A Picture of Health?

Why Graphic Warnings Don't Work

John Luik

Democracy Institute

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Contact

Democracy Institute
2nd Floor
145-157 St John Street
London EC1V 4PY
www.democracyinstitute.org.uk

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Introduction

Warning: Scarier Is Not Better

The idea of placing mandated warning labels on consumer products though now ubiquitous is really rather recent. For example, it was only in 1927 that the US Congress passed the Federal Caustic Poison Act that required the label Poison to be placed on dangerous chemicals like sulfuric acid. A decade latter food, drug and cosmetic warnings were required, while in the 1960's warning labels were required for over-the-counter drugs. And it was not until the 1960's as well that the proper use of such terms as Danger, Caution and Warnings were legislated.

In 1965 in the most famous instance of warnings, the United States required all cigarette packages and advertising to warn consumers that 'Cigarette Smoking May be Hazardous to Your Health,' which was followed in 1971 in the UK by a voluntary decision by tobacco manufacturers to place warnings on cigarettes. At the time of the first tobacco warnings, warnings for consumer products were extremely rare and tended to be directed to inappropriate product use or inadvertent exposure to a hazardous substance that posed an immediate as opposed to a long-term risk. Cigarette warnings were different from these warnings in two senses: They warned against risks that were neither immediate nor the result of inappropriate use.

In the two decades following the advent of cigarette warnings, as a result both of the consumer rights revolution and the creation of specialized governmental agencies devoted to safety, the environment and consumer protection, warnings multiplied on all sorts of products, many of them modeled on the original cigarette warnings. For instance, in 1988 the US passed the Alcoholic Beverage Labeling Act, which required warnings on all drink containers. Today, it is unusual to find a consumer product that does not have some sort of warning. David Stewart and Ingrid Martin, writing about this trend toward placing warnings everywhere, observe that:

'The number of warnings and places and

products on which they are placed has grown precipitously in the last two decades, with increasing societal concern about the hazards of using and consuming various types of products and commodities. Among commercial products that carry warnings, alcoholic beverages, cigarettes and other tobacco products, saccharin, tampons, and over-the counter (OTC) medications (especially aspirin for children) are among the more controversial. Many other products carry warnings, however. These include cleaning products, cosmetics, and other personal care products, and even popcorn. Lawn mowers, automobiles, microwave ovens, power tools, electrical appliances, and an array of other durable goods also carry warnings either on the product or in a user's manual that accompanies the product. Various service products, such as prospectuses for investment products and rides in amusement parks also include warnings or admonitions of caution. Neither is the presence of warnings restricted to product packaging and package inserts: they also appear in the advertising for various types of products and in places where products are sold or consumed, such as grocery stores or restaurants.'

(D. Stewart and I. Martin. 'Intended and Unintended Consequences of Warnings Messages: A Review and Synthesis of Empirical Research', Journal of Public Policy and Marketing 13 (1994): 1-19).

It is not simply products that are the focus of warning activists. For instance, the UK's Gambling Commission is currently considering requiring health warnings in gambling advertisements. Dermatologists from the United States have joined the warning bandwagon as well, by suggesting that gruesome pictures of various types of skin cancer, along with a warning about the risks of tanning, be posted outside of every tanning parlour.

Most recently, the focus of warning activism has moved to food and drink, with both activists and governments arguing that certain foods, particularly those with high levels of salt, sugar or fat (HSSF) need to carry warnings about their alleged health risks. For example, the head of Britain's Food Standards Agency, Dame Deirdre Hutton, has called for the introduction a colour-coded warning system for HSSF, arguing that such warnings are the best way to inform consumers about the differences between healthy food and 'junk' food.

California's Attorney General Bill Lockyer has initiated legal action against fast food companies to force them to post warnings about the allegedly human carcinogen acrylamide in their products, as well as suing tuna packagers for failing to warn consumers about the supposed hazards of mercury in their fish. The mis-named US Center for Science in the Public Interest has called for warnings about trans fat and excess salt in food, and anti-obesity crusaders have demanded warnings for all fizzy drinks and fast foods. Legal action against food and drink manufacturers has also been suggested in the United States on the grounds that the manufacturers have failed to warn about the risks associated with their products.

The United States, of course, has required extensive nutritional labeling for the past decade, on the grounds that providing consumers with more information about their food would change their eating patterns and reduce obesity. These labels, however, have been purely informational, providing consumers with information about the total number of calories and the grams of fat, cholesterol, sodium, protein and carbohydrate. They are not warning labels, which join information with an authoritative admonition about the health risks of certain eating behaviours. For example, telling someone that a product has two grams of fat is quite different from warning them that eating foods high in fat increases their risk of heart disease.

For growing numbers of activists, both in Europe and North America, however, informational labeling is not sufficient. They point, for instance, to the failure of ten years of nutritional labeling in the United States to make any difference in the prevalence

of overweight and obesity. Instead, they believe that cigarette type warnings for a range of food and drink are justified and necessary first because certain foods, just like cigarettes, pose unacceptable health risks even in the smallest quantities, and second, because only the salience and shock value of cigarette-type warnings will change consumer behaviour. For example, in 2003, Terry Sullivan, Vice President of Cancer Care Ontario, argued that a prevention message such as a tobacco-like warning might be necessary to change eating habits. 'These are all ways in which the public can be cued and aided in the job of making health decisions,' Sullivan claimed. (CBC News 16 December 2003).

The case for warning labels, to aid people in the 'job of making health decisions' appears to be based on three common sense assumptions. First, people wish to avoid disease and death. Second, once they know that a certain behaviour or product can lead to disease and death they will avoid it. Third, so providing an appropriate warning will give people the information necessary for them to change their behaviour. The reality, however, is that assumptions two and three are for many people in many instances false.

There are three principal reasons for this. First, people often miss warnings because they filter out much of the information that comes their way due to the fact that they find it neither relevant nor interesting. Second, warnings that are attended to are not processed because individuals tend to avoid information that has negative self-implications. Through a process known as cognitive re-adjustment people tend to exempt themselves as individuals who should be concerned with a warning. Seatbelt use is fine, though it isn't necessary for me. So even though someone has read and remembered a warning they also can discount its personal applicability. Finally, even warnings that are read and processed are often discounted due to what experts call 'warning fatigue' where the overabundance of warnings or the familiarity of a specific warning diminishes its effectiveness. In effect, the very ubiquity of the act of warning diminishes the power of all warnings.

The scientific evidence demonstrating these types
of warning failure is extensive, though it often tends

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to be ignored or discounted by the public health community. For example, almost a decade after the US mandated warnings on alcohol products, neither the risk perception nor the drinking behavior of those drinkers most likely to be a risk to themselves or others had changed. As Hankin et al. noted from their research on drinking during pregnancy 'among risk drinkers, the label law clearly has NOT affected drinking behaviour.'

(J. Hankin et al. 'The impact of the alcohol warning label on drinking during pregnancy', Journal of Public Policy and Marketing 12 (1993): 16).
Hankin's research is supported by other studies, including a survey from the US Centers for Disease Control and Prevention that found that the percentage of women drinking during pregnancy had actually increased since the introduction of the warnings. As the report notes 'The rate of frequent drinking among pregnant women was approximately four times higher in 1995 than in 1991' (CDC MMWR 46: 346-350 April, 1997 Alcohol Consumption Among Pregnant and Childbearing-Aged Women: United States, 1991 and 1995). Again, MacKinnon et al. who followed a group of 16,661 high school students from 1989–1995, reported that 'there was no beneficial change attributable to the warning in beliefs, alcohol consumption or driving after drinking.'

(D. Mackinnon et al. 'The Alcohol warning and adolescents: 5 year effects' American Journal of Public Health 90 (2000): 1589–1594). Several studies has also found that heavy drinkers, while aware of the warnings, are more likely to consider them less believable and to discount them more than other drinkers.
There is equally compelling evidence about the failure of food warnings. The US Department of Agriculture's Economic Research in an analysis of food labeling (Elise Golan et al. 'Economics of Food Labeling' Agriculture Economic Report 793 (2001)) noted that 'labeling may not be an effective policy tool.' There are several reasons for this. Some researchers, for instance, have found that warnings or a large list of detailed product information causes many consumers to disregard the warnings and information completely. Again, studies of consumer behaviour in food shops have found that consumers often make hasty food choices and fail to scrutinize warnings and food labels. On such study by

Lorna Aldrich (Consumer Use of Information Agricultural Handbook, 1999) discovered that a consumer's income, not warnings or labels, was the key factor in determining which foods were purchased, and that income cancelled out the effects of information.

A 2002 study, for instance, found that nutritional labeling made no difference in food density choices. As the authors observed 'In this population, explaining the concept of energy density and providing nutritional information during meals had no overall impact on the weight of food consumed.' (Kral et al. 'Does nutritional information about the energy density of meals affect food intake in normal-weight women?', T. Kral Appetite 39 (2002): 132-145).

Another study, which was conducted in a restaurant setting in the UK, found that providing information about 'health and unhealthy food' 'did not substantially affect expectations of sensory quality and acceptance, or overall energy and fat intake.' What it did succeed in doing was to decrease the number of people selecting the 'lower fat dish' by those who knew it was lower in fat. Not a terribly strong demonstration of the 'effectiveness' of food labelling. (K. Stubenitsky et al. 'The influence of recipe modification and nutritional information on restaurant food acceptance and macronutrient intakes', Public Health Nutrition 3 (2000): 201-209).

A 2003 study (A. Sproul et al. 'Does point of purchase nutrition labeling influence meal selection', Military Medicine168: 556-560) which looked at the effectiveness of nutrition labeling and warnings in an Army cafeteria found no significant difference in the sales of the items that subjects had been warned about. As Jayachandran Variyam of the United States Department of Agriculture noted last year 'These findings suggest that the benefits of labeling may be small or uncertain at best.'('Nutrition labeling in the food away from home sector', Economic Research Service, USDA April, 2005).

The danger, however, is not simply that warnings, whether for food or drinks will fail, it is also that they will be counterproductive. For example, large numbers of excessive risk-takers display what psychologist call reactance in which there is a high level of resistance

to the demands of outside authority and control. For these individuals, a warning label represents an attempt

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to unreasonably shape their behaviour and makes them more likely to ignore rather than to heed the warning. Warning labels also highlight risk and for those attracted to risk-taking this serves to make the very thing warned about more, rather than less attractive. One saw both of these reactions to warnings in the 1980's when British teens stole the 'frightening warning' 'Heroin screws you up' from public places in order to put them up in their bedrooms.

The latest attempt to get round these well-established warning failures is with graphic health warnings, first introduced on tobacco products in Canada in 2001, which show stark images of the risks associated with unhealthy behaviour. The theory behind the pictorial warnings is that they work against warnings fatigue, indifference and even reactance, by presenting new risk information in a fear-arousing way that cannot be ignored, even by the most warning indifferent. While there is considerable evidence that warnings which are scary do not convince, the premise behind the pictures of diseased lungs, hearts and mouths is that the scarier the better in terms of changing behaviour. A good many in the health promotion community are now calling for such warnings to be extended to other products, including unhealthy foods.

This paper argues that scarier is not better—that what we know about warnings, and more particularly about warnings that scare, coupled with the empirical evidence of how these new graphic warnings have worked where they have been tried, suggests that they will not work and will indeed be counterproductive with many of their intended populations. In this sense, championing such warnings, contradicts two of the central principles of medical ethics and the ethics of health promotion—beneficence—doing good and non-maleficence—avoiding harm, since there is ample evidence that graphic warnings will do no good and might, in fact, cause considerable mischief. As a recent comprehensive analysis of the use of scary, graphic warnings concluded: 'This review indicates that the contribution of fear appeals to the adoption of self-protective behaviour is in doubt. Fear arousal may render information concerning response efficacy and self-efficacy more salient…but it is the impact of

these messages on attitude and intention formation that determine the effect of a fear appeal on precautionary action.' (R. Ruiter et al. 'Scary Warnings and Rational Precautions: A Review of the Psychology of Fear Appeals', Psychology and Health 16 (2001): 613-630).

Though the warnings discussed here appear on tobacco products, the reasons for their ineffectiveness are not tobacco specific, but instead derive from the natures of both the process of warning through frightening and those to whom the warnings are directed. Indeed, the same arguments could be made whether the graphic warnings appeared on a cigarette packet, a fizzy drink tin or an Internet site. All of which suggests that the 'common-sense' strategy of both multiplying warnings and searching for evermore powerful and 'effective' ones, needs carefully to be rethought.

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Case Study

Are Graphic Health Warnings Good Tobacco Control Policy?
A Contribution to the Debate

…searching for evermore powerful warnings is
fruitless. There is no ultimate deterrent in
smoking, no mother of all health warnings that
will finally alert smokers to the error of their ways.

G. Hastings and L. MacFadyen, Tobacco Control, 2002

…the observed association between warning label
knowledge and subsequent increases in smoking
may suggest that even if attention and recall can be
improved, cigarette warning labels may do more harm than good.

T. Robinson and J. Killen Archives of Pediatric and
Adolescent Medicine, 1997

Introduction

Because tobacco use is often described as an evidence shows that such warnings fail to reduce epidemic it is sometimes assumed that any either smoking prevalence or consumption among measures to reduce its prevalence are justified, youth and adults. Some tobacco control proposals, however, are counterproductive in that they might make them less unwise, wasteful, ineffective, unnecessary and likely to quit smoking, counterproductive, and for these reasons do not constitute sensible regulation.

This paper argues that the proposals for graphic examining what such warnings are alleged to do, health warnings (GHW) on tobacco products advanced in a number of jurisdictions are not an instance of sensible regulation. This is because they will fail to do what their advocates claim and at the same time they risk counterproductive consequences. This is true for four reasons. First, the scientific evidence suggests that such warnings do not increase smokers' awareness of the risks associated with smoking. Second, the evidence shows that such warnings will not reduce youth smoking initiation. Third, the evidence shows that such warnings fail to reduce either smoking prevalence or consumption among youth and adults. Fourth, there is good evidence that for certain smokers such warnings might well be counterproductive in that they might make them less likely to quit smoking.

This paper offers a critical examination of graphic health warnings on tobacco products by first examining what such warnings are alleged to do, second looking at the social science literature about the effectiveness of visual, fear-based warnings, and finally, reviewing the empirical studies of their effects, both in laboratory settings and in one country which has already adopted them.

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What Graphic Health Warnings Are Meant To Do

Graphic Health Warnings consisting of a large warning text accompanied by graphic, fear-inducing images portraying the health risks associated with tobacco use were first required in Canada in January, 2001. The rationale for the Canadian introduction of GHW was that they would increase smokers' awareness of the risks associated with smoking, discourage young people from starting to smoke, and reduce smoking prevalence and consumption by both young people and adults. For example, Health Canada wrote in December 2000 that 'increasing the size and emotional content of warnings messages on cigarette packages, including the use of message enhancing pictures, has the potential to encourage more smokers to stop smoking and deter more non-smokers from starting to smoke.' (Health Canada Tobacco Products Information Regulations, Ottawa).

