

**GRAPHIC HEALTH WARNINGS ON AUSTRALIAN
CIGARETTE PACKETS:
EVALUATION OF A SOCIAL MARKETING INTERVENTION**

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Thesis Abstract

Tobacco-related illness remains the single greatest preventable burden of morbidity and mortality in Australia. Reducing tobacco use is a major public health imperative. This thesis investigates the impact of a public policy intervention designed to inform smokers of the harms associated with smoking and to reduce tobacco use; namely graphic consumer warnings labels on cigarette packets, introduced in Australia in March 2006. The specific aim of this thesis is to examine the impact of these warnings.

Social psychology provided a theoretical framework, with models predicting that behaviour can be influenced by new information. This thesis poses questions focussed on the relationship between such information, smokers' beliefs and attitudes, their behavioural intentions and their actual behaviour.

The first question examined is practical: *What occurred during the introduction and implementation of graphic consumer warnings labels on Australian cigarette packets?* This was asked with a view to (i) offering lessons for interested policy-makers in other countries; and (ii) documenting the intervention under study. The second question is: *Did the warnings attract the attention of smokers and communicate information about smoking to change smokers' beliefs?* Thirdly: *Were there attitude changes or other changes predictive of quitting?* and fourthly *Did behaviour change occur?*

Firstly, studies monitored press coverage about the new warnings and the pace of the roll-out into shops. Results (presented in Chapter 2) document tobacco industry lobbying and its apparent influence in delaying the introduction of the warnings in Australia. The nature of the Australian legislation created further opportunities for delay.

The second question is addressed in Chapters 2 and 3. Chapter 2 reports on a smoker intercept study; conducted once new warnings were prevalent. Chapter 3 presents smokers' awareness of new warnings and their beliefs about a range of smoking-related health effects, from a series of cross-sectional population surveys spanning 4 years.

Chapters 4 and 5 look in detail at the third and fourth research questions i.e. the impact of on smokers' attitudes, intentions to quit and quitting behaviour. Chapter 4 presents the short-term marker of success - calls to the Quitline. Chapter 5 applies Fishbein & Ajzen's[1] Reasoned Action Approach with a cohort of smokers; using the model to

investigate the influence of graphic warnings on smokers' quitting behaviour and its precursors.

Taken as a whole, this thesis provides a case study of the roll-out of Australian graphic cigarette packet warning labels and evidence of their impact on smokers. Australia was the 8th country to introduce such warnings. A further 31 countries have since adopted them with many more planning to. Very little is published about the process of implementation and this information from the Australian roll-out offers insight for other policy-makers. This thesis also contributes very strong evidence that Australia's graphic warnings labels were successful in attracting smokers' attention and in communicating information that influenced their beliefs about the consequences of smoking. There is also good evidence of translation into interest in quitting and some evidence of quitting behaviour, the ultimate aim of the public policy intervention.

Thesis Declaration

This work contains no material which has been accepted for the award of any other degree or diploma in any university or other tertiary institution to Caroline Louise Miller and, to the best of my knowledge and belief, contains no material previously published or written by another person, except where due reference has been made in the text.

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Caroline Louise Miller

Signed: _____

Date: 10 July 2011

Publications contributing to this thesis:

1. Miller CL, Hill DJ, Quester PG, Hiller JE. Response of mass media, tobacco industry and smokers to the introduction of graphic cigarette pack warnings in Australia. **European Journal of Public Health** 2009, **19(6)**:644-649.
[see Chapter 2 & Appendix 2]
2. Miller CL, Quester PG, Hill DJ, Hiller JE. Smokers' recall of Australian graphic cigarette packet warnings & awareness of associated health effects, 2005-2008 **BMC Public Health**, 2011. **11**:238.
[see Chapter 3 & Appendix 3]
**Note: Rated "Highly accessed" by journal
3. Miller CL, Hill DJ, Quester PG, Hiller JE. Impact on the Australian Quitline of new graphic cigarette pack warnings including the Quitline number. **Tobacco Control** 2009, **18(3)**:235-237.
[see Chapter 4 & Appendix 4]
4. Miller CL, Hill DJ, Quester PG, Hiller JE. The impact of Australia's new graphic cigarette packet warnings on smokers' beliefs and attitudes. **Australasian Marketing Journal** 2011,**19**:181-188.
[see Chapter 5 & Appendix 5]

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1. Miller, C., Hill, D., Quester, P., and Hiller, J. (2010) Australia's graphic cigarette packet warnings - implementation and impact, **Behavioural Research in Cancer Control**, Freemantle, Perth, Australia.
2. Miller, C., Hill, D., Hiller, J., & Quester, P. (2010) Australia's Graphic Cigarette Pack Warning: Implementation and Impact. **2008 World cancer congress**. Shenzhen, China.
3. Miller, C., Quester, P., Hiller, J., & Hill, D. (2009). Australia's Graphic Cigarette Pack Warnings. **2009 State Population Health Conference**. Adelaide, Australia.
**Note: Awarded best paper
4. Miller, C., Hill, D., Hiller, J., Quester, P., Hickling, J., & Byrnes, M. (2008). Graphic Cigarette Pack Warning: Impact on the Australian Quitline. **2008 World cancer congress**. Geneva, Switzerland.
5. Miller, C., Hill, D., Hiller, J., Quester, P., & Hickling, J. (2007). Impact on the Quitline of Australia's New Graphic Cigarette Pack Warnings. **2007 Oceania Tobacco Control Conference**. Auckland, New Zealand.
6. Miller, C., Hiller, J., Hill, D., & Quester, P. (2007). Impact on the Quitline of Australia's New Graphic Cigarette Pack Warnings. **2007 State Population Health Conference**. Adelaide, Australia.

Coverage of findings from this thesis in media

SMOKING More seek help, in *The (Adelaide) Advertiser*, 04 Feb 2009, p2.

Statement of contributions to publications

This work contains four papers for publication in peer-reviewed journals, three of which have been published and one of which is in press.

All four papers are authored by Caroline Louise Miller (CLM) and her 3 supervisors. In each instance, CLM is the first author.

In each instance, all authors participated in the conceptual development of the work reported in these manuscripts and the broad study designs. CLM was responsible for the detailed study designs and for implementation of the research projects, including the data collection. CLM performed the statistical and other analyses and interpreted the results. CLM drafted the manuscripts which were then edited by the co-authors and supervisors. CLM acted as corresponding author, dealing with revisions and responses to reviewers' comments, with contributions from and final approval of all co-authors and supervisors.

I certify that the statement of contribution is accurate.

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Chapter 1: Introduction and Literature Review

Background

Tobacco and Health

“That so many diseases - major and minor - should be related to smoking is one of the most astonishing findings of medical research in this century; less astonishing perhaps than the fact that so many people have ignored it.”

Sir Richard Doll, 1999[2]

In Australia, there is a considerable burden of morbidity and mortality, and associated health and social costs, from non-communicable diseases including cancer and heart disease.[3, 4] The determinants of health outcomes are complex and diverse, but much of the morbidity and mortality burden associated with such diseases is preventable. Estimates vary, but it is believed that at least half of cancer incidence is preventable by applying the knowledge that we already have, as is much of the incidence of other diseases. For both cancer prevention and heart disease, significant modifiable risk factors include: physical activity; nutrition; alcohol consumption; body weight and most notably, use of and exposure to tobacco smoke.[5] Exposure to risk factors is influenced by individual behaviour; living and working conditions; and social and cultural factors.

Every year, 15000 Australians die prematurely from a wide range of tobacco-related illnesses,[6] making tobacco the single biggest preventable cause of premature morbidity and mortality. Tobacco causes 10 times the number of deaths as occur from accidents on Australia’s roads[7] and 15 times the number of deaths that are attributed to illicit drugs.[8] That smoking causes lung cancer and heart disease is widely known, but that smoking also causes cancer of the mouth and oropharynx, stomach, liver, pancreas, cervix, bladder, and acute myeloid leukemia [9] is less well understood.

Recent estimates show that 19% of the Australian adult population smokes daily.[10] Smoking rates vary across the community by a number of demographic factors including age, gender, education, and socio-economic status. The vast majority of smokers have tried to quit, and many have found it very difficult.[11] Because of the health consequences, tobacco use results in considerable costs to smokers and their families, businesses and the community as a whole.[12]

Tobacco is a unique consumer product

Tobacco is a unique consumer product: It is the only one which, when used as intended by the manufacturer, kills its long term users – probably half of them.[13]

The harm tobacco causes to the people who buy and consume it, makes it unlike any other product on the market. This also justifies intervention and regulation of the product, to help consumers understand better the risks associated with consumption.

Opposition to regulation of tobacco is often accompanied by the argument that smoking is as a “rational” choice to use “legal product” by adults who understand the risks.[14] This framing de-emphasises the unique nature of tobacco among other consumer products, and has several major flaws.

Firstly, there is the question of “rational” choice. Economic theory presumes that people’s behaviour can be understood as the rational pursuit of self-interest.[15] The concept of rational choice refers to people choosing the best course of action, for their preferences, at a given time, having weighed up the information that they have when the choice is made. Implicit in the argument of rational choice is perfect information. When perfect information is compromised, so too is rational choice. As it is applied to tobacco consumption, this argument presumes that people genuinely understand and weigh up the costs (health, economic, social) versus the benefits (physiological pleasure, social) of smoking and choose to continue to start to smoke and continue to smoke. While it is true that virtually all smokers are able to affirm that smoking is harmful to health, far fewer accurately estimate the risk of disease or disability, or understand the breadth of illnesses tobacco causes or the chances of consequences in middle age.[11, 16, 17] Furthermore, there is evidence in tobacco company documents that tobacco companies have known for a long time about the effects of tobacco and have failed to disclose or denied this information to consumers.[18] Historically, health warnings on tobacco products have not provided full information about the harmfulness of this unique product.[19]

Secondly, tobacco smoking delivers nicotine, which is addictive.[20] Addiction thus impairs consumers’ ability to make a rational choice about a product. Thirdly, the majority of smoking experimentation and initiation occurs among adolescents; well below the age of adulthood. By the time many new smokers reach adulthood they have already become addicted. Therefore, a decision to initiate smoking is rarely taken by an adult, and rational

choice is frequently impeded by inadequate information and, in any case, addiction undermines an individual's 'freedom' to choose.

