00>. Accessed December 14, 2011.
111. Lee P. Limitations of studies of lung cancer and environmental tobacco smoke exposure in Japanese non-smoking women. May 18, 1994. Bates no. USX026450–USX026470. Available at: <http://legacy.library.ucsf.edu/tid/sur36b00>. Accessed December 14, 2011.
112. Charlton B. Zombie science: a sinister consequence of evaluating scientific theories purely on the basis of enlightened self-interest. *Med Hypotheses.* 2008;71(3):327–329.