A similar sort of justification lies behind the EU's support of GHW. Speaking at a press conference in Brussels in late 2004, Commissioner David Byrne noted that 'People need to be shocked out of their complacency about tobacco. I make no apology for the pictures we are using. The true face of smoking is disease, death and horror—not the glamour and sophistication the pushers in the tobacco industry try to portray. The EU must hammer home this message to young people in its media campaign and to smokers via their cigarette packs.' Justifying GHW, Bryne noted that the Canadian experience showed that they 'can help reduce smoking.' (As we shall see, this has not been the Canadian experience.) (Press Release European Union 22/10/2004)

Like their Canadian counterparts, EU health officials believe that GHW with their high 'emotional content' will increase a smoker's fear level and will lead either to reduced smoking or to quitting. In the case of nonsmokers the assumption behind GHW is that the stark images of the health risks of smoking will deter experimentation or initiation. As Lee and Ferguson write about these assumptions:

'The success of the realistic fear strategy depends on

young people's being rational information processors. It is generally believed that fear will cause arousal and the arousal will lead to interest and subsequently to better information processing. Eventually, fear will help young people think about the negative consequences of risky behavior and thus reach the intended decision-making outcomes. Therefore, when young people are shown the devastating health consequences of smoking, they may abstain from or give up tobacco habits.' (M. Lee and M. Ferguson 'Effects of Anti-Tobacco Advertisements Based on Risk-taking Tendencies: Realistic Fear vs. Vulgar Humor', Journalism and Mass Communication Quarterly 79 (2002): 945-963).

Both of these assumptions about GHW, however, are questionable as a number of European experts in risk communication have noted. For instance, Gerjo Kok and Robert Ruiter from Maastricht University in 2002 already argued that frightening people by emphasizing the negative consequences of smoking was the worst way of attempting to get people to stop smoking, and called on European policymakers to 'discontinue displaying these scary labels…' (NRC Handelsblad 12 December 2002 quoted in Jansen et al. The Scarier the Better? Effects of Adding Images to Verbal Warnings on Cigarette Packages in S. Carliner et al. Eds. Recent research in information and document design 2006 John Benjamins Amsterdam).

Unfortunately, despite these claims for GHW, the evidence, both in the scientific literature about the effects of fear-based warnings, and in the empirical studies of the effects of GHW on smoking initiation, prevalence and consumption, suggests that GHW will not only fail to achieve any of these goals, but might well be counterproductive to tobacco control.

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The Social Psychological Basis for GHW

Despite the fact that the use of fear to motivate change, whether of attitudes or behaviour, has been the subject of intense psychological research for the last fifty years, the advocates of GHW have acknowledged that there is little evidence that the use of such warnings on tobacco products has been grounded in social psychological principles that support graphically induced fear as a motivator of behavioural change. For instance, Strahan et al. noted in a 2002 literature survey of studies examining the effects of tobacco warnings 'We did not find any articles that cast their findings in terms of…social psychological principles.' (E. Strahan et al. 'Enhancing the effectiveness of tobacco package warning labels: a social psychological perspective' Tobacco Control 11 (2002): 183-190). Whilst one can only speculate about such a failure, it might well arise from the fact that so much of the psychological research into fear-based warnings has suggested that such warnings fail or are counterproductive in their consequences. Indeed, there is also considerable evidence in the literature that warnings in general fail to change behaviour (R. McCarthy et al. 1984 Product information presentation, user behaviour, and safety in M. Alluisi et al. Eds. Proceedings of the Human Factors Society 28 the Annual meeting Human Factors Society pp 81-85).

The earliest examination of the role of fear arousal and persuasion was a study by Janis and Feshbach (I. Janis and S. Feshbach 'Effects of fear-arousing communications', Journal Abnormal Social Psych 48 (1953): 78-92), who examined the effects of information about the causes of tooth decay and recommendations on oral hygiene. An illustrated lecture on dental hygiene was presented with three different levels of fear intensity, but with the same recommendations for action. The group that received the minimum fear intensity was most consistent in following the recommendations on preventing tooth decay, while the group that received the maximum fear intensity failed to change their oral hygiene. The authors concluded that 'the overall-effectiveness of a persuasive communication will tend to be reduced by the use of a strong fear appeal…'

In a subsequent study on the use of fear appeals about the harmful consequences of smoking (I. Janis and R. Terwillinger 'An Experimental Study and Psychological Resistances to Fear Arousing Communications', Journal of Abnormal and Social Psychology 65 (1962): 403-410) Janis and Terwillinger found that high fear appeals resulted in subjects developing more counterarguments against the warning and having poorer recall of the warning than with low fear appeals. They concluded that 'the more strongly fear is aroused by a warning communication, the more strongly motivated the person will become to avoid symbolic responses and thought sequences which lead him to recall or to focus his attention on the essential content of the argument and conclusions.' (p. 409)

Following Janis, Feshbach and Terwillinger's pioneering work, numerous studies examined their hypothesis with respect to fear arousing communications in specific circumstances. In all of these using emotional, vivid descriptions and simulations of the physical consequences of failure to follow the message instructions aroused high fear.

For instance, in the 1960's Howard Leventhal (H. Leventhal and P. Niles 'A field experiment on fear arousal with data on the validity of questionnaire measures', Journal Personality 32 (1964): 459-479, H. Leventhal et al. 'Effects of fear and specificity of recommendation upon attitudes and behavior', Journal Personality Social Psych 2 (1965): 20-29, H. Leventhal and J. Watts 'Sources of resistance of fear-arousing communications on smoking and lung cancer', Journal Personality 34 (1966): 155-175) and others at Yale University looked at fear-based communications using films about the risks of lung cancer and smoking. The graphic films, one of which showed a lung cancer operation, were designed to convince subjects to stop smoking and take

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X rays. Leventhal found that the High Fear movie was significantly less effective in persuading subjects to stop smoking than a communication that simply used a pamphlet about the risks of smoking. He argued that the communications that aroused a high level of fear were ineffective with vulnerable groups because they increased these groups' sense both of apprehension and helplessness.

These results about the use of warnings that provoke high levels of fear arousal with smokers have been confirmed in more recent experimental work. For example, Keller and Block (P. Keller and L. Block 'Increasing the Persuasiveness of Fear Appeals: The Effect of Arousal and Elaboration', Journal of Consumer Research 22 (1996): 448-459), found that high fear appeals to smokers motivated them to elaborate on the problem—the risks of smoking, and ignore the solution. This is due to the fact that the high fear warning, which encourages problem elaboration, results in the subject increasing his defensive reaction to the warning.

While Janis and Feshbach and Leventhal's analysis of the effect of fear-based communication was experimental, in part because it predated the era of health-based warnings, their thesis about the failure of fear-based warnings has been confirmed repeatedly in a variety of real-world settings. For instance, MacKinnon (D. Mackinnon et al. 'The alcohol warning and adolescents: 5 years effects', American Journal of Public Health 90 (2000): 1589-1594), in a study of the effects of fear-based alcohol warnings found that 'there was no beneficial change attributable to the warnings in beliefs, alcohol consumption or driving after drinking' in a group of high school students followed from 19891995. More importantly, MacKinnon found that with the alcohol warnings, those who were the heaviest users had the best recall for the warnings, yet were the least likely to heed the warning, a finding which suggests that high levels of recall—which are used in GHW research as a proxy for effectiveness—do not translate into behavioural change. Indeed, as Adler and Pittle have observed (R. Adler and R. Pittle 'Cajolery or Command: Are Education Campaigns an Adequate Substitute for Regulation', Yale Journal on Regulation 1 (1984): 159193), 'A consumers' ability to recall the specifics of an

information campaign does not necessarily mean that the consumer agrees with the object of the campaign… Indeed, audience attitudes may actually harden against the information conveyed in public interest messages.'

Similarly, studies of pharmaceutical warnings (L. Morris and D. Kanouse, 'Consumer reactions to the tone of written drug information', American Journal of Hospital Pharmacy 38 (1981): 667-671, F. Dwyer 'Consumer Processing and use of Supplemental Drug Label Information', Advances in consumer Research 10 (1978): 22-26) have found that such fear-based warnings failed to alter consumer behaviour. Stout and Sego (P. Stout and T. Sego 'Response To Threat Appeals In Public Service Announcements', Proceedings of the Conference of the American Academy of Advertising 1995: 78-86) in a recent study of the effectiveness of fear-based public service announcements found that even a high level of threat failed to produce behavioural change, and several studies of fear-inducing HIV prevention campaigns (using tombstone and grim reaper images) have also found them to be ineffective in changing behaviour. (See L. Sherr 'Fear arousal and AIDS: do shock tactics work', AIDS 4 (1990): 361364, K. Rigby et al. 'Shock tactics to counter AIDS: The Australian experience', Psychology and Health 3 (1989): 145-159, M. Ross et al. 'The effect of a national campaign on attitudes toward AIDS', Care 2 (1990): 339-346). And in one of the few studies to examine the effects of fear-based cigarette warnings (using the US Surgeon General's warnings) on the actual smoking behaviour of adolescents, Robinson and Killen (T. Robinson and J. Killen 'Do Cigarette Warning Labels Reduce Smoking?', Archives of Pediatric and Adolescent Medicine 151 (1997): 267-272), found a 'significant increase in smoking from baseline to follow-up among those teenagers with greater knowledge of the warning labels on cigarette packages… These associations are unlikely to be due to increased exposure to warning labels among smokers because the analysis controlled for the baseline level of smoking…' This led them to conclude that 'warning labels are, at best, ineffective for this target audience…' Indeed, they found that even if adolescent attention to the warning and recall of them might be increased, 'cigarette warning labels may do more harm than good.' (p. 271-272).

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There have, of course, been some students of the warning process who have argued that arousing fear can be persuasive and bring about behavioural change. For example, in a meta-analysis of the effectiveness of fear appeals that examined over 100 studies, Witte and Allen (K. Witte and M. Allen 'A Meta-Analysis of Fear Appeals: Implications for Effective Public Health Campaigns' Health Education and Behaviour 27 (2000): 591-615), claim that individual differences do not have an effect on people's responses to fear appeals. Fear appeals, they suggest, can be effective provided that public health officials increase 'references to the severity of the threat and references to the target population's susceptibility to the threat,' and link these to information about how individuals can avoid the threat—so-called high efficacy messages. (p. 606). Indeed, Witte and Allen specifically endorse GHW by noting that 'Vivid language and pictures that describe the terrible consequences of a health threat increase perceptions of severity of threat.' (ibid)

Despite these claims, however, the experimental evidence showing the failure of fear-based warning continues to accumulate, in part because contra Witte and Allen it is not the severity of the threat that is most relevant for changing behaviour but the individual's sense of being vulnerable to the threat. (Something that smokers often lack.) A recent meta-analysis by Milne et al. (S. Milne 'Prediction and intervention in health-related behavior: A meta-analytic review of protection motivation theory', Journal of Applied Social Psychology 30 (2000): 106-143), found that the severity of threats, and the efficacy of possible responses to the threat have only small effects on behaviour.

For instance, a recent study on the effects of fear appeals by Ruiter et al. (R. Ruiter et al. 'Danger and Fear Control in Response to Fear Appeals: The Role of Need for Cognition', Basic and Applied Social Psychology 26 (2004): 13-24), notes that the recent experimental evidence shows that 'the effects of fear appeals on precautionary motivation are inconsistent' (p. 15), suggesting that Witte and Allen's support for using fear-based warnings in public health campaigns is misplaced.

In their study, Ruiter et al. measured the response of subjects, based on their need for cognition, to a fear-based message on breast cancer that was followed by a persuasive message that recommended breast self-examination. The researchers found that individual differences in the need for cognition—that is the need for evidence, information, actively engaging in evaluating the strength of arguments and comfort with rational processes—made a difference in the effectiveness of fear-based warnings. Only subjects who have a high need for cognition reacted to the fear warning in a properly adaptive way through taking steps to control the danger—in this case engaging in breast self-examination. Subjects with a low need for cognition were much less ready to act on the fear-based warning and more likely to control their fear rather than the danger. As Ruiter et al. note 'Among people low in need for cognition, presenting threatening information did not result in greater acceptance of the recommended response.' (p. 20)

Several studies have also linked low need for cognition with impulsiveness, which is also associated with risk taking and rebelliousness. (M. Ferguson et al. op cit, S. Eysenck and H. Eysenck 'The Place of Impulsiveness in a Dimensional System of Personality Description', British Journal of Social and Clinical Psychology 16 (1977): 57-68). According to Eysenck for example, impulsiveness is linked to a dislike of thinking and reasoning. In their studies impulsiveness is associated with little interest in thinking about health or concern for personal health.

These findings about the way in which the need for cognition affects the effectiveness of fear appeals are directly relevant to what we know about the smoking population. Inasmuch as this population is increasingly composed of individuals with low needs for cognition, it is likely that these individuals will react to fear-based warning GHW by attempting to control their fear rather than processing the warning and seeking to control the danger. In effect, the GHW will have no effect on their understanding of the risks of smoking or on their smoking behaviour.

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As Ruiter et al. observe about the practical implications of their research for warning policy:

'…fear-arousing information can easily be followed by emotional reactions instigating denial or avoidance of the presented information, which may interfere with the adoption of the recommended action. This finding raises doubt about the renewed interest in fear arousal that we particularly witness in health education practice in The Netherlands. Examples with respect to this renewed interest are commercials that show traffic accidents with bloody and deadly consequences, and the enlarged and now clearly visible printing of health warnings on cigarette packages… Obviously, program developers presume that fear arousal directly motivates people to safer behavior. Our findings with regard to defensive responses, however, suggest that fear arousal should be used with greater caution and preceded by extensive pilot testing.' (p. 23).

Ruiter's analysis is supported by a recent research project supported by the UK's Economic and Social Research Council by Paschal Sheeran of Sheffield University. ('Does changing attitudes, norms or self-efficacy change intentions and behaviour?', ESRC, September, 2006). Sheeran reviewed a range of strategies designed to change intentions and behaviour that had been the subject of studies during the last 25 years. The review was designed to answer the critical question about interventions, namely 'Does changing attitudes, norms and self-efficacy cause changes in intentions and behaviour?' Two of Sheeran's findings suggest that there is not a compelling social psychological basis for GHW. First, Sheeran found that the least effective strategy in prompting behaviour change was arousing feelings of regret and fear in subjects, which GHW are designed to do. Secondly, Sheeran reported that interventions involving self-efficacy produced both greater intention change and behaviour change than other types of intervention involving attitudes or norms. This is particularly significant when considering the effectiveness of GHW, since there is considerable evidence that many smokers have low self-efficacy,

and fear-based GHW can inhibit smoking reductions because they decrease an individual's confidence (self-efficacy) in their ability to quit. (See the discussion of Self-Esteem and Self-Efficacy at page 19).