Another reason for regulating tobacco products is that they generate negative externalities, which are the "costs or benefits arising from an economic transaction that falls on a third party and that is not taken into account...in the transaction".[15] In the case of tobacco, the private costs or the costs to the individual might be the expense of purchasing tobacco, the illness that may be incurred, medical expenses and lost earnings. This may not represent the total costs from that individual's tobacco use; there are also costs borne by others external to the tobacco user. Passive smoking is one example. A person who does not smoke but who works or spends recreation times in a smoky environment, which is smoky and suffers health or economic consequences is bearing costs. Another example is the broader, burden to children who lose a parent to tobacco.[21] These costs to society beyond the individual are negative externalities and they constitute another form of market failure. Market failure in the case of tobacco justifies government regulation of tobacco.

Tobacco is a consumer product that has been marketed heavily and with sophistication, hence glamorizing and normalising tobacco use. History demonstrates that extensive tobacco marketing continued, despite bans on tobacco advertising in the broadcast media of television, radio and print. [22] A plethora of internal tobacco industry documents reveal public relations and market segmentation strategies to deny scientific findings about the health consequences of tobacco use, and tobacco smoke exposure, to resist regulation of tobacco and to promote and sell tobacco to different sub-groups in western societies, as well as to pursue global expansion strategies.[23, 24]

Tobacco is a consumer product that that does not fit a traditional model of an efficient market for a consumer good. When markets fail to achieve (specify what), there is clearer justification for government or policy intervention. Such intervention may take many forms – one of which is mandatory information on labels to warn consumers of the harms associated with the product. Consumer warnings labels and their effects, in particular graphic health warnings on cigarette packets, are the subject of this thesis.

About tobacco control

Much of the progress that has been made in reducing tobacco use in recent decades has been through comprehensive tobacco control strategies. *Tobacco control* is the term used

to describe a range of regulatory and program measures, which work together to reduce the harm caused by tobacco. Examples of effective program measures include mass-media campaigns (which make plain the effects of tobacco use and motivate people to quit) and services for smokers such as telephone help lines or ‘Quitlines’.

Tobacco control also includes a range of regulatory measures aimed to control supply of, reduce the promotion of, and reduce demand for tobacco products. Examples include: regulation of where and to whom tobacco products can be sold, tight controls over the promotion of tobacco, and heavy taxation of tobacco products to reduce demand.

The WHO Framework Convention on Tobacco Control (FCTC)

The “devastating health, social, environmental and economic consequences of tobacco consumption and exposure to tobacco smoke are a truly global problem”.

World Health Organization, 2003[25]

The global burden on health from tobacco is enormous. In 2004, the World Health Organization (WHO) projected that “between 2000 and 2025 the number of smokers will rise from approximately 1.2 billion to more than 1.7 billion and the annual number of deaths, which is currently estimated at about 5 million, will almost double in 20 years”.[26] An international treaty was developed under the auspices of the World Health Organization to provide a global framework for tobacco control measures – the WHO Framework Convention on Tobacco Control (FCTC). Australia became a full Party to the treaty at its inception, in February 2005. As of January 2011, the FCTC had 179 parties.[27]

Under international law, each of the Parties to the treaty, has minimum regulatory obligations and is also encouraged to undertake a range of other listed measures, in the interests of public health. These regulatory obligations include: taxation of tobacco products; tobacco advertising, promotion and sponsorship restrictions; protection from exposure to tobacco smoke; product content disclosure; and product labelling – discussed in greater detail below. Other non-regulatory obligations include: public education and awareness-raising; as well as efforts towards reducing tobacco dependence and increasing cessation.

As Australia has been one of the countries at the forefront of advances in tobacco control, many of the obligations of the FCTC were already in place in Australia at the time of its declaration.

Restrictions on tobacco marketing

"Australia is one of the darkest markets in the world... it probably is the darkest, I mean ourselves and Canada fight every month for who's got the darkest conditions to do tobacco manufacturing and marketing. And one of the things we can offer the world is what we do best, which is how to work, maximize, proactively drive our market position in a market that's completely dark.

David Crowe, Marketing Director, British American Tobacco (BAT) Australia, 2001[28]

Tobacco advertising has been prohibited from mainstream mass media such as television, on radio and at the cinema for several decades. In 1992, the Federal Government also prohibited tobacco advertising in print media and on billboards along with tobacco sponsorship, exempting the Formula 1 Grand Prix until 2006.[29] However, tobacco advertising was still permitted at the point of sale. These restrictions on advertising led to a rise in the importance of what is known as “below the line” marketing; and studies of tobacco industry documents have revealed that point of sale became particularly important.[30] Prior to the 1992 legislative change, when print- and sponsorship-related advertising were still permitted, conventional paid advertising was the primary vehicle for building brand image, and below-the-line strategies “*provid[ed] important support for these established images*”.[30] In 1992, a Philip Morris Limited presentation argued: “*new government restrictions are rapidly increasing the importance of retail marketing as a part of the overall marketing mix. With this comes aggressive competition for in-store space and importantly, cut through to the consumer...*”, the “*net result*” of which was that “*we must now extend below the line programs to encompass the image building role... retail marketing is therefore no longer the support mechanism, [but] the primary communication vehicle*”.[31]

More recently, states and territories have legislated to prohibit advertising at point of sale, with some jurisdictions placing restrictions on display of the tobacco products themselves. (In South Australia, advertising proliferated at point-of-sale until it was prohibited by state regulations in March 2005.[32] In November 2007, the South Australian government

restricted the size of tobacco displays at point-of-sale, and has since announced its intention to eliminate display of tobacco at point-of-sale altogether.[33]

As opportunities for conventional paid advertising and sponsorship were eliminated in Australia and elsewhere, the cigarette packet itself became an increasingly important component of marketing strategy. Internal tobacco industry documents have shown that tobacco companies view cigarette packaging as a vehicle for creating significant in-store presence at the point of sale, and communicating brand image.[34] Documents also reveal the careful balancing act that companies have employed in using pack design and colour to communicate impressions about different products and to ensure that cigarette packaging appeals to selected target groups, including young adults and women.[34]

This communication medium would change when in September 2003, the Australian Government announced its intention to introduce as consumer health warnings on cigarette packets which included graphic imagery;[35] and subsequently introduced them in March 2006.[36]

Health Warnings on Cigarette Packets in Australia

Government health warnings on cigarette packets are one form of tobacco control regulation. Like other consumer warning labels, warnings on tobacco packets are designed to increase consumers' understanding of the harms associated with the product. Mandating such warnings on every package ensures that smokers can see the warnings when they handle the packet. It has been estimated that a 20-a-day smoker would be exposed to cigarette packet warnings 7000 times a year.[10]

The tobacco industry has had a long history of failing to warn consumers and even actively denying the harmful effects of its products. Health warnings on cigarette packets have faced a long history of opposition from the tobacco industry.[19, 37]

The first warnings appeared on Australian tobacco products in 1973. From 1973-1987, the warning consisted of "Warning. Smoking is a health hazard" in small font at the bottom of the packet. A new generation of warnings was introduced in 1987. From 1987-1994 the warnings were: "Smoking causes lung cancer"; "Smoking damages your lungs"; "Smoking causes heart disease"; and "Smoking reduces your fitness". Again the warnings appeared in small font on the bottom of the packet. In 1995, Australia was among the first countries to

introduce prominent warnings in black text on a white background, within a black border on the top cigarette packets. “Smoking damages your lungs” was discontinued and “Smoking Kills”, “Smoking is Addictive”, “Smoking when pregnant harms your baby” and “Your smoking can harm others” were included for the first time. These warnings took up around 25% of the front of the packet; the rest remained available to the tobacco companies.

Australia’s 2006 graphic cigarette packet warnings – the intervention

In March 2006, Australian legislation came into force requiring consumer health warnings on cigarette packets, containing graphic imagery and a prominent Quitline telephone number. At the time, Australia was among only a handful of nations to have taken such a measure. Others were: Canada, Brazil; Singapore; Thailand; Venezuela; Jordan and Uruguay. Like the warnings that preceded them, the graphic warnings are mandated under federal trade practices legislation.[38, 39]

The legislation required that tobacco products sold in Australia, from 1 March 2006, display the new health warnings. The new health warning measures included the following provisions:[36]

- A new set of 14 health warnings comprising graphic images and explanatory messages which cover 30% of the front and 90% of the back of the pack, with graphics appearing on both the front and back of cigarette packets;
- Inclusion of the national Quitline number and website address on the back of packs to provide a contact for smokers for assistance with quitting;
- A new rotation system for health warnings in order to optimise consumer learning and awareness of the health effects of smoking. This involves the rotation of each set of 7 warnings alternatively, every 12 months. Warnings are also rotated within brands over each 12 month period;
- Removal of the requirement for manufacturers to list average levels of tar, nicotine and carbon monoxide yields on the side of pack (considered in the light of experience to have been unhelpful to consumers). Instead a qualitative information message on the health effects of chemicals in tobacco smoke is required on the side of the pack. This change is to highlight that there is no safe cigarette;

- An 18 month phase-in period from date of gazettal, during which time both the current or the new requirements would operate, thereafter only new health warnings could be displayed on product packaging; and
- A set of cigar-specific health warnings to be displayed on cigar packaging to increase the awareness of consumers of the health risks of smoking cigars.

The warnings can be viewed in Appendix 1, or online.[40]

The stated intention of the Australian Government in introducing the warnings was as follows:

The graphic health warnings provide a strong and confronting message to smokers about the harmful health consequences of tobacco products and convey the 'quit' message every time a person reaches for a cigarette. The graphic images, in combination with the health warnings and explanatory messages, are intended to increase consumer knowledge of health effects relating to smoking, to encourage cessation and to discourage uptake or relapse.[36]

Unlike other consumable products (i.e. food) there is no mandatory disclosure of ingredients in tobacco products. Instead, the Department of Health and Ageing negotiated a *Voluntary Agreement for the Disclosure of the Ingredients of Cigarettes* with the three tobacco companies, Philip Morris Limited, British American Tobacco Australia Limited and Imperial Australia Limited.[41] Under the Agreement the companies provide annual reports to the Government regarding the ingredients of cigarettes which are posted unmodified on the Departmental website.

The Australian Government produced a mass-media campaign to introduce the new cigarette packet warnings to Australian consumers. The Australian Government's *awareness raising campaign* screened in February 2006, and is available for viewing online.[42] In addition, a collaboration of Australian state and territory based non-government health agencies (including Quit, Cancer Council and the Heart Foundation) developed a cessation-oriented social marketing campaign to reinforce the pack warnings and promote quitting. The *Quit campaign* was started in May 2006, and is available for viewing online.[43, 44]

The new graphic cigarette packet warnings, and the accompanying campaigns, formed a significant and unprecedented tobacco control intervention in Australia. The look of tobacco packets changed markedly, as 30% of the front of the packet and 90% of the back

of the packet was taken up with prominent, full colour warnings, reducing further the discretionary space for tobacco companies' design elements.

The warnings as a policy intervention were designed to increase Australian smokers awareness of the harmful effects of smoking; to influence their perception of the risks associated with their own smoking behaviour and to decrease their comfort or satisfaction with their own smoking behaviour; to prompt thoughts of quitting and ultimately to reduce smoking behaviour. Evaluating the impact of this intervention is the broad topic of investigation for this thesis. The details of the aims and research questions are expanded upon at the end of this chapter.

The next section of this chapter outlines the theoretical and empirical work that forms the frame of reference or context for this thesis, which evaluates the impact of Australia's new graphic cigarette packet warnings. Relevant literature summarised relates to changing health behaviours, such as smoking, through information provision. Also provided is an up-to-date summary of the international literature covering the impact of graphic cigarette warnings. A further 30 countries have introduced graphic cigarette packet warnings in the time since March 2006, when the Australian law took effect and 2011. The number of papers evaluating the impact of graphic cigarette packet warnings is modest, although growing.

Understanding and influencing behaviour

Introduction to social marketing

In order to achieve public health gains of better health outcomes at a population level, such as reducing harm from tobacco, interventions need to succeed at achieving changes in behaviours among individuals, which aggregate into the population-level effects. How best to motivate, facilitate and sustain behaviour change is a primary concern for many disciplines including psychology, marketing (specifically social marketing and consumer behaviour) and the applied fields of public health and health promotion. The way in which each of these disciplines can contribute in this thesis to knowledge about the impact of graphic cigarette packet warnings and accompanying mass-media campaign, is discussed briefly below.

Psychology is the scientific study of human behaviour. It examines: behaviour itself, learning processes, cognitive processes of attention, information processing and problem solving which underpin human functioning in order to understand and predict behaviour. While not pertinent to the current thesis, it can also be the study of human emotions, personalities and human interactions.[45] A field within psychology relevant to the current thesis is social psychology, which is defined as “the thought, feeling, and behaviour of individuals” as shaped by “the actual, imagined or implied presence of others”. [46](p.3) Social psychology examines perceptions, attitudes structures, attitude change, motivation, persuasion, social norms and conformity; all of which have significant influence on behaviour. Efforts to predict and then influence health behaviours have gained much from the science of psychology.

Marketing is traditionally a commercial discipline and practice. In general terms, marketing is defined as identifying (and/or creating) consumer needs and meeting those needs, through consumer exchange of money for goods and services. A highly sophisticated understanding of how to advertise and sell products has evolved. The practice of marketing has relevance to tobacco control, as tobacco is a consumer product, which has been and still is the focus of heavy marketing by industry and counter-marketing by health professionals. This thesis looks at the consumer product of tobacco, and its package and the impact of changes to the package, on consumers’ appraisal of the product; its purchase and use.

Social marketing is a relatively new field of study and practice that is also concerned with advertising and persuading people (or consumers) to change their behaviour. Broadly speaking, social marketing applies the principles and techniques of commercial marketing to achieve socially constructive outcomes. Social marketing also employs the principles of communication and persuasion theory and models of attitude and behaviour change, which have originated from the discipline of social psychology.[47] Andreasen defined it as follows: “*Social marketing is the adaptation of commercial marketing technologies to programs designed to influence the voluntary behaviour of target audiences to improve their personal welfare and that of the society of which they are a part.*”[48] The success or otherwise of commercial marketing is judged against its “bottom line” of increasing sales; for social marketing the “bottom line”, against which it can be judged is influencing behaviour [48] or social change for the well-being of the community.[49]

One of the fundamental aspects of (social) marketing, shared with social psychology, is recognition of the influence of the social and physical environment on individual behaviour. Comprehensive social marketing campaigns might involve communication of a message to individuals to try to persuade them to change a voluntary behaviour, or they might also be designed to persuade legislators to mandate changes that influence the physical environment, or influence public opinion thereby changing the social environment. Information provision to change beliefs and attitudes, and structural changes which influence environments are often integral to social marketing interventions, but such changes are a means to an end, not the end itself, since behaviour change is the goal.

Three core strategies of social marketing which aim to bring about behaviour change are (i) to educate; (ii) to motivate; and (iii) to advocate.[49] Education provides information and understanding about behaviour or assists in the development of skills to change the behaviour. Motivation goes beyond dispassionate presentation of information and involves presentation of information together with explicit or implied arguments so as to persuade the target audience to accept the communicator's ("source's") recommendations.[49] For example, rather than presenting a statistic about a health outcome of a behaviour, a health effect may be dramatised in an attempt to change the target audience's perceptions of the severity or likelihood of experience of that health outcome as a result of continuing the behaviour in question. Advocacy is aimed at bringing about structural change through policy innovation to vary social, physical and policy environments to prompt or facilitate the desired behaviour change.

Tobacco control has a well-established track record of applying the theory of social psychology, to develop social marketing interventions, to bring about behaviour change in populations. For three decades, quit campaigns discouraging smoking have been used to change beliefs and attitudes, to influence intentions to quit and to influence actual smoking behaviour. Governments have legislated to restrict where people can smoke and to restrict the marketing and promotion of tobacco products. The inclusion of graphic warnings on cigarette packet themselves and the television campaigns that accompanied their introduction provide another example of a social marketing intervention designed to influence behaviour.

Theoretical models of behaviour change applicable in social marketing

Key predictors of behaviour

The fields of social psychology and marketing understand behaviour both as the function of, and predicted by, a number of independent variables. These disciplines study the mechanisms by which these independent variables operate to influence behaviours. As well as investigating what influences behaviour, the disciplines also postulate how changes to behaviour are brought about directly and/or via the predictors of behaviour.

The underpinnings of behaviour or key predictors, and how to influence those predictors, are integral to this thesis. Implicit and explicit in the design of the policy intervention under investigation – graphic health warnings on cigarette packets – was the intention to influence behaviour by influencing its pre-cursors such as knowledge, beliefs and attitudes. The theoretical constructs and empirical studies from social psychology, and their practical application in social marketing, are examined for insights into ways in which the components of the intervention would be likely to influence behaviour. In evaluating the intervention, the current thesis will examine whether change in behaviour has taken place – the key outcome of interest being the use of tobacco products. The thesis will also focus more closely on the extent to which the intervention has brought about changes in the independent variables that social psychological (and marketing) literature predicts should lead to behaviour change.

The remainder of this section summarises the key variables that social psychology theory predicts are relevant to bringing about behaviour change, with an emphasis on social cognitive (or information processing) theories which have relevance for the current context of new graphic health warnings on cigarette packet.

Beliefs and attitudes

The proposition that behaviour is influenced by attitudes and beliefs, and that changing attitudes and beliefs is one mechanism to change behaviour, is fundamental in the discipline of social psychology and the practice of social marketing. The relationship between beliefs, attitudes and behaviour is complex and has been extensively investigated.

The field of attitude definition and measurement has an entire literature of its own. Although attitude is variously defined in social psychology literature, a fundamental working definition of an attitude is as a positive or negative evaluation. Within the context

of this thesis, those evaluations (or attitudes) are about the behaviour of smoking and its various consequences.

What people think, or believe, and how they process information - i.e. cognition - has a central role in theories of attitude formation and change. Social cognition research focussed on how people make sense of messages, other people and themselves, has produced several highly influential theories of attitude change, with relevance for this thesis.

Consistency theories posit relationships between cognitive processes and attitudes, with implications for behaviour. Festinger's cognitive dissonance theory [50] focuses on the inconsistency among cognitions, but also between cognitions and behaviour. Inconsistency is viewed as causing a state of dissonance. There is a (psychological) discomfort caused by this dissonance which generates a drive to reduce that discomfort. Smoking provides a relevant example. Most smokers report believing that smoking can kill, and yet most people, including smokers, report wanting to live a long and healthy life. The behaviour of smoking is inconsistent with the cognition of wanting to live a long and healthy life, again creating cognitive dissonance. Similarly, smokers may have several different smoking-related cognitions, some consonant with the behaviour (e.g. I enjoy smoking) and some dissonant with the behaviour (e.g. smoking causes cancer; smoking makes me smell). Theory predicts that if dissonant cognitions outweigh the consonant ones, then the smoker would experience cognitive dissonance. Cognitive dissonance can be reduced cognitively or behaviourally. Cognitive consistency can be increased, by decreasing the importance of the dissonant cognitions e.g. downplaying the risks, or by increasing the importance of consonant cognitions so that an overall positive attitude towards smoking behaviour can be retained. Another, less easy option for reducing cognitive dissonance is to change the behaviour by quitting smoking. Studies have reported that smoking-consonant cognitions or self-exempting beliefs are widespread among Australian smokers. Commonly held beliefs include: scepticism about the harms of smoking e.g. "many people who smoke live long and healthy lives"; smoking is "worth it"; everything is dangerous and "smoking is no more risky than lots of other things"; and protective beliefs such as "exercising and eating healthily and will cancel out smoking".[51, 52] It has also been reported that some self-exempting beliefs influence interest in quitting, and that interventions which challenge "skeptical" beliefs and "worth it" beliefs by making the harms of smoking more salient are likely to increase cognitive dissonance and increase engagement with quitting.[52]

Consistency theories also propose that people seek out, notice and interpret information in ways that reinforce their attitudes and dissonance theory predicts that people will try to protect their attitudes by avoiding information that increases dissonance. This involves three elements: selective exposure (i.e. people are motivated to avoid information that is inconsistent with their belief, attitude or behaviour), selective attention (i.e. providing more attention to information that is consistent) and selective interpretation (i.e. translating ambiguous information to be consistent with existing attitude). The empirical evidence to support the notion of selective exposure has been mixed, but the evidence for selective attention and interpretation is stronger. Cognitive Dissonance Theory and Balance Theory [53] have both demonstrated that information that is consistent with attitude is easier to learn and remember.