Why Fear-based Warnings Fail

1) Fear Control rather than danger control

The reasons for the failure of these emotional, fear-based warnings stem from an early insight of Leventhal who noted that fear messages evoke two parallel responses in a subject. The first process, a rational one, is danger control in which the subject recognizes and appraises the danger and considers ways to avoid it. The second process, fear control, is less rational and centers on the emotional aspect of the warning. In fear control the individual focuses on ways to control his fear rather than on ways to control the danger. This may involve such fear-control behaviours as resting, drinking or eating. Commenting on the failure of Leventhal's subjects to stop smoking and take X-rays, even after seeing the gruesome lung cancer film, Sternthal and Craig (F. Sternthal and C. Craig 'Fear appeals: revisited and revised', Journal of Consumer Research 7 (1974): 22-34), note that 'Vivid pictorial representations may simultaneously activate fear control processes. The individual may eat, relax or engage in some other behaviour to cope with the emotional response… If emotion is strong, a person may engage in cigarette smoking to reduce emotion and inhibit danger control.' In some instances (H. Leventhal and P. Niles, 'A field experiment on fear arousal with data on the validity of questionnaire measures', Journal of Personality 32 (1964): 459-479), which looked at the effect of graphic warnings on smoking, the subject's focus on fear control increased their sense of apprehension and helplessness without resulting in any attempts to deal with the danger. 10

Types of Fear Control

Avoidance

Fear-based warnings then are likely to fail because their target audience is attending more to fear control than danger control, a process psychologists refer to as maladaptive coping responses (P. Rippetoe and R. Rogers, 'Effects of Components of Protection-Motivation Theory on Adaptive and Maladaptive Coping With a Health Threat', Journal of Personality and Social Psychology 52 (1987): 596-604). The fear control responses take several forms according to researchers. One response is to simply avoid processing the danger information because of its negative implications. In this case, the needs of fear control overwhelm the rational functions of danger control so that the person fails to recognize the subject of the warning as dangerous. As Gina Agostinelli (G. Agostinelli and J. Grube 'Tobacco Counter-Advertising: A Review of the Literature and a Conceptual Model for Understanding Effects', Journal of Health Communication 8 (2003): 107-127) notes 'Compelling evidence abounds on how people avoid processing information that has negative self-implications and even fail to recognize familiar stimuli that are threatening.' (p. 112)

Defensive Processing

Another fear-control response is termed defensive processing. Here a subject argues with the warning, produces effective counter-examples and rejects its conclusions (See R. Petty and J. Cacioppo 'Effects of forewarning of persuasive intent and involvement on cognitive responses and persuasion', Personality and SocialPsychologyBulletin3 (1979): 173-176; R. Petty and J. Cacioppo 'Issue involvement can increase or decrease persuasion by enhancing message-relevant cognitive responses', Journal of Personality and Social Psychology 37 (1979): 1915-1926; B. Calder and B. Sternthal 'Television Commercial Wearout: An Information Processing View', Journal of Marketing Research 17 (1980): 173-186 Pechmann and Stewart, 1988; R. Petty and J. Cacioppo, The elaboration likelihood model of

persuasion in l. Berkowitz Ed Advances in Experimental Social Psychology Vol 19 New York Academic Press pp 123-203 1986 The elaboration likelihood of persuasion Advances in Experimental Social Psychology 19: 193-205; J. Tanner et al. 1991Protection motivation model: a normative model of fear appeals Journal of Marketing 55: 36-45 ; A. Liberman and S. Chaiken, 1992 Defensive processing of personal relevant health messages Personality and Social Psychology Bulletin 18; 669-679). Essentially, defensive processing works much like the inoculation process in which the vaccine stimulates the body to create antibodies to resist the disease. In defensive processing the individual faced with a threatening warning mobilizes information that serves to refute the information conveyed in the warning, allowing him to 'defend' himself against what the warning suggests. The warning then, rather than serving to change behaviour, instead serves as an 'antibody' which inoculates the subject against the effect of the warning itself.

Liberman and Chaiken, for instance in a 1992 study found that 'with a threatening message, increased personal relevance may…increase motivation to arrive at or defend a preferred conclusion or to reject an undesirable one.' Despite the supposed rationality of the message, 'People do sometimes,' they note, 'strongly prefer a particular conclusion, whether because of a health threat, a threat to self-interest, or simply reactance against an influence attempt.'

Defensive processing is particularly evident in individuals who have prior knowledge and experience with a hazard. The effect of such knowledge is to tame the danger by reducing its imminence, credibility, specificity and personal relevance. Inasmuch as individuals have confronted it before without mishap, they are inclined to believe they can do so in the future. As Tanner et al. observe: 'For example, a person who has driven for 20 years without wearing a seatbelt and

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has never had an injury caused by an accident is likely to have a large repertory of coping responses, such as 'I won't have an accident' or 'I'm very careful when I drive' or 'I don't need a seatbelt because I took a defensive driving course.' (p. 43).

The effect of such defensive processing is to negate the warning's effectiveness through the way in which it is processed and remembered. Describing the consequences of this response to a fear-based warning Agostinelli writes that 'Threatening information can induce defense biases that also affect how it is constructed, interpreted, remembered, and evaluated such that negative self-implications are avoided.' Several studies (Levanthal and Niles, 1964; Levanthal, R. Singer, 1965 'The Effects of Fear-arousing Communications on Attitude Change and Behaviour', unpublished doctoral dissertation University of Connecticut; L. Berkowitz and D Cottingham, 'The interest value and relevance of fear-arousing communications', Journal of Abnormal and Social psychology 60 (1962): 37-43) found that whether the warning was about smoking, tetanus shots or seat belts, as the individual's vulnerability to the warning increased, its persuasiveness declined. As Witte and Allen (2000) observe 'For high-relevance participants (those at risk for harm by the health threat, the defensive systematic processing was even more pronounced.'

Thus even though the fear-based warning might increase the subject's feelings of vulnerability to the risk, defensive processing of the warning served systematically to negate that sense of personal vulnerability.

This process is especially evident in smokers. For instance, over time smokers cognitively readjust their smoking related beliefs particularly with respect to the credulity of smoking risks in general and in terms of their own vulnerability, both as a result of smoking and of seeing warnings. This readjustment makes them more likely both to selectively attend to warnings and to discount them. Agostinelli, for instance, writes about a 'male smoker exposed to a counter-advertisement suggesting that smoking causes impotence [as GHW do]. He may feel threatened by such a message, decide it is stupid, and tune it out.'

In a 2002 study for the EU of the fear-based, graphic tobacco warnings, the European Health Research Partnership and Centre for Tobacco Control (Research into Labelling of Tobacco Products in Europe 15 September 2001 Research Report submitted to the EU Commission Co-ordinated by Cancer Research, UK) found ample evidence of defensive reasoning on the part of smokers confronted by such warnings. For instance, one focus group participant commenting on the impotence warning, noted 'You've just got to laugh at these things—wives tales.' As the researchers observed 'Respondents in all countries found the image humorous and often appeared to find it difficult to take the intended message seriously.' (p. 38).

Similarly, with the mouth disease warning, the researchers found a large element of rationalization and defensiveness among smokers 'who argued that such dental disease would be the result of bad oral hygiene generally, and not smoking specifically.' As focus group participants noted: 'The thing is if you have got teeth like that it is not 'cos you are smoking. It's 'cos you are not really taking care of them. All of us smoke and we dinnae exactly look like that, do we?' 'Tobacco is not the simply cause of all this. With proper hygiene you can prevent this even if you smoke.' (p. 36).

Other participants in the study showed similar instance of defensive processing in response to the fear-based warnings. For instance, one commented that 'Using that guideline, they should also go after the cars as well, they also kill.' Another, in response to the GHW noted that '…traffic accidents kill too.' (p. 27).

Reactance

A third fear control response, closely related to defensive processing, is psychological reactance, also referred to as the 'boomerang effect'. Psychological reactance occurs when the subject perceives the fear-based warning as threatening his freedom and then moves in the opposite direction from that proposed by the warning (M. Clee and R. Wicklund 'Consumer Behaviour and Psychological Reactance', Journal of Consumer Research 6 (1980): 389-405; S. Brehm and J.

Brehm 'Psychological Reactance: A Theory of Freedom and Control', New York Academic Press 1981; J. Sensenig and J. Brehm 'Attitude Change From an Implied Threat to Attitudinal Freedom', Journal of Personality and Social Psychology 8 (1968): 324-330; B. Bushman and

A. Stack, 'Forbidden fruit versus tainted fruit: Effects of warnings labels on attraction to television violence', Journal of Experimental psychology: Applied 2 (1996): 207-226).These findings of reactance are, as Brehm and Brehm note, consistent across many studies and show that warnings from an authoritative source, with a dogmatic tone and which demand compliance harden a subject against the warning and reduce compliance. For instance, Bushman and Stack in their 1996 study of reactance to warnings about violent television programmes write that:

According to reactance theory, when a individual's freedom to engage in a particular behavior is threatened or eliminated, the individual will experience psychological reactance, defined as the unpleasant motivational state that consists of pressures to re-establish the threatened or lost freedom. The more important the freedom is to the individual, the greater is the reactance when the freedom is threatened or eliminated. One method of re-establishing the freedom is to engage in the proscribed behavior. (p. 208).

Bushman and Stack found that high-reactance individuals were especially interested in viewing the very programmes that the warning cautioned against.

Commenting on the risks associated with warning induced reactance, Stewart and Martin (D. Stewart and I. Martin 'Intended and unintended consequences of warnings messages', Journal of Public Policy and Marketing 13 (1994): 1-19), observe that:

'Warnings that produce psychological reactance, serve as signals for risk-taking opportunities, or make a product more attractive may produce behaviour that is exactly the opposite of that intended by the placement of the warning, at least among certain groups of individuals. Such effects are clearly unintended, but their consequences, under some circumstances, can make the use of warning messages less desirable than no message at all.' (p. 13).

Indeed, as we shall see, these counter-productive consequences of GHW raise the question of whether the use of these 'warning messages' is less desirable than no message at all.'

Numerous studies have found that one of the most reliable predictors of smoking uptake is rebelliousness. (T. Jex and T. Lombard 'Psychosocial Factors Associated with Smoking in Air Force Recruits', Military Medicine 163 (1998): 222-225, I. Lipkus et al. 'Personality Measures as Predictors of Smoking Initiation and Cessation in the UNC Alumni Heart Study', Health Psychology 13 (1994): 149-155, M. Ferguson et al. 'Communicating with Risk Takers: A public relations perspective', Public Relations Research Annual 3 (1991): 195-224). If smokers, particularly young smokers are rebellious, then they are highly likely to be reactant to the attempts to control or influence their behaviour through warnings. Indeed, their reactance will work against the warning and make them more likely to continue smoking.

For instance, a just published study by Miller et al. ('Identifying Principal Risk Factors for the Initiation of Adolescent Smoking Behaviours: The Significance of Psychological Reactance', Health Communication 19 (2006): 241-252), reports that reactant behaviour, which they define as 'the tendency to resist adult control, to engage in superficial, oversimplified thinking, to emulate adult behaviours…to feel invincible; and to rebel against authority…' is one of the most important factors in predicting adolescent smoking behaviour. The importance of reactance in fashioning adolescent smoking prevention measures is also highlighted in a study by Grandpre et al. ('Adolescent Reactance and Anti-Smoking Campaigns: A Theoretical Approach', Health Communication 15 (2003): 349-366). Grandpre found that explicit anti-smoking messages increased the reactance of 10th grade students. As they write: 'Whereas younger message recipients may be accustomed to, or more tolerant of, behavioural restrictions, adolescents are less receptive to messages targeting behavioural changes… Adolescents simply do not like having their choices limited and their options clearly delineated.' Strong, explicit anti-smoking messages, notes Grandpre, 'may even boomerang and have negative effects on

adolescents' health behaviours.'

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For instance, Lee and Ferguson (2002 M. Lee and M. Ferguson Effects of Anti-Tobacco Advertisements Based on Risk-taking Tendencies: Realistic fear vs. vulgar humor Journalism and Mass Communications Quarterly 79: 945-963)) discovered in a recent study using fear warnings, that the more rebellious the young smokers were, the less likely they were to quit smoking after seeing a fear-based smoking communication. Noting that adolescents were more prone to accept health risks than older people, they caution that 'health messages designed to persuade them to reduce risk-taking behaviors must recognize their risk-taking tendencies or reasons. Otherwise, the messages may backfire and reinforce the unhealthy behaviour. For example, some might take risks to be rebellious. Scare tactics might trigger their rebellious tendencies.' (p. 946). Based on their findings they concluded that 'Even though the high-rebellious participants reported more interest in the ads, the higher in rebelliousness they scored, the less likely they were to quit smoking after viewing the realistic fear ads… The traditional method of inducing fear by seriously portraying the consequences of smoking might not be as effective for targeting highly rebellious risk takers.' (p. 956).

Why Fear-based Warnings Fail

2) Oversimplification and Exaggeration

But fear-based warnings also fail for a variety of reasons additional to a focus on fear control rather than danger control. For instance, fear-based warnings, because of their high emotional content and their emphasis on danger, are often oversimplified or exaggerated and it is this exaggerated quality that causes them to fail to convince their intended audience. This failure, known as the Reefer Madness Response after the 1936 film in which the dangers of drug use were exaggerated, is produced by the tendency of fear-based appeals to suggest risks that have no credible basis in the subject's daily experience. For instance, Sherif and Hovland (M. Sherif and C. Hovland 'Social Judgement: Assimilation and contrast effects in communication and attitude change', Yale University Press, New Haven CT 1961), note that for a person to accept a piece of

information the information must be close enough—
within what they call the 'Latitude of Acceptance' to
the person's current beliefs. Views that were outside
of the subject's latitude of acceptance were likely to be
rejected as improbable.

Smokers, for instance, understand the common and
easily understood diseases most often identified as
risks of smoking. Warnings about these risks are not
so far removed from smoker's experiences as to lack
credibility. On the other hand, smokers have no daily
experience of the diseased lungs portrayed in GHW,
and the use of these warnings is likely to be outside the
smoker's latitude of acceptance, and thus much more
likely to be rejected as improbable.

Writing about the preference for simplistic and overly
rationalistic models as the basis for adolescent smoking
prevention, Lloyd and Lucas (B. Lloyd and K. Lucas
'Smoking in Adolescence: Images and Identities',
Routledge London 1998), note that:

'the complexity of the decision-making
process concerning the adoption of health-
related behaviours must not be underestimated.
Much health promotion activity has been
predicated on somewhat simplistic interpretations
of influential social-psychological models, in
which such decisions are interpreted as logical
and straightforward. An individual's motivation
for engaging in a given behaviour is not simply
the opposite pole of his or her motivation for
avoiding that behaviour. Motivations for and
against engagement are commonly very different
psychological structures… It is also important
for the successful modification of beliefs that
the risks should not be exaggerated for the sake
of emphasis, nor be excessively oversimplified.

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The consequence of such exaggeration may be a reduction in credibility of future messages brought about by a perceived discrepancy between health messages and people's own experiences. In any programme or intervention it is essential to produc[e]… Information that is direct enough to be appropriate to the medium used, without translating probability data into messages that may be interpreted as implying inevitability and which may be contrary to most people's experience.' (p. 185).

For example, research as shown (S. Breznitz 'Cry Wolf: The Psychology of False Alarms', Hillsdale NJ Lawrence Erlbaum and Associates 1984) that simplistic fear-based warnings that predict dire consequences from ignoring the warning, are discounted because the consequences fail to occur in the short term. As Stewart and Martin write 'Such effects are most likely to occur when failure to heed a warning cannot be connected directly and immediately to potential consequences. This is frequently the case for many potential hazards that occur over the long term and are probabilistic in character. Each time the behaviour is enacted without the adverse result, the credibility of the warning system may be reduced.' (op cit)

As Breznitz found, such diminished respect for fear-based warnings is particularly true for tobacco warnings. He observes: 'in spite of information to the contrary, one smokes a cigarette and nothing happens unlike the result of swallowing bleach or not using protective gloves when handling toxic chemicals… One smokes another cigarette and still nothing happens. Thus, in the absence of any clear signals that may indicate the danger involved, these threats turn out subjectively to be false alarms.' (p. 282).

This sort of 'alarm failure' can be observed in a qualitative focus group study on tobacco warnings (Research into the Labelling of Tobacco Products in Europe, 2002), by the European Health Research Partnership and Centre for Tobacco Control Research for the European Commission. Summarizing the result of their qualitative research, the report found that fear warnings tended to be rejected because of their 'radical generalizations'. As one focus group participant noted: 'Few people my age fall ill because of tobacco.' (p. 27).

Why Fear-based Warnings Fail

3) Self-Esteem and Self-Efficacy

Fear-based warnings also fail with groups that have
low self-esteem and low self-efficacy. Studies
of warnings in relation to self-esteem (Tanner et
al. 1991 op cit) have found that while high self-
esteem individuals react to the warning by focusing
on controlling the danger, low esteem individuals
focus instead on controlling the fear and ignoring the
danger. The greater the fear-based threat, the higher the
acceptance of the threat in high self-esteem individuals,
and the lower the acceptance in low self-esteem subjects
(J. Dabbs and H. Leventhal 'Effects of varying the
recommendations in a fear-arousing communication',
Journal Personal, Social Psychology 4 (1961): 525531,
N. Kornzweig, 'Behavior change as a function
of fear-arousal and personality', unpublished doctoral
dissertation Yale University (1967); H. Leventhal
and G.Trembly 'Negative emotions and persuasion',
Journal of Personality 36 (1968): 154-168). Inasmuch
as smokers, particularly young smokers, have low self-
esteem, there is a strong likelihood that such warnings
will fail to work.

Similarly, work on self-efficacy suggests that an
individual's sense of capability to act conditions their
reaction to fear-based warnings. Individuals with high
self-efficacy react rationally by acting to control the
danger highlighted by the warning. But individuals
with low self-efficacy—the individual's estimate of his
ability to address the danger—tend to focus on the fear
and feel incapable of dealing with the danger itself.
(P. Rippetoe and R Rogers 'Effects of components
of protection motivation theory on adaptive and
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maladaptive coping with a health threat', Journal of Personality and Social Psychology 52 (1987): 596: 604 C. Abraham et al. 'Exploring teenagers' adaptive and maladaptive thinking in relation to the threat of IVC infection', Psychology and Health 9 (1994): 253-272). Individuals with low self-efficacy fail to address the subject of the warning because they see themselves as ineffective, and instead focus solely on dealing with their fears. Low self-efficacy often results from failures in previous attempts to deal with the danger in the recommended way, for instance, in the case of Leventhal's subjects, stopping smoking and getting an X ray. As McGuire (W. McGuire 'Personality and attitude change: an information-processing theory in A. Greenwald et al. Eds. Psychological Foundations of Attitudes', Academic Press NY 1968) observed that failure to heed a warning tends to further ingrain the subject's behaviour by establishing a pattern of unsuccessfully coping with the danger. And as Sternthal and Craig (1974 op cit) note such a pattern is difficult to break in that subjects who fail to act on a warning will increasingly feel 'hopelessly inadequate and thus pursue a self-following prophecy.'

Effectively, frightening the individual with low self-efficacy reduces the chances that the warning will be heeded, creating a boomerang effect. 'If people believe that they cannot cope with a threat, write Self and Rogers (1990 op cit) increasing the level of threat decreases intentions to adopt the recommended response. Thus, people actually planned to consume more alcohol, exercise less, and avoid precautions against STDs. The conditions producing this deleterious effect are beliefs people have that they are incapable of protecting themselves because the coping response is ineffective and/or they cannot perform the response.' (p. 356).

As Robinson and Killen (1997 op cit) observe in analyzing tobacco product warnings and young smokers, 'high fear messages may actually inhibit reductions in smoking by decreasing a person's perceived ability to quit.' (p. 271).

Thus this failure of fear-based warnings in relation to low self-efficacy is particularly relevant to smokers. First, low self-efficacy is an important risk-factor

for smoking initiation, a fact that suggests that fear-based warnings would have little impact on preventing smoking uptake. Second, smokers who have a history of unsuccessful quit attempts might find their failure to comply with the fear-based warnings further reduces their self-efficacy, thus reinforcing their smoking. Third, fear-based warnings that emphasis the addictive properties of smoking are likely to further enhance the feelings of helplessness typical of smokers with low self-efficacy. For example, (J. Eiser et al. 'Trying to Stop Smoking: Effects of Perceived Addiction, Attributions for Failure and Expectancy of Success', Journal of Behavioural Medicine 8 (1985): 321-341) found that the most important predictor of smoking cessation was confidence in one's ability to quit. Lower confidence, and crucially, less behavioural change was closely linked to considering oneself 'addicted'.

The same point was made by Lloyd and Lucas in their study of adolescent smokers. They write '…regular smokers claimed that they themselves were addicted. This latter observation supports Regis's (1990) assertion that an overemphasis on the addictive properties of cigarettes may be counterproductive: expected, as well as actual, addiction is used by adolescents and adults alike as a rationalisation for continuing to smoke.' (p. 165).

Addiction talk, with its clear implications of powerlessness, thus works against the very type of attitudinal and behavioural change that fear-based warnings are designed to promote. As the EU research on fear-based warnings concluded 'The majority of the messages focus on the behaviour of the individual and ways in which they should modify or change their behaviour. Consequently, many smokers perceive them to be blaming and a personal attack on their lack of willpower while not recognizing the difficulties associated with cessation.' (p. 33).

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Why Fear-based Warnings Fail

4) Lack of New, Relevant Information

Fear-based warnings also fail to work when the message being conveyed is already clearly understood and fails to provide new information. As Kip Viscusi of Harvard has noted in his research (K. Viscusi and W. Magat 'Learning about Risk: Consumer and Worker Responses to Hazard Information', Cambridge Harvard University 1987, 'Hazard Warnings in Reforming Products Liability', Cambridge Harvard University 1991) on the effectiveness of warnings, for warnings to effect behavioural change they must provide information that is not previously known and is useful. Viscusi's research confirms earlier work (Horst et al. 'Evaluation of the potential effectiveness of warning labels on alcoholic beverage containers', Pala Alto Ca Failure Analysis Associates 1988), which suggested that warnings are ineffective in changing behaviour with familiar products when they fail to convey information that the individual finds novel and relevant. Despite the claims that smokers do not understand the risks of smoking and that GHW convey new information, the empirical evidence suggests that this is not the case. Not only do smokers overestimate the mortality risks associated with smoking (See Viscusi 'Smoking: Making the Risky Decision', Oxford, New York 1992 and 'Smoke-Filled Rooms: A Postmortem on the Tobacco Deal', Univ of Chicago 2002), but having grasped the fact that smoking can kill, they are uninterested in and inattentive to a detailed knowledge of the particular ways in which this might occur. This is not peculiar to smokers. For instance, it is difficult to believe that risky behaviour with respect to AIDS would change appreciably by including in AIDS prevention materials graphic pictures of the individual diseases caused by AIDS. This is because once subjects understand the possibly fatal risks associated with an activity or product, the precise ways in which death might ensue fail to have a further impact.

The failure of GHW to convey new and relevant information to smokers can be found in the comments of the EU focus groups where participants rejected the warnings as 'patronizing and 'worn out',' clearly

indicating that they failed to convey new information about smoking of relevance to smokers. Again, evidence from Canada (Health Canada, Environics Research Wave Surveys, 2000), indicated that 98 percent of adult smokers were aware of the harmful consequences of smoking and only 3 percent of adult smokers failed to recall correctly one of the current package warnings, indicating that smokers clearly understood smoking related risks.

Despite the universal appreciation of smoking-related risks, especially amongst smokers, proponents of fear-based warnings refuse to accept that smokers understand the risks of smoking. Instead, they propose that if only additional, more frightening information about the risks of smoking is presented to smokers, than they will act more 'rationally'. R. Borland and D. Hill ('Initial impact of the new Australian tobacco health warnings on knowledge and beliefs', Tobacco Control 6L (1997): 317-325), for example, take this position in writing about the impact of Australia's new warnings. 'It is true that in Australia almost everybody has heard about dangers of smoking…but this does not mean that they know and believe all the information that is central to making rational decisions about whether or not to smoke. The data clearly indicate that what knowledge they have is not very salient…or there is a reluctance to admit it, or both.' (p. 325). While this might be true, it fails to address the evidence that fear-based warnings do not change smokers' reluctance to address the health risks of smoking.

Writing about the repetitive nature of tobacco warnings, Hastings and MacFadyen (G. Hastings and L. MacFadyen 'The limitations of fear messages', Tobacco Control 11 (2002): 73-75), argued that '…repeating this to a population that knows it, two thirds of whom already want to quit, is of questionable value. To return to our initial example, there comes a point where the theatre-goer shouting 'fire' is reduced to the irritation

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of a malfunctioning alarm. Furthermore, searching for evermore powerful warnings is fruitless. There is no ultimate deterrent in smoking, no mother of all health warnings that will finally alert smokers to the error of their ways.' (p. 74).

This problem of failing to provide new and relevant information is amplified by research that shows that increased familiarity with products over time lessens the perceived hazard associated with them and this familiarity in turns reduces the attention to a warning (S. Godfrey et al. 'Warnings Messages: Will the Consumer Bother to Look', Proceedings of the Human Factors Society 27th Annual Meeting The Human Factors Society (1983): 950-954, G. Robinson, 'Human Performance in Accident Causation: Toward Theories on Warnings Systems and Hazard Appreciation', Proceedings of the third International System Safety Conference 55-59).

Why Fear-based Warnings Fail

5) Health-based deterrents are ineffective

Fifth, fear-based warnings fail with adolescents and others because they tend not to be influenced by health- based deterrents. Lloyd and Lucas in their UK-based study of adolescent smoking note this failure:

'A further problem with the traditional knowledge-attitude-behaviour formula so often employed in health promotion is that it assumes that a risk to physical health is necessarily a deterrent… [T]he possibility that young people view health as least ambivalently should also be considered. From the 1950s' James Dean to the 1960s' Jimi Hendrix, from the 1970s' Sid Vicious through to the 1990s' Kurt Cobain and beyond, teenage heroes have been characterized by 'unhealthy,' risk-taking behaviour. There is an undeniable appeal in the image of the artist, actor or musician whose lifestyle is fast, chaotic and exciting. Across five decades of teenage culture, appearing 'fashionably wrecked' by such behaviour has only served to heighten charisma and desirability.' (p. 185-186).

The failure of fear inducing messages based on health effects is well-known in areas outside of smoking prevention. Hale and Dillard in writing about why such warnings go wrong note that:

'The impact of age on the persuasiveness of fear appeals also helps to explain why so many fear appeals to promote better health are ineffective. Televised public service messages to decrease driving under the influence of alcohol or drug abuse are frequently targeted at adolescents. Those messages frequently employ fear appeals, but fear appeals are unlikely to influence the young people at whom they are aimed. We can imagine living rooms across America where parents of adolescents find a public service announcement compelling, but where the target of the appeal…is unaffected by it.' (J. Hale and J. Dillard 'Fear Appeals in Health Promotion Campaigns' in E. Maibach and R, Parrott Eds. Designing Health Messages: Approaches from Communication Theory and Public Health Practice Sage, NY 1994 p. 22).

For instance, in a recent study of the impact of fear appeals, de Hoog (N. de Hoog et al. 'The Impact of Fear Appeals on Processing and Acceptance of Action Recommendations Personality and Social Psychology Bulletin 2005 31: 24-33) found that not only do fear appeals fail to affect behaviour, but that however significant the risk to health might be, it was unlikely to change behaviour if individuals did not feel vulnerable to the risk. She writes that:

'Whereas the emphasis of health education campaigns has frequently been on depicting the severity of health consequences, as well as on stressing the response efficacy of the recommended action, we have found that

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although these factors affected attitudes, they failed to have much of an impact on intention and behavior. Intention and behavior were solely determined by vulnerability. This suggests that however severe a health risk, and however effective the protection offered by the recommendation, unless we can persuade individuals that they are vulnerable to the health risk, they are unlikely to take protective action.' (p. 32).

Yet the evidence suggests that it is this very absence of health risk vulnerability that characterizes many young people to whom warnings are directed. Indeed, Lloyd and Lucas in their study of adolescent smokers in the UK found that young smokers, based on their own experience and the observation of other smokers, did not feel vulnerable to the health risks of smoking. Writing about these young smokers they note that 'Regular smokers described lifelong smokers they knew who appeared to be healthy and well. These individuals were offered as an illustration of the discrepancy between the message, as they saw it, and their own experiences.' (p. 167).(Op Cit?)

As Robinson and Killen note in a study of the paradoxical effects of warning labels on adolescents '…warning labels are intended to reduce smoking behaviour by frightening people with the health hazards of smoking. However, adolescents are generally not influenced by interventions that focus only on more distal, health-related outcomes.' (p. 271). (are you saying type Op Cit?)

Nor are these reactions confined to adolescents. As Eiser (J. Eiser and P. Gentel, "Health Behaviour as a Goal-directed Action', Journal of Behavioural Medicine 11 (1988): 523-535) notes:

'The possibility exists that many people engaging in unhealthy behaviour see the costs to their health as outweighed (at least in the short term) by benefits in other domains. The message here is that health researchers should be wary of imposing their own value system on

their subjects' responses. Many health-related behaviours may actually be predicted better from values other than 'health'… In short, such findings allow the possibility that many substance users are doing what, up to a point, they want to do, but that what they want to do is not necessarily to stay healthy.'

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6) Impaired Credibility

Sixth, fear-based warnings fail because their source is perceived to lack credibility. The persuasiveness of fear-based warnings is determined by the subject's judgement as to the threat's genuineness, severity and likelihood, but all of these are contingent on his judgement about the warning's credibility, which is linked to the authority of its source. If the warning is judged to come from a less than credible source, than its claims about a hazard's genuineness, severity and probable occurrence are discounted.

The EU warnings research specifically examined the issue of fear-based warning credibility and found that the warning's credibility was severely compromised by the fact that its source was the government. 'Smokers did not respond well,' they write, 'to regulatory bodies as a possible source of messages.' As one subject noted 'But they don't take an active part in helping people to stop. What they are is just making laws and Acts and rules. It's all political.' (p. 40). Summarizing the compromising effects of the government as a source of fear-based warnings, the EU researchers conclude that 'Smokers in all countries generally perceived government and regulatory bodies to lack empathy with their needs which made it easier for them to reject the message.' (p. 41-42).