These original traditional cognitive consistency theories have the basic postulate that attitude and behaviour change come about because people are motivated to reduce internal discrepancies and to avoid the uncomfortable feeling of holding two conflicting beliefs. Cognitive dissonance theory would predict that any new information about smoking may increase dissonant cognitions, making the smoker uncomfortable and motivated to change either their cognitions or behaviour to reduce the inconsistency. However, empirical studies have shown that people are biased in the attention they give to and the way they interpret information which is reinforcing of versus contradictory to their current attitude or behaviour. The implications for social marketing are that attitude change (and behaviour change) could be expected to be elicited by presenting new and confronting negative information about smoking.

McGuire's Chain of Persuasion [54] is another relevant early information-processing theory of attitude change, with implications for social marketing. The Chain of Persuasion theory proposes that people process and evaluate information or arguments, either agreeing or disagreeing with them, and thereby altering attitude and potentially behaviour. McGuire's model proposes a series of cognitive processes as necessary conditions for communications to be effective in changing attitudes and influencing behaviour. These steps are: (i) exposure – first a person must be exposed to the message; (ii) attention – the person must receive or attend to the message; (iii) comprehension – the recipient must understand the message; (iv) yielding – the recipient must be persuaded by the content of the message in order to change his/her attitude. Furthermore, and to generate behaviour change, there must be (v) retention – the changed attitude must be maintained in the face of competing information and influences such as friends with different views; and (vi)

retrieval – the attitude must be remembered in a relevant situation; then the person must take the (vii) decision – to act upon their attitude; and (viii) behave – according to their attitude. This model and the associated field of empirical research build on the early cognitive consistency theories by demonstrating the significance of: features of the communicator; attributes of the message; and characteristics of the audience, in changing attitudes and behaviours.

Many classical theories of attitude like those outlined above, posit that attitudes are formed and changed based on conscious and careful consideration of information relevant to the attitude (or behaviour) in question. However, psychological studies in cognition have systematically demonstrated that people take short cuts in searching for and processing the information they encounter. For example, the Heuristic-Systematic model [55] argues that people only engage in such conscious processes when they are sufficiently motivated and have the capacity to do so. When people are motivated they engage in systematic processing which involves weighing up the pros and cons of an argument and testing the argument against an existing attitude. Systematic evaluation of attitude-relevant information has been shown to be more likely to occur in cases where: the message is of high personal relevance; when the attitude in question is important; or when the person finds that their attitude is inconsistent with the majority view.[56] The faster, easier, heuristic evaluation of attitude-relevant information provides cognitive shortcuts for people. People learn certain heuristics which they apply to attempts to persuade them and to process the information contained in a message. One example of such a heuristic is that “experts can be trusted”.

The theoretically similar elaboration likelihood model,[57] outlines a set of situations in which people will or will not be likely to attend in detail to attitude-relevant information or a message. In brief, when a person is both motivated and able to think carefully about a message, that person engages in extensive elaboration (cognitive processing) of that message. Examples of motivating factors which favour contemplative cognitive processing are perceived relevance of message topic and an innate disposition towards cognition or thinking. Examples of disabling factors are time pressures and distractions in the environment and lack of relevant knowledge needed to scrutinise the arguments. During high elaboration, people engage with and assess the merits of the argument carefully. They may check the argument against what they already know, or seek out further information. If the elaboration process generates a positive appraisal of the message then the message is accepted and an attitude is formed or changed to be consistent with the

message's proposition. If the merits of the argument are assessed unfavourably then the message is likely to be rejected.

More commonly, people engage in low elaboration and look for simple characteristics of the message or its presentation context to determine whether they should accept the message. When low elaboration occurs and people use the peripheral route, the persuasion heuristics or "rules" of thumb people apply become significant. According to the elaboration likelihood model, cognitive engagement is important because attitudes formed under high elaboration are stronger than those formed under low elaboration.[57]

These social cognition models outlined above have an underpinning tenet: people are motivated to hold 'correct' attitudes, and when motivated and able, people will respond to the quality of an argument. These theoretical models, which articulate how attitudes are formed and changed, provide a broad framework for understanding the basic processes behind persuasive communication.

From these models and empirical literature come principles which underpin many applied theories and much practice in health promotion, including social marketing. (The implications for graphic health warnings on cigarette packets will be expanded in a later section.) The highly applied Health Belief Model [58] developed in the US Public Health system in the 1950's reflects the emphasis on cognition and the weighing up of opposing cognitions, in predicting health behaviour. This model assumed that attitudes and behaviours are influenced by: a person's belief that they are susceptible to health consequences related to a behaviour; a personal appraisal that those health consequences are serious; the person's perception that the behaviour has more costs than benefits; and that there is some "cue to action" or precipitating force changing the current (implicitly balanced) state. The cognition-based health belief model continued to be one of the most frequently applied models in published reports in health education and health behavior until the early 1990s. It is still influential for developing the communication components of social marketing campaigns.

A systematic review in 1992 found it lacked predictive power,[59] probably due to its lack of scope in discussing other predisposing and enabling factors. The model did not have the predictive power of newer cognitive models, which did account for other constructs, notably the Theories of Reasoned Action and Planned Behaviour (discussed in detail below). The next section briefly discusses two additional constructs which have become

seminal in social cognitive theories and the study of health behaviour change; namely efficacy-beliefs and social norms.

Efficacy-beliefs

Much behaviour, such as quitting smoking, is complex and can require considerable motivation and skill. People's appraisal of their own capabilities and the control they have over outcomes are held to be important. Many prominent social psychology theories not elaborated upon here, emphasise the role of control beliefs in predicting behaviour. The most relevant to this thesis is Albert Bandura's Social Cognitive Theory,[60] which used the term self-efficacy to describe people's perception that they can perform a desired behaviour. He argued that people's self-efficacy or belief in their ability to control an outcome, mediated their behaviour. Self-efficacy is an important construct in the context of trying to promote quitting smoking. Research has shown that self-efficacy judgements are related to whether or not an individual will undertake particular goal-directed activities, the amount of energy that the individual will put into that effort, and the length of time that the individual will persist in striving to achieve a particular goal. Unless people believe have the belief that they can achieve the desired effects by their actions, they are unlikely to persist in the face of difficulty. The stronger the self-efficacy, the more likely individuals are to believe they can achieve their goal, and the more likely they are to view obstacles to that achievement as surmountable. Response efficacy then describes people's perception that performing the desired behaviour will lead to the desired outcome (e.g. quitting smoking will lead to avoiding heart disease).[61]

Empirical testing of a range of social cognitive theories emphasising beliefs, attitudes and self-efficacy has demonstrated these theories' capacity to predict a range of health behaviours, including, safe sex, breast-feeding, cancer screening, exercise, dietary intake, weight loss and alcohol consumption.[62]

Changing social norms

The previous discussion has focused on cognitive factors internal to the individual which are likely to influence behaviour. In addition to internal psychological factors, social learning theories [63, 64] emphasise the influence of external or environmental social factors on behaviour. Central to social learning theory is the tenet that behaviours are learned by observation of others, as well as by observations of outcomes of behaviours. People wish to avoid negative consequences, and maximise positive results. If people

observe positive, desirable outcomes from behaviour, then it is argued, they are more likely to model, imitate, and adopt that behaviour themselves.

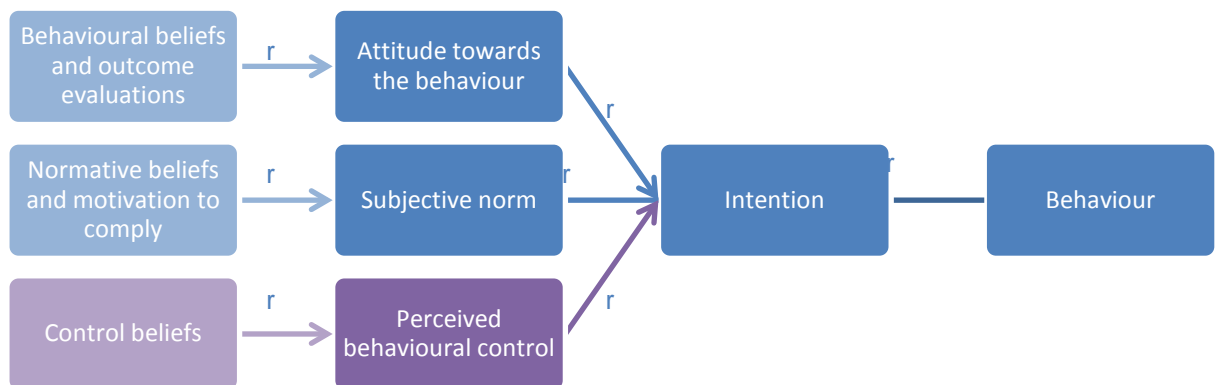
Both social psychology and marketing theory recognise that social conformity, or the tendency to want to be like relevant and significant others, is a fundamental component of human behaviour. People conform consciously and unconsciously in their everyday behaviours. Some social psychological theories argue that subjective norms or social norms have a direct impact on intentions and, in turn, behaviour. Social norms reflect the extent to which relevant others are perceived to be supportive of the person taking an action, and the person's motivation to comply with those expectations. Overall it has been demonstrated that people are more likely to intend to perform a behaviour, when they believe that other people who are important to them think that they should perform it.[65]

Many consumer products, such as alcohol and tobacco, are consumed in social situations and carry social meaning. Arguably, tobacco is close to a person's public image of being a non-smoker or a smoker, even a smoker with a particular persona reflected in their cigarette brand choice. Smoking with friends can be an important part of people's smoking behaviour and in some cases, smoking may be perceived as highly integral to social functioning. Because smoking also has serious health-consequence, most people report having pressure from friends or family to give up smoking. Smoking is, therefore, a behaviour with several social components and likely to be influenced by social norms.