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Why Fear-based Warnings Fail

7) The High Cost of Compliance

Fear-based, graphic warnings fail because consumers determine that even allowing for the reality of the risks described, the costs of avoiding the risks are too substantial. The rational-knowledge-based assumption on which warnings are founded—that informing, providing knowledge about risks, leads to behavioural change—is in fact not supported by the evidence. In effect, as part of the warning process consumers perform a cost-benefit analysis in which the costs of complying with the warning are weighed against the benefits, both present and future, derived from risks (Dwyer, 1978 op cit; P. Wright and B. Weitz, 'Time Horizon Effects on Product Evaluation Strategies', Journal of Marketing Research 14 (1977): 429-443; S. Godfrey et al. 'Warnings: Do They Make a Difference', Proceedings of the Human Factors Society 29th Annual Meeting (1985); D. Fruin et al. 'Protection motivation theory and adolescents' perceptions of exercise', Journal of Abnormal Social Psychology 22: 55-69, D. Floyd et al. 'A meta-analysis of research on protection motivation theory', Journal of Applied Social Psychology 30 (2000): 4070429, S. Milne et al. 'Prediction and intervention in health-related behaviour: A meta-analytic review of protection motivation theory', Journal of Applied Social Psychology 30 (2000): 106-143, S. Moore and E. Gullone, 'Predicting Adolescent Risk Behavior Using a Personalized Cost-benefit Analysis Journal of Youth and Adolescence 25: 343-359). As the cost of responding to the fear appeal increases, changes in attitude, intention and behaviour decrease. Commenting on the ways in which compliance costs defeat fear appeals, Hale and Dillard write that:

'Response costs refer to negative outcomes that results from complying with a message recommendation. In Fruin et al's (1992) study of exercise to reduce risks of cardiovascular disease, response costs included lost time and physical discomfort associated with exercising. In Witte's (1992b) study of risk behaviours and AIDS, response costs of wearing condoms

might have included lost spontaneity. In Hale
et al's (1993) study of risks from ultraviolet
radiation, several participants would not use
a sun block every day because its application
was inconvenient.' (J. Hale and J. Dillard 'Fear
Appeals in Health Promotion Campaigns in
Designing Health Messages: Approaches from
Communication Theory and Public Health
Practice E. Maibach and R. Parrott Eds. 1994
Sage p. 78).

For example, in an experiment involving college
students, Godfrey et al. found that the cost of compliance
with a warning (in this case about a broken door)
determined compliance rates. In a situation where the
cost of compliance was high, there was no statistically
significant change in behaviour.

This failure to heed a warning is not due to the fact
that the warning has not been understood. There are
numerous studies that have shown that individuals
clearly understood the risks associated with a behavior
but chose to continue anyway (Godfrey et al.; op cit Eiser
and Gentel, 1985 op cit). As Eiser observed '…many
people engaging in unhealthy behaviour see the costs
to their health as outweighed (at least in the short term)
by benefits in other domains.' Nor is the failure to heed
a warning an instance of irrational behaviour. Because
many risks are both uncertain and distant, the failure to
follow a warning cannot be judged as irrational, though
it is frequently portrayed in this fashion by some in the
public health community. Rather it can be plausibly
construed as evidence simply of a different appraisal
of the values present in any situation involving risk and
uncertainty. Judgements about risk are, at the end of the
day, idiosyncratic. As Stewart and Martin note:

'Despite well-known information about
potential dangers, consumers continue to use
products and engage in behaviours that are
unsafe, at least at some level. The argument

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that 'if people just knew better, they would change their behaviour' is not supported by common experience, Neither is it supported by empirical studies… It also may be the case that consumers understand and accept the content of the warning, but choose not to act on it after evaluating the costs and benefits of complying or not complying.

A consumer may decide that the risks associated with smoking are not sufficient to give up whatever benefits they believe they derive from this activity. Likewise, a consumer may deliberately take a greater dosage of an analgesic than is recommended because he or she desires the benefit of a stronger dose. It may also be the case that the costs of inconvenience of compliance are perceived to be greater than the risk posed by the product. For example, a consumer might find it inconvenient to wear protective glasses when using a power tool for a very brief period. Finally, a consumer might decide that the immediate benefits of consumption of a given product are sufficiently desirable that a low probability of harm that may occur at some point in the distant future is discounted. Thus, he or she may continue to drink heavily because he or she enjoys the immediate relief from tension provided by alcohol and considers the risk of health impairment to be small.' (p. 10).

Studies have shown that smokers make similar tradeoffs in terms of the costs and benefits of warning compliance. For example, Beltramini (R. Beltramini 'Perceived Believability of Warning Label Information Presented in Cigarette Advertising', Journal of Advertising 17 (1988): 26-32) found that smokers who believed that cigarettes posed a risk to their health were more inclined to believe the package warnings than those who did not, and there was no connection between smoking behaviour and the warning's believability. Smoking status did not reduce warning credibility. Clearly there was acceptance of a hazard, but without change

of behaviour. In the EU survey on the GHW, for instance, smokers complained that the warnings seemed to downplay the costs of compliance, which obviously were a salient consideration for them in the decision to stop smoking.

Why Fear-based Warnings Fail

8) The Forbidden Fruit Effect

Finally, fear-based graphic warnings fail because of what psychologists term the forbidden fruit effect. There is considerable empirical evidence that certain individuals are attracted to proscribed and risky products and activities (D. Taylor 'Accidents, Risks, and Models of Explanation', Human Factors 18 (1976): 371-380; M. Hyland and J. Birrell 'Government health warnings and the boomerang effect', Psychological Reports 44 (1979): 643-647; K. Schneider 'Prevention of Accidental Poisoning Through Package and label Design', Journal of Consumer Research 4 (1977): 67-74; H. Urzic 'The Impact of Safety Warnings on Perception and Memory', Human Factors 28 (1984):

677-682; P. Feingold and M. Knapp, 'Anti-Drug Abuse Commercials', Journal of Communication 27 (1977): 20-28; L. Snyder and D. Blood 'Alcohol Advertising and The Surgeon General's Alcohol Warnings May Have Adverse Effects on Young Adults', Journal of Applied Communication Research (1992 February): 3753; B. Bushman and A. Stack, 'Forbidden Fruit versus Tainted Fruit: Effects of Warnings Labels on Attraction to Television Violence', Journal of Experimental Psychology Applied 2 (1996): 207-226; M. Clee and

R. Wicklund 'Consumer Behavior and Psychological Reactance', Journal of Consumer Research 6 (1980): 389-405). Highly charged, emotional warnings act
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to advertise these products and activities and make them more attractive to these individuals than they would otherwise be. Stewart and Martin note that:

'A source of excitement for some people, both individually and within certain cliques, the transgression of restrictions imposed by law and taboo in a society… Warnings may draw attention to risks that members intentionally choose to take, When asked about their reasons for risk taking, these individuals often indicate that risk taking is a means to other goals such as social acceptance or a thrilling experience. Warnings can represent a signal of opportunities for risk taking in such circumstances.' (p. 12 op cit?).

Taylor, for instance, finds that certain personality types are drawn to activities that are designated as high risk because of the thrill attached to risk-taking itself. (D. Taylor 'Accidents, Risks and Models of Explanation', Human Factors 18 (1976): 371-380 1976), Bushman and Stack (op cit), in an analysis of warnings about television violence, found that the warning itself increased interest in viewing the violent content. Snyder and Blood, (L. Synder and D. Blood 'Alcohol Advertising and The Surgeon General's Alcohol Warnings May Have Adverse Effects on Young Adults', a paper presented to the International Communication Association Annual Conference Chicago 1991) in a study of young adult consumers' reaction to alcoholic beverage warnings found that the presence of the warning led the young drinkers to not only rate the benefits of drinking more highly but report more frequent intentions to drink. Boddewyn (J. Boddewyn 'Why Do Juveniles Start Smoking?', New York International Advertising Association, 1986) found a correlation between adolescent risk-taking propensities and curiosity about the risks of smoking.

In an extensive examination of the types of personality drawn to risk, Ferguson et al. (M. Ferguson 'Communicating with Risk Takers: A Public Relations Perspective', Public Relations Research Annual 3 (1991): 195-224), describe three risk-

taking profiles—impulsive risk takers, rebellious risk takers, and unconventional risk takers—for whom the forbidden fruit effect is particularly strong. Each of these types of risk-taker would not only be attracted to a risk that is highlighted by a warning, but, more importantly, highly unlikely to attend to, process or act on the warning. For instance, according to Ferguson et al. each of these risk-taking types is likely to be a smoker, and each is likely to be impervious to most warnings about smoking. As they note the reasons for this vary by risk-taker type:

'Impulsive risk takers are much more difficult to reach. They do not like to think and we expect that they may process information heuristically… Rebellious risk takers…are not going to respond to experts solving their problems… These risk takers do not want to be told what to do: they want to be in charge. Of all the risk-taking predispositions, getting the attention of and persuading the unconventional risk taker will be one of the most challenging goals… These risk takers…do not care about their health, and they do not have confidence in a source as widely respected as the Surgeon General. These risk takers seem to value unconventionality.' (p. 220).

Warnings for these individuals thus run the risk of being counter-productive since they both heighten the attractiveness of the risk—the forbidden fruit— while at the same time failing effectively to mitigate its consequences.

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The Weight of the Psychological Evidence About Fear-based Warnings

A review of the relevant psychological literature clearly shows, as Strahan et al. observed, that the graphic, fear-based tobacco product warnings are not grounded in social psychological principles. Indeed, the psychological evidence suggests why the use of graphic, fear-based warnings is likely to fail to accomplish the objectives claimed for such warnings in terms of increasing smokers' understanding of the risks of smoking and reducing smoking initiation, consumption and prevalence. Graphic, fear-based warnings are likely to fail to change either smokers' knowledge or behaviour because they may:

• evoke fear control rather than danger control responses;
• elicit defensive message processing;
• promote reactance;
• be oversimplified and exaggerated;
• tend not to work with individuals who have low self-esteem and low self-efficacy;
• often fail to provide new, relevant information;
• falsely assume that risks to health serve to deter;
• not be credible;
• exact too high a cost to comply;
• serve to make smoking appear more, rather than less attractive with certain groups.

Additionally, the psychological literature on reactance and forbidden fruit suggests that such warnings might not simply fail to prevent or reduce smoking but might rather initiate or increase it.

Empirical Studies of the Effectiveness of GHW On Tobacco Products

Writing in 1995, Barwick, Bergham and Burns in a report for the New Zealand government, noted that:

'It has not proved possible to establish any direct relationship between the provision of health warnings and health information on tobacco products and changes in

actual or intended smoking behaviour…
It does not seem to be currently possible
to empirically establish either that health
warnings and information definitely do,
or do not, influence smoking behaviour.'
(H. Barwick, P. Bergham and j. Burns
Smoke-Free Issues: Analysis of Key issues
in shaping proposed amendments to the
Smoke-Free environments legislation
Prepared for MOH, NZ)

While those comments might have been true in
1995, they are certainly not true a decade latter.
Since the introduction of graphic, fear-based
health warnings in Canada in January, 2001
there has been considerable evidence that, as the
psychological research suggests, such warnings
both fail in their purposes and are possibly
counterproductive. The evidence comes from two
sources, studies in Canada and the Netherlands.

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Canada

The Liefeld Report 1999–2000 The Relative Importance of the Size, Content and Pictures On Cigarette Package Warning Messages University of Guelph

Prior to the introduction of GHW, Health Canada commissioned a study of the effects of fear-based graphic health messages from Professor John Liefeld of Guelph University. On the basis of Liefeld's report (1999–2000) the government argued that GHW improved the 'effectiveness' of tobacco warnings. In his study Liefeld showed teen and adult smokers pairs of test tobacco packages and asked them which package would encourage them more not to smoke or not to start smoking. The results, however, hardly support the conclusion that GHW are more effective in increasing smokers' understanding of the health risks of smoking or of preventing initiation or of reducing prevalence and/or consumption, regardless of the government's claims.

Of the six subject groups, four found GHW to provide more encouragement not to smoke, and in only two of these four were the differences statistically significant. In other words, the evidence for the effectiveness of the GHW was not generally statistically significant. Further, the GHW were not the main factor, according to subjects, that would influence them either to quit or not start smoking.

Equally importantly, Liefeld's study, despite his own reservations about such attitudinal research, was based entirely on his subject's BELIEFS about whether GWH would encourage them to stop or not start smoking. It did not measure their actual smoking behaviour in the face of GWH. This sort of problem is, as we shall see, common to almost all of the studies on the alleged effectiveness of GHW (Hammond et al. EU, and Canadian Cancer Society). All claim that GHW are effective based on the subjective appraisals of smokers or nonsmokers. Yet these sorts of appraisals are notoriously unreliable as indicators of behavioural change. As McCarthy et al. (1987) note in their study of the impact of

warnings on user behaviour '…subjective opinions on the quality of labels may not be a valid predictor of the impact of the labels or user behaviour…' (G. McCarthy et al. 'Measured Impact of A Mandated Warning on user Behaviour', Proceedings of the Human Factors Society 31st Annual Meeting 1987: 479-483)

Indeed, one of the major problems with much of the research on the supposed effectiveness of GHW is that it is based on the subjective opinions of focus groups. As Gina Agostinelli and Joel Grube have noted, the research based on such groups is plagued with problems that make the conclusions drawn from them highly suspect:

'Focus groups only inform us of what certain individuals think influence them and not what actually does influence them… People are notoriously inaccurate in making attributions for the causes of their behavior… Further, with the public format of focus groups, there are conformity pressures…' (G. Agostinelli and J. Grube op cit. 110)

Finally, and most importantly, based on these equivocal results, Liefeld refused to conclude that GHW would reduce smoking or help prevent initiation. He wrote that 'Overall the effects of increasing the size and emotional content of warning messages on cigarette packages and including message enhancing pictures, has the POTENTIAL (our emphasis) to encourage more smokers to stop smoking and deter more non-smokers from starting to smoke.' Of course, that potential is an article of faith inasmuch as it was not statistically demonstrated in his study.

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The Canadian Cancer Society 2001 Study

Evaluation of New Warnings on Cigarette Packages 2001 Environics

The Canadian GHW have been described by the antismoking movement and government regulators in other jurisdictions as a marked success. For example, in a New Zealand MOH Consultation Document (2004), it was claimed that after 'only a short time' the GHW increased knowledge of the health effects of smoking, made smokers think more about these effects, increased smokers' motivation to quit, increased the number quitting attempts and encouraged people to smoke less. These results, it is claimed, were measured against a pre GHW baseline to insure that they were valid.

These claims, however, are not true. The survey, referred to in the New Zealand Consultation Document was carried out by the Canadian survey firm Environics for the Canadian Cancer Society (2001), and this survey did not measure the alleged effects of GHW against a pre-GHW baseline. This fact makes the reported effects essentially useless since there was no attempt to determine the effects of the previous warnings on information, intention to quit, quit rates or smoking consumption. A properly designed and controlled social science experiment would have conducted two surveys, one before the introduction of GHW and one after introduction.

The Environics survey was carried out from 19 September to 10 October, 2001 and comprised 2031 adults of whom 652 were smokers. Despite the fact that there was no pre GHW baseline control, the lack of results for the new warnings is striking. For example, one of the claims for the new warnings was that they increased smokers' awareness of the risks of smoking. But in response to the question of how much new knowledge smokers had on the effects of smoking, 65 percent of respondents indicated that they had no new knowledge. When asked whether the GHW had increased their level of concern about the health risks of smoking, 58 percent of respondents indicated that the warnings had no impact. As for quitting, 81 percent of respondents replied that the warnings had no impact on their decision to have a cigarette, with 56 percent

indicating that the GHW had produced no impact on their motivation to quit.