The Theory of Reasoned Action and the Theory of Planned Behaviour

The Theory of Reasoned Action and the later Theory of Planned Behaviour are seminal theories from social psychology that represent the culmination of earlier theories of social cognition. The Theory of Reasoned Action and the Theory of Planned Behaviour encompass many of the factors listed above, which have been demonstrated to influence behaviour. Fishbein and Ajzen's original Theory of Reasoned Action[65, 66] argues that people are essentially rational decision makers who make systematic use of the information available to them. Actions are largely seen to be made by choice and under an individual's control. The figure (1.1) below provides a basic overview of the Theory of Reasoned Action (with additional variables from the Theory of Planned Behaviour presented in a different colour). Fishbein and Ajzen's (recently re-labelled) Reasoned Actioned Approach [1] provided the theoretical framework for part of this thesis.

Figure 1.1: Schematic presentation of the Theory of Reasoned Action (blue) and Theory of Planned Behaviour (blue plus purple). Adapted from Fishbein & Ajzen[65, 66]



A person's volitional *behaviour* is held to be predicted directly by an individual's intention to take action. That is to say, at a given point in time, people do what they intend to do. The person's behavioural intentions, in turn, are a combined function of personal and social factors. The Theory of Reasoned Action proposed that behavioural *intention* is determined by a weighted function of that individual's (i) attitude towards performing that behaviour and (ii) the perceived *subjective norms* or perceived social pressure to perform the behaviour. The Theory of Planned Behaviour extended the Theory of Reasoned Action by incorporating self-efficacy or perceived behavioural control as a direct influence on intention and behaviour.[67] *Perceived behavioural control* (see Figure 1.1 above) is the extent to which the individual believes that taking the action will be hard or difficult. Most behaviours require skills, resources and cooperation of others to facilitate the behaviour change, hence the addition to the model of (iii) perceived control over the behaviour or self-efficacy.

Attitudes about whether to take the action are themselves the product of the sum of salient *behavioural beliefs* about the consequences of the action weighted by the evaluation of those consequences (*outcome evaluation*). Salient behavioural beliefs are the beliefs about the behaviour in question which are most prominent and relevant for the individual. Attitudes towards the behaviour can range from highly favourable to highly unfavourable, and are determined by the perceived personal consequences of an action, and its perceived likelihood of occurrence. If the individual believes the behaviour will lead overall to a

positive outcome, they will hold a positive attitude, if they believe that performing the behaviour will lead overall to a negative outcome, they will hold a negative attitude. *Subjective norms* are a function of the perception of the extent to which relevant others and groups support taking the action, and the individual's motivation to comply with expectations of others.

Generally speaking, people will intend to perform a behaviour when they evaluate it positively, when they believe that important others think that they should perform it, and when they believe that they will be able to perform it. Certain factors are argued to increase the correspondence between behavioural intentions and behaviour.[68] Intentions will correspond with behaviours according to the extent to which the measures of these elements are consistent. These include correspondence between the elements that make up intentions, and the stability of intentions over time. The elements of intention are: (i) the action itself (e.g. not purchasing cigarettes or not smoking a cigarette); (ii) target (e.g. cessation); (iii) time (e.g. in the next week); and (iv) context (e.g. while at work, at home and out with friends). The stability of intentions also affects the predictive power of intentions on behaviour. The longer the time between measured intention and behaviour, the less stable the intention. For example, an intention to quit smoking tomorrow would be more predictive than an intention to quit smoking next year sometime, but only because, according to this essentially information processing model, the determinants of intention (behavioural, normative and control beliefs) might have changed in the mean time. Greater knowledge about an issue also strengthens the relationship between intention and behaviour.

While the Fishbein and Ajzen model acknowledges the place of social influence and of confidence in one's ability to carry out an action, the beliefs that people hold about a behaviour which underpin attitudes, are fundamental determinants about whether to perform that behaviour. Importantly, it is only salient beliefs that determine attitudes. These are defined as 'top of mind' beliefs about a behaviour, that is to say they do not require to be prompted into consciousness, and are therefore assumed to be capable of determining intentions and behaviour on an ongoing basis. It is postulated that no more than 5-7 salient beliefs are held for any attitude object. Elements of the above model can be quantified.[69] Salient beliefs are measured through salient belief statements assessed on Likert scales:

e.g. *Evaluation* (e): outcome X of performing behaviour Y would be [very good to very bad];
Belief (b): outcome X is [not likely to very likely] to happen to me.

$Attitude = \Sigma$ (*Evaluation* of each behaviour's consequences * the strength of *belief* that performing the behaviour will lead to that consequence.)

$$Attitude = \Sigma_n e*b$$

The behavioural beliefs that underpin attitude have been formed from a variety of information sources, including past personal experiences. Those beliefs are the most accessible to intervention by communication to an individual from a third party.

Fishbein and Ajzen's original theories, recently re-labelled by the authors as the Reasoned Action Approach[1], are social cognition theories. As noted above, in their early writings Fishbein and Ajzen's [65, 66] argue that people are essentially rational decision makers, systematically using information available to them whose actions are largely made by choice and under an individual's control. At a fundamental level, this Approach has a lot in common with how economic theory understands behaviour; as the outcome of rational choices of individuals, taking the best course of action for themselves, given the information available. In an earlier section, the point was made that rational choice about tobacco use can be compromised by addiction. Fishbein and Ajzen address the question of whether intentions and cognition become irrelevant and addiction controls behaviour in case of addictive behaviours, such as smoking, drug use and gambling. They argue that their theoretical Approach holds for addictive behaviours.[1] In all but the most extreme cases of psychological or physiological addiction, they argue that people still engage in addictive behaviours because they intend to do so. In every instance, people's intentions are explained by underlying beliefs, attitudes, perceived norms and perceived control. In fact, people's knowledge of their addiction and their experience of trying to change that addictive behaviour may inform their beliefs about the behaviour and their perceptions of control .[1]

Fishbein and Ajzen's Reasoned Action Approach has been widely applied and successfully used to predict of a range of health behaviours, such as safe sex, breast-feeding, cancer screening and weight loss, and also addictive behaviours including smoking, alcohol and drug use and gambling.[1, 46] To date this approach does not appear to have been applied to the examination of the impact on attitudes of interventions such as graphic cigarette packet warnings.

In this thesis, the Reasoned Action Approach will guide empirical testing of effects of exposure to new cigarette pack warnings, and more specifically to effects on quitting smoking. It will explore the quitting behaviour; intentions to quit smoking; attitudes towards quitting smoking; normative beliefs about quitting smoking and perceived control over quitting smoking.

The thesis will explore the influence of graphic health warnings on cigarette packets on relevant variables within the model. Graphic health warnings on cigarette packets, depicting the harms of smoking, could influence quitting intentions and behaviour, via attitudes, by engendering salient beliefs about negative consequences of smoking that displace previously held salient beliefs. As well, graphic warnings might change the outcome evaluation (e.g. increase the negative valence of gangrene as a consequence of smoking). Since it is the product of perceived likelihood and outcome evaluation that is relevant, change in either would have an impact on a person's attitude.

Arguably, the graphic health warnings on cigarette packets might also influence smokers' peers' perceptions of the risks and benefits of smoking and their approval or disapproval of the smoker's behaviour; thereby affecting social norms. In addition, it is also possible that the inclusion of the Quitline number on cigarette packets might influence smokers' perceptions of their own ability to quit smoking. However, it is anticipated that any effects on social norms and perceived control are a less likely outcome of new graphic health warnings on cigarette packets and it is anticipated that the most likely change would be to beliefs and evaluations of the harms associated with continued smoking versus quitting.

Before turning to test the theoretical models described in detail above, the next section of this chapter describes how some of the theoretical constructs above have been applied in the practice of social marketing. Implications of the lessons about persuasive communication of information or arguments are also discussed in relation to the intervention of graphic health warnings, and the attributes that would or would not make them likely to deliver information in a way which affects attitude.

The practice of behaviour change and social marketing

Several relevant principles emerge about what should make communications, such as the current intervention, more effective in changing attitudes and beliefs.

Attracting Attention and Raising Awareness

A first step in motivating behaviour change is generating some recognition that change is required. In consumer behaviour theory this is called “activating problem recognition”. In health, it is referred to as “awareness-raising”. Loosely, these terms refer to taking an issue of concern to the health agency, government or other agency, of which people are unaware or have low awareness, and putting it on the people’s personal agenda for change.

People may not recognise such problems before they occur and until it is too late, when the timing of the solution is difficult or impossible. Social marketers try to trigger problem recognition before the negative outcome occurs. In the case of health, the negative health outcome can be close in time to the behaviour e.g. unprotected sex leading to contracting a sexually transmitted disease, or very distant and remote e.g. excess sun exposure leading to melanoma. General awareness of some outcomes associated with a behaviour can be high e.g. drinking alcohol causes drunkenness, or less well understood e.g. drinking alcohol causes bowel cancer. The job of the social marketer is to increase the awareness in the target audience that the behaviour, e.g. unprotected sex, excess sun exposure, or excess alcohol consumption, is a “problem” requiring behaviour change.

Smoking is behaviour with multiple serious health, social and economic consequences for the individual smoker, for government and the broader community. The “problem” behaviour that the graphic cigarette packet warnings are trying to raise awareness about is smoking tobacco. The goal is to increase awareness among smokers by focussing on the, mostly distant, negative consequences of smoking.