But perhaps the most striking feature of the Environics survey is the fact that it failed to address the critical success factor for legitimate regulatory measures: was there a change in behaviour that was a direct consequence of the regulation? This is interesting given the fact that in Health Canada's own commissioned research from Liefeld (1999), Liefeld describes two sorts of data that might be used to demonstrate the effectiveness of GHW. Type I data measures the actual changes in behaviour brought about by GHW while Type 2 data measures changes in psychological states such as attitudes, beliefs, feelings, intentions. Liefeld argues that only Type 1 data provides legitimate and reliable evidence that GHW are effective and not counterproductive.

As we shall see, this failure to provide Type 1 evidence, to address behavioural change is a consistent feature of GHW studies commissioned by governments or regulators. Yet the psychological literature is full of references to the fact that the important criterion of effective warning is changing a subject's behaviour with respect to the danger. This process of behavioural change appears to succeed when three sorts of factors are addressed: cognitive factors which devote attention to and understanding of the need for change; facilitating factors which provide means for the change to occur; and reinforcing factors which cement the new behaviour. Warnings in general, and GWH in particular, while trying to address the first of these factors—the cognitive—fail to address the second and third, and thus fail to produce behavioural change.

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Health Canada Commissioned Environics Wave Surveys 2001–2002

Wave Studies of Consumer Behaviour and Attitudes to Smoking, Environics Research Group Ltd for Health Canada

Health Canada commissioned the survey and research firm Environics to conduct a series of surveys (called Wave surveys) in Canada to assess the effectiveness of GHW. Prior to the introduction of GHW in January 2001, Environics conducted a baseline survey, referred to as Wave 1, in November-December 2000. Follow-up surveys, Waves 2-6 were conducted from March-April 2001 to December 2002. The results for the baseline, Wave 1 survey were released by Health Canada, but it has not released the results of Waves 2-6 except through an Access to Information request.

The results of Waves 2-6 clearly demonstrate that GHW fail in each of their tobacco control objectives, both with youth and adult smokers. First, the surveys show that there was no statistically significant trend of declining youth smoking prevalence, either regular or occasional, following the introduction of GHW, In fact, one year after their introduction occasional youth smoking was actually higher than before.

Second, there was no statistically significant decline in youth consumption, either regular or occasional, after the introduction of GHW. As with prevalence, a year after the introduction of GHW occasional youth consumption was higher than before.

Third, despite claims that GHW increase the awareness of the health risks of smoking, the Wave results showed that the number of young people who believed that smoking was not a health problem, 2 percent pre-GHW, was the same post-GHW. Despite the prominence given to the impotence/sexual dysfunction GHW, according to the survey only 1 percent of the population cited it as a 'top of mind' smoking related health problem. Again, the surveys showed little change in the leading 'top of mind' smoking related health problems (lung cancer, cancer in general, heart attack and lung disease) over the

survey period or compared with the baseline.

Finally, even though there was a post-GHW increase in the number of youth who expressed an intention to quit, this was not reflected in the number of young people who actually attempted to quit, further highlighting the gap between reported attitudes, beliefs and intentions and actual smoking behaviour.

A similar pattern of failure was found with GHW and the behaviour of adult smokers. First, there was no change in consumption levels among adult smokers, either occasional or regular smokers.

Second, there was no statistically significant change in adult smoking prevalence. Third, the percentage of adults who attempted to stop smoking did not significantly change following the introduction of GHW.

Fourth, there was no statistically significant change in the numbers of adult smokers who believe that smoking is a major source of disease, nor was there a change in the subjects' views about the role of smoking in the major 'top of mind' smoking related diseases. Fifth, there was a decrease in the number of adult smokers who look at the warnings several times a day. And there was also an increase in the number of smokers, and indeed nonsmokers, who never look or read the warnings.

In summary then, according to Health Canada's own data from the Environics research, confirmed against a pre-GHW baseline, the results of the introduction of GHW in Canada were that:

• there was no statistically significant decline in smoking incidence of adolescents:
• there was no statistically significant decline in adolescent consumption—indeed one year after the introduction of GHW occasional adolescent| smoking and occasional adolescent consumption were both HIGHER than before GHW;

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• there was no statistically significant increase in the number of adolescents who attempted to quit smoking;
• there was no statistically significant decline in the number of adolescents who believed that smoking was not a health problem;
• there was no statistically significant change in adult smoking prevalence;
• there was no statistically significant change in adult consumption, either among occasional or regular smokers;
• there was no statistically significant increase in the percentage of adult smokers who claimed to have tried to quit smoking;
• there was no statistically significant change in the numbers of adult smokers who believe that smoking is a major source of disease;
• there was a decrease in the number of adult smokers who look at the warnings several times a day;
• there was only a small minority of smokers who claimed that GHW were effective in encouraging themselves to either smoke less or quit, even though a majority of smokers believed that GHW were more effective in encouraging smokers to quit or smoke less; and
• there was an increase in the number of both smokers and nonsmokers who never look at or read the warnings.

The Hammond et al. Study of 2003–2004

In August 2004 two researchers from Concordia University released a study (Global Health Warnings on Tobacco Packaging: Evidence from the Canadian Experiment) which looked at the actual behavioural effects of Canada's GHW. The study used data from two waves of Health Canada's Canadian Tobacco Use Monitoring Surveys, one prior to the introduction of the

GHW, the other subsequent to it. The authors found that there was no statistically significant decline in either smoking prevalence or tobacco consumption. The authors also looked at the potential behavioural impact of the GHW by age group but found no difference in the null effect regardless of whether the ages were 1519, >64, and 20-64.

The Gospodinov/Irvine Study 2004

N. Gospodinov and I. Irvine Global Health Warnings on Tobacco Packaging: Evidence from the Canadian Experiment Topics in Economic Analysis and Policy 4 2004

The Hammond et al. study (D. Hammond et al. 'Impact of the graphic Canadian warning labels on adult smoking behaviour', Tobacco Control 12 (2003): 391-395), which appeared, rather curiously, twice, once in Tobacco Control in 2003 and again in the American Journal of Public Health in 2004, is often cited as evidence of the effectiveness of the Canadian graphic warnings. In the study the authors conducted a telephone survey of 616 adult Canadian smokers in October/November 2001 with a follow-up survey three months latter. The survey looked at subjects' smoking

behaviour and demographic variables, knowledge of the warnings and 'depth of cognitive processing' of the warning labels. In the follow-up survey information was collected about smoking status, knowledge of the warnings, depth of cognitive processing and any changes in smoking behaviour.

Hammond et claim that the study provides support for three of the four goals of GHWs, reducing smoking consumption, prevalence, and increasing smokers' understanding of the health risks associated with

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smoking. The authors write that their 'findings indicate that graphic warnings labels are a salient means of communicating health risk information and may serve as an effective smoking cessation intervention'. (p. 395). Unfortunately, the study does not support these claims. If it provides evidence of anything it is that the Canadian GHW failed. Indeed, it mirrors the results of the Health Canada Wave studies and the Gospodinov/ Irvine study.

First, Hammond et al. display a confusion rife in studies that purport to demonstrate that health warnings are effective in preventing or reducing smoking in that they consistently confuse the salience or prominence of warnings with their effectiveness. For instance, they note that 'Research has identified the basic principles for enhancing the effectiveness of tobacco warning labels: colour pictures or graphics, positioning on the front of packs, increases in size, and direct unambiguous messages all increase the likelihood that smokers will notice warnings labels.' (p. 391) In effect, their claim is a mixture of truism and non sequitor. The truism is that the more salient the warning the more it is noticed, and the non sequitor is that noticing a warning means that someone will consider and act on it. While noticing a warning might be a necessary condition for considering and acting upon it, it is not, as the social psychological literature and the empirical evidence demonstrates, a sufficient condition. Indeed, the heart of the problem with warnings is that their messages, however noticed and indeed considered, are not converted into action.

Second, is unclear what one can conclude about the effectiveness of the Canadian GHW compared to the previous health warnings from this study since this study has no pre-GHW baseline against which the effectiveness of the new GHW can be measured.

Third, it is unclear to what degree the graphic warnings, as opposed to the written messages, were recalled by subjects since they were asked to recall the location of the warning label and identify the message, but were not asked to identify the graphic. Given that the fear-based graphic was the entire point of the new warning, this is a rather extraordinary oversight.

Fourth, it is not true that the GHW increased the subjects' knowledge of the health risks associated with

smoking since the authors report that only 91 percent of subjects had read the warnings and could recall the warnings. This compares to 98 percent of smokers in the Health Canada Wave 1 (pre-graphics) who had read and could correctly recall the warnings. Indeed, fewer smokers read and remembered the GHW than the previous warnings.

Fifth, the crucial depth of cognitive processing, the measure of the warning's salience and the extent to which smokers thought about the warning, actually declined from the baseline survey to the follow up. As the authors admit 'Overall cognitive processing of the warnings decreased from baseline to follow up.' (p. 393) Clearly then the claim that GHW increase salience and warning processing, one of their supposed major advantages, is not true.

Sixth, the study's flawed methodology makes it impossible to draw any causal conclusions about the effects of GHW on smoking behaviour. This is true for two reasons. First, studies of smoking predictors have identified over 100 different predictors for smoking behaviour, including initiation and cessation, none of which were controlled for by Hammond et al. Inasmuch as none of these were controlled for it is impossible to draw any conclusions about the effects of GHW as distinct from the effects of other influences on smoking behaviour.

Second, the association alleged to be causal between reading and thinking about the GHW and quitting is just as easily explained in a reverse causal fashion. That is, those smokers contemplating quitting paid more attention to GHW than others because they were thinking about quitting. Indeed, the authors even acknowledge this noting that the direction of this relationship is unclear—smokers who intend to quit may be more likely to read the labels'. Because of the poor methodology of the study the true direction of the causality, key to the author's claims, cannot be determined.

Finally, the key measure of effectiveness—individual results for cessation behaviours (intentions to quit,

quitting, attempts to quit and reductions in smoking)—
was not statistically significant. In fact, the strongest
relationship between baseline behaviour and subsequent
quitting was intention to quit, not GHW. In effect, GHW
did not change either prevalence or consumption.

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The Ptito and Chebat Neuro-Imaging Study, 2006

University of Montreal neuroscientist Maurice Ptito and HEC-Montreal School of Management Professor Jean-Charles Chebat have recently completed the first neurological study of the effectiveness of GHW for the Canadian Tobacco Control Research Initiative. Though the study is a small pilot, it provides dramatic evidence of the failure of GHW. Unlike conventional analyzes of warnings, which rely on a subject's report on the effects, neuro-imaging instead shows the brain's response to a warning. Ptito and Chebat used brain-imaging to examine the responses of 12 female adolescent smokers to 15 of the current Canadian GHW. According to their findings, when the subjects were showed each of the GHW there was no response to any of the warnings in the parts of the subject's brain associated with negative feelings, a finding which contradicts the claim of GHW proponents that such warnings induce negative reactions in smokers who view them.

Distorting the Canadian GHW Experience: New Zealand 2004–2005

Ministry of Health Review of the Smoke-free Environments Regulation 1999: labeling of tobacco products, tobacco product content regulation, disclosure by tobacco companies, regulation of product descriptors; Consultation document 2004

In June, 2004 the New Zealand Ministry of Health published a consultation document which reviewed much of the research relating to the effectiveness of graphic health warnings discussed above and invited submissions from interested parties. Unfortunately, the consultation document provides an inaccurate account of a number of research findings. For example, it alleges, with respect to the general effectiveness of warnings in changing behaviour, that there is evidence from the use of warnings on alcohol products 'that warnings have the potential to influence behaviour…' (p. 22), a claim which we have seen is not supported in the research literature. (See Introduction, page 4) But the consultation document's inaccurate and misleading

account of research on GHW is most pronounced in its description of the research findings from Canada about the effectiveness of GHW. Given that Canada was the only country at the time with GHW, it is particularly important that the experience of GHW there be accurately reported.

According to the MOH document GHW had 'after only a short time' increased the knowledge about the health effects of smoking, encouraged people to smoke less and affected smoking quit rates. Moreover, these outcomes were specifically linked to the introduction of GHW since the changes were measured against a pre-GHW baseline. These claims by the MOH, however, are untrue.

First, the study referenced was not done for the Canadian health ministry, Health Canada, but for the Canadian Cancer Society by the research firm Environics. Second, Environics did not examine the alleged effects of GHW against a baseline survey since the Cancer Society did not have one. This means that there is no way to determine whether the effects cited were the result of GHW. Third, even if one were to assume that the 'results' were a product of GHW, they fail to demonstrate that GHW were successful.

For instance, despite the claim that GHW increased smokers' awareness of smoking risks, 65 percent of respondents indicated that they had no new knowledge. In response to the question 'What impact have the new warnings had on your smoking behaviour inside your home?,' 72 percent of respondents replied that

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the GHW had had no impact. When asked whether the GHW had increased their level of concern about the risks of smoking, 58 percent of respondents indicated that the warnings had had no impact. And in answer to the question 'To what extent have the new warnings increased your motivation to quit smoking,' 56 percent replied that the GHW had no impact on their motivation to quit. Perhaps most crucially, 81 percent of respondents replied that the warnings had no impact on their decision to smoke a cigarette.

A second problem with the MOH consultation document about the effectiveness of GHW in Canada is to be found in its reporting of the Canadian government's own research into the effectiveness of GHW. Instead of reporting the actual results of Health Canada's commissioned Environics Wave Surveys (see our discussion at page 26), the report relies on a summary presentation by a Health Canada official (p. 24 in the report) This summary which includes such relatively unimportant findings as 'smokers continue to read the messages' and the 'messages continue to be noticed,' completely omits the important data which Health Canada had obtained about the effectiveness of GHW. Given how unsuccessful GHW had been in reducing Canadian smoking initiation, smoking prevalence, consumption or quit rates, it is not surprising that Health Canada chose not to provide the Ministry with the actual data, or if they did that the Ministry chose not to release it.

For instance, according to Health Canada's own data (Wave Studies of Consumer Behaviour and Attitudes to Smoking, Environics Research Group Ltd for Health Canada), confirmed against a pre-GHW baseline, following the introduction of GHW:

• there was no statistically significant decline in smoking incidence of adolescents:
• there was no statistically significant decline in adolescent consumption—indeed one year after the introduction of GHW occasional adolescent| smoking and occasional adolescent consumption were both HIGHER than before GHW;
• there was no statistically significant increase in the number of adolescents who attempted to quit smoking;

• there was no statistically significant decline in the number of adolescents who believed that smoking was not a health problem;
• there was no statistically significant change in adult smoking prevalence;
• there was no statistically significant change in adult consumption, either among occasional or regular smokers;
• there was no statistically significant increase in the percentage of adult smokers who claimed to have tried to quit smoking;
• there was no statistically significant change in the numbers of adult smokers who believe that smoking is a major source of disease;
• there was a decrease in the number of adult smokers who look at the warnings several times a day;
• there was only a small minority of smokers who claimed that GHW were effective in encouraging themselves to either smoke less or quit, even though a majority of smokers believed that GHW were more effective in encouraging smokers to quit or smoke less; and
• there was an increase in the number of both smokers and nonsmokers who never look at or read the warnings. A minimum definition of the GHW effectiveness would include: 1) a reduction in youth and adult prevalence and consumption; 2) an increase in smoker's awareness of the health risks of smoking and 3) an increase in quit rates. Judged against these criteria of effectiveness the Canadian GHW were unequivocally ineffective.