Much effort in social marketing in health is aimed at awareness-raising through information provision. The graphic warnings on cigarette packets will present a combination of new information and old information in new ways. The intention is that this information: (i) gets attended to; (ii) is appraised as relevant; (iii) changes the consumers’ attitude towards smoking and/or (iv) raises the urgency of smoking as an issue which requires action. There are important lessons from the theory about how to maximise the chances of new information being processed by the intended recipient.

Taking in and processing new information involves effort – to attend to, interpret and prioritise that information. People have considerable information in their long term memory that they have already acquired from numerous sources including: first-hand personal experience; personal sources such as friends or family; and independent sources

such as the marketing efforts of government, companies and other agencies. New information-seeking, and even attending to information presented, requires effort and has an opportunity cost. Furthermore, people vary in their capacity and motivation to analyse and interpret new information, particularly when message content conflicts with existing attitudes or behaviour. Because of these factors, theories state that people may be biased against attending to and thinking about information and in some cases, it may not occur.

People's attention is selective. Empirical studies have provided insight into different aspects of stimuli which can be manipulated to increase attention relevant to health warnings. Format factors that increase the probability of attention to a stimulus include: increase in size; increase in intensity; colour; movement; position (near the centre of the field of vision); simplicity or format; contrast; and isolation (e.g. white space).[70, 71] In terms of information delivery, simplicity increases the likelihood of attention and too much information risks overloading the intended recipients, causing them to ignore all of the information.[71] Adaptation level theory shows that stimuli, including advertisements, will stand out when they are first introduced, but there is likely to be attenuation over time. [71]

Some of this theoretical work has already been validated with text-based cigarette packet warnings in Australia. Research conducted after the introduction of the 1995 black and white warnings found that awareness of the warnings and awareness of the health effects of smoking increased with greater warning size; and stronger messages contributed to salience.[72] However, at the time, other features of the packet promoting brand were found to be more salient, leading to a call for larger more salient warnings in the future.[73]

A basic prerequisite for this intervention – new graphic cigarette packet warnings – to be effective in raising smokers' awareness was that they must first be noticed – the warnings must attract and retain attention. The pack warnings introduced in March 2006 were larger than ever seen before in Australia, they used photographic images in colour; the graphic image of a health effect was to contrast with the appealing aesthetics of the rest of the cigarette packaging itself and the image was accompanied by white text on a black background for high contrast. The message in text was short, simple and to the point.

Theory and previous empirical studies suggest that the design features of the new graphic cigarette packet warnings should have promoted smokers noticing and attending to them. In addition to visual presentation of stimuli, the nature of content also influences the likelihood of attention a new message. For example, perceived personal relevance of a

message increases attention to new messages. Other mechanisms which make have been shown to make information or messages more influential are discussed below.

Persuasive communication styles

There are important elements of communication styles which have been found to enhance the ability of a message to change attitudes. These include the credibility of the source, use of emotion, and the framing of the message in terms of gains or losses.

Source credibility consists of trustworthiness and expertise of the source providing the information.[46] Source credibility is also important for information processing. It is relevant when people engage in detailed cognitive processing of messages to make them compelling and it is important if people use heuristics or shortcuts such as “experts are right” to appraise messages. If the source has no motive other than to provide complete, objective and accurate information then a source is more likely to be seen as trustworthy. High credibility sources can have an immediate and significant impact on attitude change that a low-credibility source does not have. Major non-government organisations in health are frequently seen, and seek to be seen, as both trustworthy and expert. Friends are frequently seen as trustworthy, but not necessarily expert. It is worth noting that over time the source of information can dissipate and even low-credibility sources presenting information over time can build up into what is called the ‘sleeper effect’ – an apparently counter-intuitive psychological phenomenon whereby an individual becomes more persuaded by a message over time.[74]

If the information included on the pack warnings is seen to be coming from an expert and trustworthy source, it should increase the chances of it being persuasive and therefore changing attitudes. The pack warnings intervention attempts to provide factual information from a credible source. If the source, namely the Australian Government, is viewed as expert and trustworthy, then the information contained in the warnings should be more likely to change beliefs and attitudes. If the source is seen to have a conflict, such as not being sincere or having too much of an interest in revenue from cigarette excise, then there may be an issue of source credibility. The sources of the mass-media campaigns accompanying the introduction of graphic health warnings on cigarette packets were major non-government organisations (i.e. Quit, Heart Foundation, and Cancer Council). These agencies are likely to be seen to have a sound motive – reducing smoking and therefore heart disease and cancer, and to have scientific credibility at their foundations.

As noted above and elsewhere,[71] some people will have the motivation and ability to engage in extensive cognitive elaboration of the messages on cigarette packets; other people will not and/or circumstances will not always be conducive to such elaboration. In light of this, the content of the warnings themselves should be more likely to be persuasive if the arguments presented are strong and people find them compelling.

However, because there is also likely to be low elaboration, the cigarette packet warnings could be expected to be persuasive if the shortcuts they provide – such as unattractive imagery and credible sources – gain ready acceptance through more peripheral routes of processing which also leads people to accept the basic message that smoking leads to serious health consequences.

Emotional appeals use largely non-verbal communication techniques to bring about attitude change. Emotional appeals, such as those arousing a (positive) physiological reaction have been shown to increase: (i) advertisements' ability to attract and retain attention; (ii) the level of mental processing of the advertisement; (iii) memorability of advertisements; (iv) liking of advertisements; (v) involvement; and (vi) liking of products advertised.[75] Repeated exposure to positive emotional arousal has been shown to increase brand preference through classical conditioning.[75] Negative emotional appeals which help smokers not only to “know” what the consequences of smoking-related harm would be like but also to “feel” the consequences, have been used frequently and successfully in anti-tobacco advertising in the past decade.[76] If the graphic warnings make the effects of smoking real for smokers, rather than provide statistical information they should be more likely to influence attitudes.

Fear appeals are used heavily in social marketing and commercial marketing. Examples from social marketing include road safety campaigns and anti-smoking campaigns. It was traditionally held in psychology and marketing that fear arousal is highly motivating and effective in changing attitudes but must not generate so much fear that consumers' defence mechanisms lead them to discount the messages out of hand.[77] More recently this widely held concern has been challenged and fear appeals have been widely used in tobacco control social marketing efforts with great effect.[78] The messages contained in the warnings are designed to change cognition but also to produce a visceral “yuck” response, which is affect-based. The affective component is negative rather than positive so could be expected to decrease liking of the behaviour (smoking) and the product (cigarettes).

Gain and loss framed messages. Nearly all health-related messages can be conceptualised in terms of gains (benefits) and losses (costs) Gain- and loss-framed alternatives do not have the same impact on decision-making.[79] People have been shown to avoid risky or uncertain behaviours when framed in terms of gains, but prefer to take risks and tolerate uncertainty when considering the same options in terms of avoiding loss or costs. It has been shown that, to the extent that a health-related behaviour involves the risk of an unwanted outcome, or is 'risky' to perform, behaviour messages framed in terms of loss rather than gains should be more effective. This was demonstrated when women were shown messages about Breast Self Examination (BSE) in the 1980s. Loss-framed messages were associated with higher intention to undertake BSE and BSE behaviour at follow up than gain-framed messages.[80] Loss framed messages were found to be similarly more effective in encouraging mammograms and HIV testing. It is argued that cancer or HIV screening is a risky behaviour because it is designed to find out if people have a disease. On the other hand, many prevention behaviours, e.g. promoting physical activity, are designed more to maintain existing health. Consistent with this perspective, studies have shown that gain-framed messages can increase use of child restraints, requests for high SPF sunscreen and intentions to use condoms.

It has been argued previously that gain-framed positive messages about quitting on pack warnings or in social marketing campaigns would be more appropriate than loss-framed messages because quitting smoking is a preventative health behaviour.[71] However, smoking involves a major risk of unwanted outcomes (serious health consequences). Quitting smoking is a behaviour people engage in to avoid such outcomes, and many smokers will already be experiencing the symptoms of smoking such as early signs of emphysema. Quitting smoking itself can also be conceived of as having risks, such as discomfort from withdrawal, self-deprivation of something enjoyable, social changes and concern about not succeeding. Therefore, it is expected here that loss-framed messages will, in fact, be more effective in persuading people to initiate smoking cessation behaviour than gain-framed messages.

Implications of theory for graphic health warnings on cigarette packets

The tobacco control intervention under study – new graphic health warnings on cigarette packets – provided warning information for consumers (smokers) on cigarette packets with

the intention of influencing beliefs, feelings (or evaluations), attitudes, behavioural intentions and ultimately behaviour. In the current context, there are two behaviours of interest: smoking behaviour and quitting behaviour.

Beliefs and attitudes towards smoking are not necessarily equal to and opposite of beliefs and attitudes about quitting. Smokers may hold negative attitudes about smoking but their attitudes about quitting may be even more negative. Theory suggests that in order to change smoking behaviour, any tobacco control intervention needs to offer a persuasive message, which generates negative attitudes towards smoking behaviour and positive (or less negative) attitudes towards quitting. As a result, the smoker is uncomfortable, no longer wants to smoke, is motivated to act, and so wants to quit or is prepared to quit.

Pack warnings should have been most likely to influence smoking behaviour if they: increased beliefs (feelings or evaluations) that smoking leads to very bad health outcomes; increased beliefs that a negative health outcome is likely to occur as a consequence of smoking; and/or therefore smoking should be avoided. Generating positive beliefs about quitting – such as social approval for quitting or self-efficacy to quit – should also promote quitting behaviour; all via the mediator of increased quitting intentions. As outlined above, the new warnings contained graphic imagery about multiple tobacco-related pathologies, but also promoted the Quitline, with one warning dedicated to quitting smoking.

Other variables should have influenced the likelihood of the intervention succeeding in changing behaviour; the most basic of which being design of the warnings and their ability to attract and maintain attention. The credibility and trustworthiness of the source of the message (the Australian Government and health agencies by association), and the strengths of the case presented in the message itself, should also have influenced smokers' processing and acceptance of the messages. The basic design should also have increased message persuasiveness and acceptance, among smokers who do not stop to think intently about the message text.

Evidence of the impact of cigarette pack warnings prior to 2006

As mentioned previously,[72, 73] there was some research conducted in the lead in to and in the immediate aftermath of the introduction of Australia's 1995 black and white cigarette packet warnings. The preliminary developmental research concluded, "to be effective, health warnings need to be noticed, persuasive and provide guidance for

appropriate action. To be noticed, health warnings need to stand out from the surrounding pack design and they need to be large enough to be read easily. To be persuasive, the warnings need to be understood, believed and judged to be personally relevant by the reader.”[73](p.1152) The preliminary research also found that existing smokers were not adequately informed of the health consequences of smoking and that potential smokers were likely to be even less informed. It also found the new warnings were salient but not as salient as the producers’ trademarks and other commercially designed components of the pack. The authors also cautioned about the ‘plateauing’ of effects of the warnings and called for stronger warnings and regular changes to warning regimens. After the warnings were introduced, Australian research demonstrated increases in awareness of warnings and knowledge consistent with the health messages and better informed smokers.[72] There was also evidence in the first few months of implementation of some behaviour changes including avoiding buying packets with new warnings, smoking less and talking about the warnings. Longer-term studies found evidence of the warnings stimulating thoughts about the negative effects of smoking and consequent action of not smoking a previously planned cigarette. This spontaneous rejection of a cigarette was predictive of later cessation.[81] These warnings were in place in Australia for 11 years.

At the time of the announcement that Australia would introduce graphic cigarette packet warnings, a handful other countries had already introduced graphic packet warning labels and published research on their impact. Canada was the first country to require colour graphic cigarette packet warnings, introducing them in 2000. Much of the work published prior to their introduction in Australia in 2006 was Canadian. In summary, Canadian research demonstrated that graphic cigarette warnings were an effective way of communicating the health impacts of smoking.[82-84] A Canadian study of 616 adult smokers demonstrated that the graphic warnings were noticed by smokers, that smokers engaged cognitively with the warnings’ contents, and that thinking in depth about the warnings was predictive of quitting intentions. In-depth processing of the warnings was predictive of making some attempt at cessation over the following three months.[83] Brazilian data, published on line, demonstrated that graphic warnings had had a significant impact on smoking intentions and behaviour.[85]

Unlike the Australians warnings, neither Canada nor Brazil featured a Quitline number (prominently) on their packets and neither country has published data on the impact on their Quitlines or Smokers’ Help Lines. There was some indicative evidence of likely demand for the Australian Quitline from the Dutch research which demonstrated an

increased and sustained demand (3.5 times baseline) for its Quitline after including the number with new prominent written warnings.[86]

Note: In the time while this thesis was underway, other research was conducted on the topic of graphic health warnings. This research is summarised in Chapter 6.

Research justification

The impact of Australia's new graphic cigarette packet warnings, together with the accompanying social marketing (Quit) campaign, warranted evaluation. While a handful of countries had introduced graphic cigarette packet warnings, or a prominent Quitline number, Australia was the first to introduce both. Australia was also the first country to introduce the warnings and supplement them with a social marketing campaign promoting quitting tailored to the content of the warnings. Evaluation of the individual and cumulative impact of these interventions was intended to add the work from Canada and inform tobacco control efforts in the majority of countries that did not have graphic cigarette packet warnings at the time, but were likely to introduce them as they ratified the Framework Convention on Tobacco Control. The current thesis was planned within this context.

This thesis documents the intervention. It describes the impact of the graphic cigarette pack warnings on smokers, and it also seeks to interpret and evaluate that impact using lessons from social psychology theory and empirical literature, as well as the documented experience from social marketing. Social psychology and social marketing offer much to the understanding and prediction of behaviour change, within the context of an intervention which seeks to offer a persuasive message via new information (or old information presented in a new way).

Fishbein and Ajzen's the reasoned action approach (the Theory of Reasoned Action and the Theory of Planned Behaviour) synthesises the relevant factors of beliefs, attitudes, social norms and perceived control, into two models which are designed to predict behaviour change. With smoking behaviour as the outcome, this thesis will test the predictive utility of the two models. This thesis will measure each of the constructs within the model(s) in the context of the intervention. The ability of the models to predict behaviour change should be influenced by the extent to which the elements of the intervention successfully bring about change in the pre-cursors to behaviour change.

Research Aim and Research Questions

The aim of the current research is to assess the impact of a public policy intervention – graphic cigarette packet warnings introduced to Australian in 2006 – on smokers; including influence on quitting behaviour and its precursors.

The research questions addressed, in turn, are:

1. How did the implementation of this policy occur in Australia and are there lessons of process to help policy makers in other countries?
2. Were the new warnings successful in attracting the attention of smokers, and communicating information about smoking to change smokers' beliefs?
3. Did the new warnings lead to any attitude or other changes in smokers, predictive of future quitting?
4. Did the new warnings lead to change in behaviour?

It was hypothesised, that the graphic cigarette packet warnings would be noticed and attended to. It was hypothesised that graphic cigarette packet warnings would then lead to changes in smoking behaviour beliefs; specific to the messages on the packets, and that this would lead to changes in attitudes, intentions and potentially smoking behaviour.

Thesis Outline

Paper 1 (Chapter 2) examines Question 1 and documents the introduction and implementation of graphic consumer warning labels on Australian cigarette packets, with a view to (a) evaluating/documenting the process of the implantation to offer lessons for public policy makers in other countries, yet to introduce graphic consumer warning labels on cigarette packet; and (b) measuring the exposure of Australian smokers to the new warnings labels. Firstly, it details the volume and nature of press coverage of the new warnings; secondly it documents the pace of the roll-out into retail stores; and then describes the exposure that smokers intercepted in the city streets had had to new warnings and their initial reactions to them. These studies took early measures of the intervention's presence, which is rudimentary to the interventions ability to capture attention and awareness raise. By monitoring the media, there is documentation of the environment surrounding the introduction of the intervention. Media monitoring documents the unpaid publicity the intervention and its core communication messages received (namely health effects of smoking contained in the warnings). Media monitoring also documented publicity given to counter arguments from the tobacco industry or others. The public

framing formed part of the social environment of the intervention. While very preliminary, the smoker intercept survey included in this chapter was designed to gauge smokers' early reactions to the graphic health warnings (Question 3).

Paper 2 (Chapter 3) used a series of cross-sectional population surveys spanning 4 years to document smokers' awareness of new cigarette packet warnings (Question 2, see page 40). It also documents coincidental changes in smokers' beliefs about a range of smoking-related health effects, including those which were the subject of the new cigarette packet warnings (Question 2). In order for the information and messages contained within the graphic health warnings to be effective, they must be noticed. This paper measured smokers' general unprompted and prompted awareness of new warnings. Smokers' prompted recall of each individual warning was measured, as were smokers' beliefs about all of different health outcomes features on the warnings. This was done to see if different warning messages and styles had different effects on message cut through and smoking-related beliefs.

Papers 3 (Chapter 4) and 4 (Chapter 5) looked at the new warnings impact on smokers' behaviour (Question 4, see page 40). Paper 3 examined the short term marker of success for promoting quitting, in calls to the Quitline. Paper 4 employed Fishbein & Ajzen's [1] widely applied Reasoned Action Approach. It applied the model to investigate the potential impact of new graphic cigarette packet warnings on determinants of smokers' behavioural intentions and actual behaviour (Questions 3 and 4). A cohort of smokers, recruited from the (same) 2005 population survey (presented in Chapter 3) was followed up after a year; when the new packs were known to be prevalent (established in Paper 1).

The next four chapters of this thesis consist of reproductions of four papers published in peer-reviewed journals. Their formats reflect the requirements of the individual journals. There will be some repetition within the introductory sections of each chapter, reflecting the background that was required for the independent readers of the four papers. References for the articles have been removed and consolidated at the end of thesis.

Chapter 2

Response of mass media, tobacco industry and smokers to the introduction of graphic cigarette pack warnings in Australia

PUBLICATION:

Miller CL, Hill DJ, Quester PG, Hiller JE. *Response of mass media, tobacco industry and smokers to the introduction of graphic cigarette pack warnings in Australia*. European Journal of Public Health 2009, 19(6):644-649.

ABSTRACT

Background: In 2006, Australia introduced graphic cigarette packet warnings. Previous warnings were text only. New warnings include one of 14 pictures, many depicting tobacco-related pathology.

Methods: This study monitored the roll-out of the health policy initiative using multiple methodologies. Print media coverage of new pack warnings was observed over 3 years. Story content was coded as positive (supportive of pack warnings), neutral or negative. An observational study of small random sample of metropolitan stores (n=16) over 7 months measured the pace of the roll-out in shops. Once new packs were readily available in stores, smokers (n=152) were intercepted in city streets and asked about their reactions.

Results: Of the 67 media stories, 76% were positive or neutral about the new warnings and 15% were negative. Supportive content presented health benefits. Unsupportive content presented industry arguments. After the legislative change, it took two months before any new packs appeared in stores. After 6 months the majority carried them. Newest images had highest recall among smokers. 60% said new warnings detracted from the look of their brand. 51% felt increased risk of dying from smoking-related illness. 38% felt motivated to quit.

Conclusion: Plans by government to introduce graphic warnings were delayed up to two years, apparently by heavy industry lobbying. Actual widespread appearance in shops occurred several months after the implementation date. While media coverage of the new warnings reported the industry arguments against them, the balance of coverage was overwhelmingly positive. Smokers' initial reactions were in line with tobacco control objectives.

Key points:

- Tobacco industry lobbying tactics appear to have been effective in delaying the introduction of graphic cigarette packet warnings in Australia. The same tactics are likely to be used in other countries.
- Australian legislation proscribed a date of production for new packs, rather than a date of sale, which created further opportunities for delays. Policy makers in other countries could proscribe a date for sale rather than a date for manufacture to avoid this.
- Many smokers demonstrated an almost warm acceptance of the new labelling regime, and preliminary evidence of increased intentions to quit.