The third problem with the MOH document is that is presents an inaccurate picture of another piece of research into the effectiveness of GHW in Canada, namely the Hammond et al. study (See page 27). From the summary of Hammond et al. presented in the MOH report (p. 25) it would appear that the effects reported were attributable to the GHW. But this is not the case since Hammond et al. have no pre-GHW base from which to compare the knowledge/behaviours on which they report. Moreover, the gains claimed by the MOH in

the number of smokers who had read and remembered the GHW based on Hammond are not in fact true since they actually represent a decline from the reading and recall levels found with the text only, pre-GHW warnings. Hammond et al. report that 91 percent of their survey respondents had read the warnings and could recall them compared with 98 percent of respondents to Environics base-line survey of the previous text-only warnings.

Again, with respect to the key claim about the GHW—that they increased the depth to which readers processed and thought about the warning—there was a decline, according to Hammond from the baseline to the follow-up, thus calling into question one of the supposed main advantages of the GHW. Finally, the key measures of GHW effectiveness such as cessation behaviours including intentions to quit, quitting, number of attempts to quit and reductions in smoking, were not statistically significant.

In response to the Consultation Document, both British American and Imperial Tobacco provided the Ministry with submissions which raised substantial questions about the quality of the research reported by and relied on by the Ministry. For instance, Professor Sarah Todd of the Department of Marketing, University of Otago in an analysis prepared for Imperial Tobacco's submission noted that 'very few of the research papers demonstrate any evidence of a link between the health warnings and some form of outcome in terms of behavioural or attitudinal change on the behalf of both smokers and non-smokers… Much of the research evaluated for this report has recall or awareness of the health warnings as its key focus. While awareness is the initial step in any hierarchy of communication or advertising effects, it cannot be seen in any way as inferring that behavioural or attitudinal change has occurred.' (S. Todd Review of research undertaken into the placement of health warnings on cigarette packages, September, 2004 Imperial Tobacco Submission to MOH Consultation Document, p. 10-11)

In an attempt to rebut BAT and IT's questions about the effectiveness of GHW, the MOH asked Professors Janet Hoek and Philip Gendall of Massey University

to review the research evidence. ('Pictorial Health Warnings: A Review of Research Evidence Prepared for the Ministry of Health', April, 2005) Given that subsequent to their report Hoek and Gendall conducted their own study into the effectiveness of GHW and concluded that the evidence suggests that GHW are more likely to reduce tobacco consumption than text-only warnings, the question of their objectivity on the issue of GHW might well arise. ('Massey researchers back Health Ministry tobacco labeling plan', Press Release Massey University 10 May, 2006)

Hoek and Gendall argue that the objections raised about the research into the effectiveness of GHW were largely beside the point for three reasons. First, 'longitudinal research would be difficult, time-consuming and expensive to undertake and the results would be likely to provoke rather than resolve disputes over the effects of pictorial health warnings.' (p. 46). Second, arguments about the evidentiary standards required for introducing GHW are 'logically flawed as they pre-suppose the introduction of the measures they propose to assess.' (p. 49). Third, despite the fact that all of the research studies—as we have seen—supporting GHW, have flaws, 'when viewed holistically, they suggest that pictorial warning labels will be more impactful and credible than text-only messages. For health researchers, these findings provide compelling evidence that pictorial warnings labels should be mandatory, since they have improved the communication effectiveness of text-only warning messages. (p. 48).

None of these arguments are compelling, either taken individually or together. First, it is a truism that longitudinal research on important and complex social science issues is difficult, time-consuming and expensive, but this does not count as a reason why it should not be undertaken. Indeed, given that longitudinal research and clinical trials constitute the gold standard of research practice, it would be difficult to find any researcher who would counsel against their use. And while any research study is likely to generate controversy, longitudinal studies would be far less open to criticism than the sorts of studies cited as supporting GHW. To suggest, as Hoek and Gendall do, that 'for health researchers' the existing cross-sectional evidence

is 'compelling' is simply to demonstrate once again
how far-removed the standards of health researchers are
from those of mainstream science.

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Second, the catch-22 argument that behaviour change is a necessary condition for determining the effectiveness of GHW is logically flawed misses the point in at least three respects. First, it ignores the fact that there is a wealth of fifty years of experimental evidence (outlined in the first part of this paper) which suggests both that GHW will not work to change behaviour and why it will not work. This evidence provides strong theoretical and empirical support for the hypothesis that GHW will not change behaviour and thus does not presuppose the introduction of GHW. Second, as a matter both of logic and fact it is entirely possible to design a pilot and limited introduction of GHW in one area and use the results to assess effectiveness prior to mandatory and comprehensive legislation covering an entire nation. Indeed, such a plan to test the effectiveness of GHW in terms of changing smokers' behaviour was proposed to Health Canada during its considerations of GHW by the author and a colleague from Queen's University, Canada. Third, given the weight of the research evidence from Canada, both in Health Canada's own Wave Surveys and in the econometric analysis of Gospodinov/Irvine, coupled with the general lack of evidence in all of the research that GHW reduced smoking initiation, prevalence, consumption or quit rates, there is a very strong presumption that GHW are ineffective. To claim that evidence of failure to promote behavioural change is unavailable until the measures are introduced is simply not true.

Third, the leaky bucket argument that the evidence 'when viewed holistically' has a strength not found in any of its individual pieces is obviously flawed. Five leaking argumentative buckets put together are no more likely to hold water than when the buckets are considered individually. Moreover, as we have seen above, the results from Canada, whether from Gospodinov/ Irvine, Hammond et al. or most compellingly Health Canada itself, all suggest, contra Hoek and Grendall's unsupported claims that GHW are a substantial failure against any criteria of behavioural effectiveness. To argue that for 'health researchers' these studies provide 'compelling evidence' is more a comment on the debased evidentiary standards of tobacco policy research than an argument. Indeed, given Hoek and Grendall's support for Health Canada's approach (p. 47) it is especially

surprising that they seem unwilling to accept Health Canada's own evidence of the failure of GHW.

Instead of accepting that GHW fail to change smoking behaviour in any statistically significant manner, Hoek and Grendall are reduced to arguing that GHW have improved the 'communication effectiveness of text-only warning messages.' But even this claim cannot be supported since there are only two ways in which improved communication effectiveness can be plausibly measured: one, in terms of smokers knowledge about smoking risks and two, in terms of smokers behavioural change, and neither of these measures show that GHW were more effective than text-only messages in Canada. As we noted, in Hammond fewer respondents could recall the GHW compared to the text-only messages, and fewer respondents processed and thought about the GHW from the baseline to the follow up. And in the Health Canada studies, not only were there no statistically significant changes in many of the risk knowledge measures after the introduction of GHW, but there were no statistically significant favourable changes in either adult or adolescent consumption or quit rates. Finally, according to the Health Canada studies, there was actually an increase in the number of both smokers and nonsmokers who neither looked at nor read the GHW. Given that looking at and reading are necessary conditions for even the most minimal notion of communication, it is difficult to understand Hoek and Gendall's claim that GHW 'have improved the communication effectiveness of text-only warning messages.'

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The Netherlands

The C. Jansen et al. Study 2006 (C. Jansen et al. op cit)

One of the two most recent analyses of the effectiveness of GHW comes from a research group at Radboud University Nijmegen led by Professor Carel Jansen. Jansen et al. ran an experiment with 214 subjects to compare the effects of traditional tobacco warnings with the GHW proposed by the EU.

The Jansen et al. study was prompted by a small study carried out in New Zealand by Searle et al. ('2004 Effects of Visual Images as On-Pack Anti-Smoking Warnings', Australian and New Zealand Marketing Academy Conference, Wellington 29 November–1 December, 2004) As Jansen notes, the Searle study is severely compromised as it does not use a theoretical model to interpret its data, and its statistical analysis is so limited as to make it difficult to draw any valid conclusions about the effectiveness of GHW. Most significantly, Searle provides no baseline against which to interpret her results since she does not compare GHW with the existing tobacco warnings. It is thus impossible to determine whether GHW not they are more effective, which is the most important question.

In order to correct these defects, Jansen et al. place their study clearly within the psychological constructs which explain why fear-based warnings often fail and provide a through statistical analysis of his results. Subjects were shown four proposed warnings from the EU database: a 'tumor-infested throat…and a badly stained set of teeth…a female with an empty baby carriage…and a limp cigarette…' along with a verbal version of the current package warnings. (p. 6). Subjects were then given a set of questions about the perceived severity of the health warnings, the extent to which the warnings made the subject frightened and anxious, whether the warning would influence a subject's smoking behaviour (e.g. not start, reduce) and what the subject's reaction would be to packages with such a warning (e.g. 'I prefer to buy cigarette packages without this health warning').The results show that, as

in Canada, there are no statistically significant changes in smoking behaviour to be expected from GHW.

For instance, Jansen et al. found that the 'smokers rated the threatening dangers as less serious, considered themselves more susceptible to them, were less frightened in the case of the explicit warnings, were less inclined to let their smoking behaviour be influenced in the desired direction, and were less disposed to make a conscious effort to shield themselves from the anti smoking warnings on the cigarette packages' (p. 9), all results consistent with the literature on the effects to be expected from fear-based warnings, which predict that such warnings will activate a stronger fear control as opposed to danger control response. In other words, smokers saw the dangers portrayed as less significant, were not frightened by the warnings and were more inclined to focus on fear control as opposed to danger control. Moreover, with non-smokers who are meant to be deterred from smoking by the graphic warnings, Jansen found instead that the strongest effect of the warnings was to increase their desire for fear control as opposed to their desire to control the danger, that is, avoid smoking. As he notes 'this effect [fear control] is distinctly stronger than the effect on the variable danger control mode.' (p. 11). Though finding that nonsmokers claimed that the graphic warning increased their expectation that they would not start smoking, (a not unexpected result from fear-based warnings which often change attitudes, but not behaviours) Jansen et al. also found that they showed a much more pronounced tendency to react defensively to the graphic warnings.

As the authors conclude 'For the smokers, there appeared to be no significant effects of adding visual to verbal warnings on cigarette packages, as intended by the EU… To put this in a nutshell: confronting smokers with the new warnings does not increase their willingness to cut down smoking, but they do expect they will more actively shield themselves from the warnings…' (p. 10-11)

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N. de Hoog et al. The Impact of Fear Appeals on Processing and Acceptance of Action Recommendations Personality and Social Psychology Bulletin 2005 31: 24-33

N. de Hoog 2005 Fear Arousing Communications and Persuasion: The impact of vulnerability on processing and accepting fear appeals (2005 Optima Grafische Communicatie, Utrecht)

In her recent monograph on the effectiveness of fear-based communications, Natascha de Hoog begins with the observation that the 'warnings on packs of cigarettes are supposed to make smokers concerned about the hazardous consequences of smoking in such a way that they will stop smoking, yet most smokers continue to smoke.' (p. 9). She then proposes to examine, through a series of careful experiments, whether the 'plan in the Netherlands in 2006…to put explicit 'scary' pictures of individuals suffering from the consequences of smoking on cigarette packs' will prevent smoking or convince smokers to quit.

In the experiments, which examined subjects' responses to fear-based communications on the consequences of alcohol consumption, repetitive strain injury, and hypoglycemia, de Hoog found that fear-based warnings that stressed the negative consequences of a behaviour failed to change the subjects' attitudes and intentions. In an extensive meta-analysis of fear-based appeal experiments, she found that the use of 'scary images is not more effective than only stressing the negative consequences of a certain behaviour.' (p. 154). The reason for the failure of 'scary' images, both in her own experiments and in the literature, is that such warnings, though they may affect attitudes—as the literature on GHW shows, fail to convince individuals that they are personally vulnerable (as opposed to belonging simply to a vulnerable group such as smokers) to the health risks associated with smoking, a necessary condition for behavioural change, and thus fail to encourage them to take protective action to avoid these risks.

'Thus, feeling vulnerable instead of belonging to a vulnerable group, motivates intention and behaviour change. In addition, it was found that extremely 'fear-arousing' messages are no more effective than

messages that simply state the negative consequences of a certain behavior. These findings have important practical implications.

The emphasis of health education campaigns has frequently been on the severity of negative health consequences by presenting vivid, scary materials, as well as on stressing the response efficacy of the recommended action. However, this thesis shows that, although these factors affect attitudes, they fail to have much of an impact on intention and behaviour. Furthermore, vivid, scary images are in no way more effective than just presenting negative, consequences in a sober way…

Therefore, if the warnings are having a limited effect on smoking cessation now, adding scary pictures will not make much of a difference.' (p. 153-154).

Conclusion

Despite the claims advanced by the proponents of GHW about their effectiveness in increasing smokers' awareness of the risks of smoking and reducing smoking initiation, prevalence and consumption, the evidence, both from social psychology and from empirical studies, one of which was commissioned and paid for by the government which introduced GHW, of their effects in real world settings, indicates that such warnings are not sensible regulation for they in fact accomplish none of these objectives.

Indeed, using a cost benefit analysis, it appears that GHW provide no benefits for either smokers or nonsmokers, while at the same time threatening serious costs in terms of smoker concentration on fear as opposed to danger avoidance, defensive processing, and reactance, as well as feelings of low self-esteem and self-efficacy, while at the same time possibly making tobacco products appear more attractive to certain individuals.

Given this lack of both conceptual and empirical backing it is unlikely that GHW are a legitimate public policy measure for tobacco, alcohol or food.

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Appendix

What the Research Says

I. Janis and R. Terwilliger An Experimental Study of Psychological Resistances to Fear Arousing Communications Journal of Abnormal and Social Psychology 1962 65: 403-410

The more strongly fear is aroused by a warning communication, the more strongly motivated the person will become to avoid symbolic responses and thought sequences which lead him to recall or to focus his attention on the essential content of the arguments and conclusions.

H. Leventhal et al. Sources of resistance to fear-arousing communications on smoking and lung cancer Journal of Personality 1966 34:155-175

In a recent study Leventhal and Niles…investigated the effects of fear-arousing communications upon intentions to stop smoking and upon intentions to take chest X rays and the actual taking of X rays. The three communications used in the study included identical recommendations to stop smoking and to take X rays. The fear-arousing stimuli in two of the communications were color motion pictures on the dangers of lung cancer. One of these, the Moderate Fear movie, told the story of how the editor of a small-town newspaper discovered that he had lung cancer and was hospitalized for treatment. The other, the High Fear movie, included the above material and a further film clip of scenes from the patient's lung cancer operation. Comparing the effectiveness of the communications, the investigators found that the film communications were significantly less effective in strengthening intentions to stop smoking than the third communication, which used a pamphlet instead of a film (Low Fear).

P. Keller and L. Block Increasing the Persuasiveness of Fear Appeals: The Effect of Arousal and Elaboration 1996 Journal of Consumer Research 23: 448-459

The impact of high fear arousal appears to be influenced by the level of defensive maneuvers people engage in when faced with a threatening message. These

defensive techniques may include avoiding the message, minimizing the severity of the threat, selectively attending the message, discounting the threat, and denying its personal relevance.

These findings suggest that the level of fear arousal may be positively related to the propensity to elaborate… [A] high level of fear may motivate subjects to elaborate on the problems and ignore the solution.

R. Ruiteretal. Scary Warnings and Rational Precautions: A Review of the Psychology of Fear Appeals Psychology and Health 2001 16: 613-630

This review indicates that the contribution of fear appeals in the adoption of self-protective behaviour is in doubt. Fear-arousal may render information concerning response efficacy and self-efficacy more salient, for example, through enhancing systematic processing… but it is the impact of these messages on attitude and intention formation that determine the effect of a fear appeal on precautionary action… Measures of threat perception have weaker relationships with intention and behaviour… This implies that it is the precautionary information or reassurance included in the message, not the capacity to arouse fear, which is likely to have greatest impact on behaviour, especially since fear may inhibit the establishment of precautionary motivation through the instigation of fear control processes… It seems likely that fear arousal may have inhibiting as well as facilitating effects on assimilation of protection motivation and can lead to avoidant. Consequently, cautious use of fear arousal techniques seems advisable. A greater focus on precautionary information and the promotion of action at the expense of prompting fear arousal is likely to more consistently effective than attempts to frighten people about health risks with images of death and injury.

R. Ruiter et al. Danger and Fear Control in Response to Fear Appeals: The Role of Need for Cognition Basic and Applied Social Psychology 2004 26: 13-24

…fear-arousing information can easily be followed by emotional reactions instigating denial or avoidance of the presented information, which may interfere with the adoption of the recommended action. This finding raises

doubt about the renewed interest in fear arousal that we particularly witness in health education practice in the

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Netherlands. Examples with respect to this renewed interest are commercials that show traffic accidents with bloody and deadly consequences, and the enlarged and now clearly visible printing of health warnings on cigarette packages… Obviously, programme developers presume that fear arousal directly motivates people to safer behaviour. Our findings with regard to defensive responses, however, suggest that fear arousal should be used with greater caution and preceded by extensive pilot testing.

N. Gospodinov and I. Irvine Global Health Warnings on Tobacco Packaging: Evidence from the Canadian Experiment Topics in Economic Analysis and Policy 2004: 4

Our next step was to investigate if the warnings may have been successful in reducing the consumption or prevalence of some specific groups… The results from the two-part model…do not reveal any identifiable age effect of the warnings: in both the prevalence and quantity smoked equations the coefficients on the interaction of age and warnings failed to reach a high level of significance for any group.

The data we have analyzed provide a limited set of answers to the question we posed at the outset: have the 'heavy-duty' warnings on cigarette packages in Canada had a significant impact on the prevalence or intensity of smoking in the period following their introduction? Our two part estimator indicates that answer to the first part of this question is negative—we have not been able to detect any significant prevalence effects, much as the unconditional data suggest.

A. Liberman et al. Defensive Processing of Personally Relevant Health Messages Personality and Social Psychology Bulletin 1992 18: 669-679

In conclusion, the present study demonstrates that threatening messages can evoke defensive goals and that personal relevance can heighten his defensiveness.

G. Agostinelli and J. Grube Tobacco Counter-Advertising: A Review of the Literature and a Conceptual model for Understanding Effects Journal of Health

Consider a young male smoker exposed to a counter-advertisement suggesting that smoking causes impotence. He may fell threatened by such a message, decide it is stupid, and tune it out. Compelling evidence abounds on how people avoid processing information that has negative self-implications and even fail to recognize familiar stimuli that are threatening… Threatening information can induce defensive biases that also affect how it is constructed, interpreted, remembered and evaluated, such that negative self-implications are avoided.

In contrast, exposure to tobacco counter-advertising does challenge smokers' beliefs, and thus defensive reactions to the counter-advertisements are likely. Hence, the very group who is at the highest health risk is the group most likely to be selectively processing the counter-advertisements. Thus, it is reasonable to expect that prior experience with smoking may moderate attention to and the processing of tobacco counter-advertisements… Over time, adolescents 'cognitively readjust' their smoking-related beliefs in light of their smoking behaviour… Accordingly, we might expect that one's prior smoking will not only impact attention to and the processing of tobacco counter-advertising on immediate measures, but also may moderate the effects of exposure to tobacco counter-advertising on how its content is processed…

Our findings indicate that prior knowledge and experience moderate the effect of threat communications by influencing maladaptive behaviors. Heavy prior experience appears to result in a greater number of maladaptive behaviors. For example, a person who has driven for 20 years without wearing a seatbelt and has never had an injury caused by an accident is likely to have a large repertory of coping responses, such as 'I won't have an accident' or 'I'm very careful when I drive' or 'I don't need a seatbelt because I took a defensive driving course.' These statements all reduce fear, but do not really remove the danger.

J. Hale and J. Dillard Fear Appeals in Health Promotion Campaigns in Designing Health Messages: Approaches from communication theory and public health practice E. Maibach and R. Parrott Eds. 1994 Sage
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The impact of age on the persuasiveness of fear appeals also helps to explain why so many fear appeals to promote better health are ineffective. Televised public service messages to decrease driving under the influence of alcohol or drug abuse are frequently targeted at adolescents. Those messages frequently employ fear appeals, but fear appeals are unlikely to influence the young people to whom they are aimed.

D. Stewart and I. Martin Intended and Unintended Consequences of Warnings Messages: A Review and Synthesis of Empirical Research Journal of Public Policy and Marketing 1994 13: 1-19

A more recent study by Snyder and Blood (1991) found that among young adult consumers of alcoholic beverages, warnings on alcoholic beverages had a 'boomerang effect.' Young drinkers in the study who were exposed to warnings rated the benefits of drinking more favorably and expressed higher drinking intentions than did comparable respondents who were not exposed to warnings. A similar boomerang effect was found in an earlier study of high school students exposed to anti-drug public service announcements… Warnings that produce psychological reactance, serve as signals for risk-taking opportunities, or make a product more attractive may produce behavior that is exactly the opposite of that intended by the placement of the warning, at least among certain groups of individuals.

Despite well-known information about potential dangers, consumers continue to use products and engage in behaviours that are unsafe, at least at some level. The argument that 'if people just knew better, they would change their behaviour' is not supported by common experience. Neither is it supported by empirical studies… It also may be the case that consumers understand and accept the content of the warning, but choose not to act on it after evaluating the costs and benefits of complying or not complying.

A consumer may decide that the risks associated with smoking are not sufficient to give up whatever benefits they believe they derive from this activity. Likewise, a consumer may deliberately take a greater dosage of an analgesic than is recommended because he or she desires

the benefit of a stronger dose. It may also be the case that

the costs of inconvenience of compliance is perceived to be greater than the risk posed by the product. For example, a consumer might find it inconvenient to wear protective glasses when using a power tool for a very brief period. Finally, a consumer might decide that the immediate benefits of consumption of a given product are sufficiently desirable that a low probability of harm that may occur at some point in the distant future is discounted. Thus, he or she may continue to drink heavily because he or she enjoys the immediate relief from tension provided by alcohol and considers the risk of health impairment to be small.

R. Adler and R. Pittle Cajolery or Command: Are Education Campaigns an Adequate Substitute for Regulation Yale Journal on Regulation 1984 1: 159-193

A central difficulty social marketers encounter is the tenuous relationship between increased knowledge and changes in attitude. A consumer's ability to recall the specifics of an information campaign does not necessarily mean that the consumer agrees with the object of the campaign. Studies have shown, for example, that many smokers exposed to information about cigarette-related health problems fail to change their attitudes toward smoking. Indeed, audience attitudes may actually harden against the information conveyed in public interest messages.

G. Hastings and L. MacFadyen The limitations of fear messages Tobacco Control 2002 11: 73-75

Fear messages assume a direct, stimulus response, effect by the media; the individual hears, understands, accepts, and then acts on the messages… However, they have been severely criticized. They ignore the fact that mass media messages are mediated in various ways by significant others. The passivity they assume on the part of the audience is contradicted by uses and gratifications theory, and multi-step communication models… English health promoters have been all too aware of this since the mid-1980's, when teenagers were found to be stealing supposedly off-putting 'Heroin screws you up' posters and hanging them on their bedroom walls.

Linear sequential paradigms also assume that audiences
are completely rational. Faced with the public health facts

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they will do the sensible thing. The reality is much more complex and inconvenient.

The fact is, in the developed world, at least, people know about the health risks of tobacco and around two thirds want to quit…

This contrariness, this irrationality should not come as a surprise. We all do lots of apparently senseless things—we support hopelessly unsuccessful football teams, enjoy the Scottish climate, and marry unsuitable partners. We do these things, despite the contraindications, because some element of each also brings emotional benefits…

Fear messages do not sit easily with this thinking. If they have any relational dimension at all, it is as the hectoring parent to the erring child, rather than the adult to adult of commercial marketing…

The first step in tobacco control is to inform people of the dangers of smoking. But repeating this to a population that knows it, two thirds of whom already want to quit, is of questionable value. To return to our initial example, there comes a point where the theatre-goer shouting 'fire' is reduced to the irritation of a malfunctioning alarm. Furthermore, searching for evermore powerful warnings is fruitless. There is no ultimate deterrent in smoking, no mother of all health warnings that will finally alert smokers to the error of their ways.

T. Robinson and J. Killen Do Cigarette Warnings Labels Reduce Smoking Paradoxical Effects Among Adolescents Archives of Pediatric and Adolescent Medicine 1997 151: 267-272

To assess the effects of warning labels on actual smoking behavior, we measured knowledge of warning labels and then monitored changes in smoking behavior during the subsequent 3 months. If the warnings were effective, we expected to see a reduction in smoking associated with greater knowledge of warning labels. However, we found a paradoxical, significant increase in smoking from baseline to follow-up among those teenagers with greater knowledge of the warning labels on cigarette packages…

How can we account for this paradoxical effect?…
[W]arning labels are intended to reduce smoking behavior
by frightening people with the health hazards of smoking.
However, adolescents are generally not influenced by
interventions that focus only on more distal, health-
related outcomes… In fact, there is evidence that high
fear messages may actually inhibit reductions in smoking
by decreasing a person's perceived ability to quit…

Our findings suggest that warning labels are, at best,
ineffective for this target audience…However, the
observed association between warning label knowledge
and subsequent increases in smoking may suggest that
even if attention and recall can be improved, cigarette
warning labels may do more harm than good.

**D. Ringold Boomerang Effects in Response to Public
Health Interventions: Some Unintended Consequences
in the Alcoholic Beverage Market Journal of Consumer
Policy 2002 25: 27-63**

The research reviewed here suggests the possible
adverse effects of education campaigns and warning
initiatives, especially when mandated by law. Research
has often revealed unintended consequences in the form
of oppositional responses… For example, research on
the effects of warnings in advertisements has revealed
unmistakable symptoms of psychological reactance.

**M. Lee and M. Ferguson Effects of Anti-Tobacco
Advertisements Based on Risk-taking Tendencies:
Realistic Fear vs. Vulgar Humor Journalism and Mass
Communication Quarterly 2002 79: 945-963**

Rebellious personality types take risks for the sake
of opposing perceived social norms. They enjoy being
labeled a 'rebel.' Those who are smokers and ex-smokers
tend to score high in this area. This personality type
also tends to take risks not for perceived benefits, but
rather for notoriety among others for being rebellious
or daring. Rebellious adolescents also tend to respond
to the sensational aspects of a message rather than its
perceived risks. Therefore, individuals in this category
would likely exhibit stronger resistance to persuasive
messages, particularly those perceived as being designed
to induce fear,

A plausible explanation as to why fear appeals targeting adolescents might be less effective is adolescents' selective attention and information processing of persuasive messages, resulting in defensive responses.

High levels of arousal in the realistic fear ads might also interest impulsive risk takers. However, impulsive risk takers dislike thinking and therefore are unlikely to process the content of the messages. Therefore, neither changes in the perception of the dangers of smoking nor their beliefs about smoking and smokers are anticipated.

Even though the high-rebellious participants reported more interest in the ads, the higher in rebelliousness they scored, the less likely they were to quit smoking after viewing the realistic fear ads.

The traditional method of inducing fear by seriously portraying the consequences of smoking might not be as effective for targeting highly rebellious risk takers.

C. Jansen et al. 2006 The Scarier, The Better? Effects of adding images to verbal warnings on cigarette packages in S. Carliner et al. Eds Information and Document Design: Varieties on Recent Research John Benjamins Publishing Amsterdam

Compared to non-smokers, the smokers rated the threatening dangers as less serious, considered themselves more susceptible to them, were less frightened in the case of the explicit warnings, were less inclined to let their smoking behavior be influenced in the desired direction, and were less disposed to make a conscious effort to shield themselves from the anti-smoking warnings on the cigarette packages.

For the smokers, there appeared to be no significant effects of adding visual to verbal warnings on cigarette packages, as intended by the EU.

To put this in a nutshell: confronting smokers with the new warnings does not increase their willingness to cut down smoking, but they do expect they will more actively shield themselves form the warnings, for instance, by slipping the packages into pack covers more often.

N. de Hoog et al. 2005 The Impact of Fear Appeals on Processing and Acceptance of Action Recommendations Personality and Social Psychology Bulletin 31: 24-33

When fear was added to the model, regressing intention from vulnerability, the effect of fear on intention appeared nonsignificant…and, therefore, fear did not operate as a mediator.

Whereas the emphasis of health education campaigns has frequently been on depicting the severity of health consequences, as well as on stressing the response efficacy of the recommended action, we have found that although these factors affected attitudes, they failed to have much of an impact on intention and behavior.

N. de Hoog 2005 Fear Arousing Communications and Persuasion: The impact of vulnerability on processing and accepting fear appeals Optima Grafische Communicatie, Utrecht

The plan in the Netherlands in 2006 is to put explicit 'scary' pictures of individuals suffering from the consequences of smoking on cigarette packs. These pictures will show individuals with bad tooth decay or extensive tumors. However, I propose that this is unlikely to make smokers quit in any substantial way. Mostly, because the experiments in this thesis have shown that only stressing the negative consequences of a certain behavior is not enough to make individuals change their intentions and behavior. Moreover, the meta-analysis in this thesis has shown that the use of 'scary' images I not more effective than only stressing the negative consequences of a certain behavior. Therefore, if the warnings are having a limited effect on smoking cessation now, adding scary pictures will not make much of a difference.

The emphasis of health education campaigns has frequently been on the severity of negative health consequences by presenting vivid, scary materials, as well as on stressing the response efficacy of the recommended action. However, this thesis shows that, although these factors affect attitudes, they fail to have much of an impact on intention and behavior. Furthermore, vivid, scary images are in no way more effective than only presenting negative consequences in a sober way.

About the Author

John Luik was educated on a Rhodes Scholarship at the University of Oxford, where he earned the BA, MA, and DPhil degrees. He has taught philosophy and management studies at a number of universities, served as Senior Associate of the Niagara Institute with responsibility for its work in public policy and leadership, and worked as a management and public policy consultant for governments, professional organizations, and corporations in North America, Europe, Asia, Africa, the Middle East and Latin America.

His professional interests include public policy, particularly the use of science in policy and the question of government intervention to change risky behaviours, the ethics of advertising and business, and philosophy. He is the author of numerous articles and eight books on a variety of public policy issues. He has written extensively on tobacco policy, including Plain Packaging and the Marketing of Cigarettes, Passive Smoke: The EPA's Betrayal of Science and Policy, and 'I Can't Help Myself': Addiction as Ideology.

Currently, he is a senior fellow at the Democracy Institute and also provides public policy analysis and counsel.