INTRODUCTION

Legislative measures which control the distribution, use, promotion and packaging of tobacco products are an essential tool for tobacco control. The World Health Organisation's Framework Convention on Tobacco Control (WHO FCTC)[25] is a global health treaty designed to help curb the global tobacco epidemic and associated burden of disease and mortality. Countries that ratify the WHO FCTC commit themselves to a schedule of tobacco control legislative reform in an effort to advance disease prevention and health promotion.

Evidence-based comprehensive tobacco control programs include demand reduction and supply reduction provisions. Core demand reduction strategies include price (tax) and counter-marketing (anti-tobacco advertising). The regulation of packaging and labelling of tobacco products is one component of a comprehensive approach (see Articles 6-14)[25] to reducing the demand for tobacco products. [25, 87]

The rationale for package warnings is based on the principle that “[e]very person should be informed of the health consequences, addictive nature and mortal threat posed by tobacco consumption”. [25] Package warnings should contribute to understanding of the health consequences of smoking, thus decreasing motivation to smoke, increasing motivation to quit and decreasing the consumption of tobacco overall.[88, 89] The FCTC outlines countries' legal obligations with regard to the size and content of cigarette packet warnings. Pictorial warnings are recommended and several countries are legislating for the mandatory inclusion of graphic cigarette packet warnings.[90-92] To date, 15 countries have introduced graphic cigarette packet warnings. Although the European Union provided graphic warnings for use by each of its member states, only Belgium has adopted them to date.

In 2006, Australia changed from text-based to pictorial warnings on tobacco products. Trade practices legislation[38] mandated that prescribed health warnings be included on cigarette and other tobacco packaging. From 1 March 2006, starting with any products manufactured on or after 1 March 2006, the regulations required that graphic warnings (images, explanatory messages and the Quitline number) covered 30% of the front and 90% of the back of the pack.[39]

The 14 warnings were divided into two sets.[36, 93, 94] From 1 March 2006 to 31 October 2006, only Set A was printed on packs. This set comprised graphic pictures associated with messages such as smoking causes: peripheral vascular disease; emphysema; mouth and throat cancer. Other messages were: Smoking clogs your arteries; Don't let children breathe your smoke; Smoking - a leading cause of death; and Quitting will improve your health.[93]

This paper presents a study of the roll-out of graphic cigarette packet warnings in Australia using three perspectives: media coverage of the policy initiative from inception through roll-out; observations in shops; and smokers' responses. Specifically, the aims of this research were to explore the nature and extent of media reporting of the policy initiative; the rate at which the new packs replaced the old ones in retail outlets; and the very early reactions of smokers when exposed to the graphic messages

METHODS

Media coverage

Print media coverage was monitored in Australian national daily papers and major metropolitan papers in Sydney, Melbourne and Adelaide from the first announcement of the Australian Government's intention to legislate for new graphic cigarette packet warnings (September 2003) until 6 months after the legislation took effect (September 2006). General news, editorials and letters to the editor were classified as "print media stories". The file of all material used in this analysis is available at:

http://www.cancersa.org.au/cms_resources/200808%20Graphic%20Warning%20Media%20Coverage.pdf.

Print media stories were coded by one author into five categories: "actively positive"; "positive"; "neutral"; "negative"; and "actively negative". A story was coded as "actively positive" or "actively negative" when the article was arguing in favour or against graphic cigarette packet warnings. When articles were fact-based rather than argument-based they were coded as "generally positive", "generally negative" or "neutral". Codes were determined on the basis of the volume of text within the article dedicated to the purported merits or limitations of graphic warnings.

Point-of-sale observations

Tobacco points-of-sale observations were undertaken to detect when packets with new warnings first started to make an appearance in shops and when they were widespread. A methodology was designed to provide these markers, rather than to measure with accuracy the percentage prevalence of types of packets in stores. Point-of-sale observations were also designed to inform the timing of the smoker intercept survey. They provided an indication of when packets with new warnings were starting to become prevalent, in a roughly equal proportion to packets with old warnings, but not at saturation. The stores observed were in the Adelaide CBD, the same location as the smoker intercept survey.

Retail outlets for the observations were randomly selected from the Electronic Yellow Pages 2005 edition for Adelaide and Melbourne from all listings located in the central business districts under: “supermarket” OR “food &/or general stores”; “tobacconist”; “Deli” [Adelaide only] “Milk Bar” [Melbourne Only]; and “service station”. Two from each of the main listings described were randomly selected and visited on the first Tuesday of the month for 7 months; starting 7 March 2006. An additional observation was made in Adelaide and incorporated a visit prior to the implementation of the legislation.

Research assistants introduced themselves to the retailer, identifying themselves as working for the Cancer Council. They asked for permission to observe the cigarette display stating that they were conducting a study on tobacco displays in retail outlets. The total number of packages visible was counted and the number of new warnings and old warnings were recorded for the eight top selling brands. Also recorded was the presence or absence of promotional items for sale such as tins or cigarette pack covers.

Smoker intercept survey

In July 2006, when approximately half of packets in retail outlets were those with new warnings (see Results), people smoking outside office buildings in Adelaide’s central business district were intercepted by research assistants working for the Cancer Council and were asked to participate in a brief survey. People smoking in groups were interviewed asked to step away from the group before interview.

Participants were asked whether they had with them, or had ever bought a packet of cigarettes with the new warnings. They were asked which warning(s) they had seen on packets they had purchased. They were then asked about their own initial reactions to the

warnings, first unprompted, then using a scale of affective responses.[95] They were asked whether "...seeing the images increase[s], decrease[s] or make[s] no difference to [their] perception of dying from a smoking-related illness, should [they] continue to smoke?" Participants were also asked whether they thought the new warnings detracted from the look of their brand, (answering "yes"/"no").

This study received approval from the Human Research Ethics Committees of the University of Adelaide and The Cancer Council South Australia. Analyses were conducted using SPSS v15.0.1.

RESULTS

Media coverage

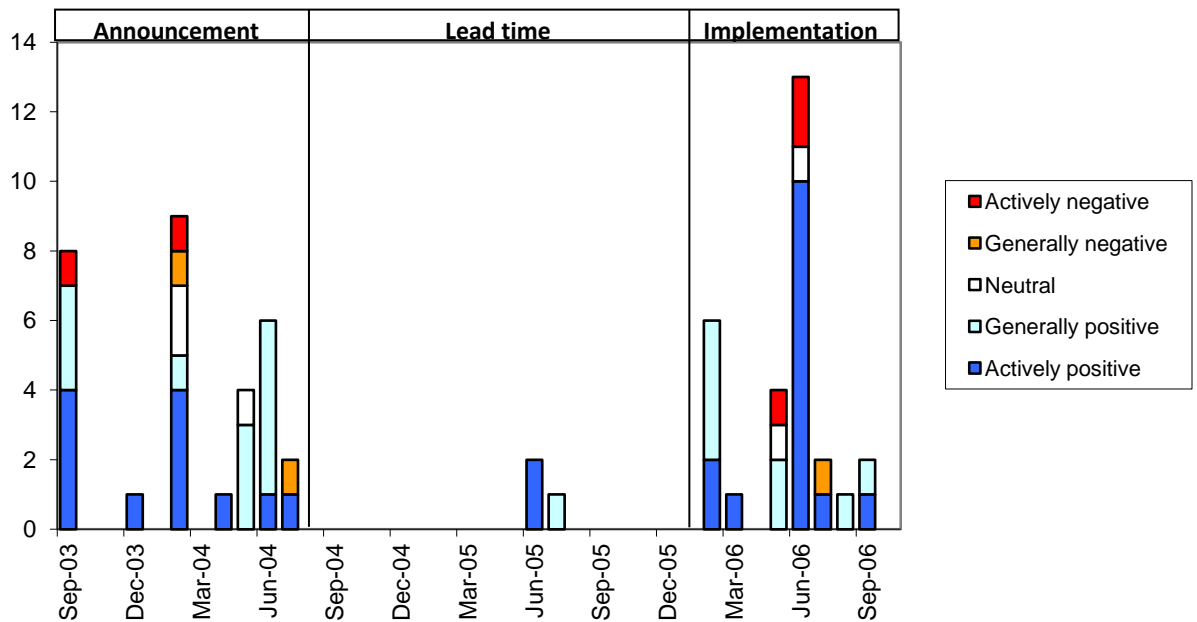
Volume of articles

During the observation period, graphic cigarette packet warnings were mentioned in 67 separate stories. Of these, 76% were "actively positive" (n=29) or generally positive (n=29) about the new warnings, 9% (n=6) were "neutral" and 15% were "actively negative" (n=5) or "generally negative" (n=5).

As depicted in Figure 2.1, print media coverage was prevalent at the time of the government announcement of its intention to legislate (September 2003) during the lead up to its implementation (February 2004) and around the time of the government's announcement of its final decision about the nature and timing of the introduction of the new warnings (June 2004).

A small number of stories appeared in June 2005, arising from a journalist's Freedom of Information search of government documents into the process of decision making about the timing and nature of the warnings. There was another spike in stories just before the warnings were to be introduced (February 2006), and another in the months following implementation (April-June 2006).

Figure 2.1: Number of media stories over time, and tone of stories



Content of articles

Articles surrounding the initial announcement of the intention to introduce graphic packet warnings contained statements from three sources: government, health agencies, and the tobacco industry. Government content included the initial announcement of intention to legislate in the next calendar year (i.e. 2004), the plan to have graphic warnings covering 50% of the front and 50% of the back of the packets and health reasons for introducing warnings.[35] During the final announcement of the revised size of warnings (30% of front and 90% of backs of packets) and revised timings(early 2006), government content included their decision to amend the size of the warnings to allow for brand communication.[96]

Tobacco industry arguments reported at the time of the initial announcement were not supportive of the introduction of the warnings. Key themes were that: the timing of implementation was too rapid and; there was no evidence on the effectiveness of warnings; that the new warnings would be anti-competitive and impinge on the ability to communicate brands/trademarks to customers; that people would use cigarette packet covers; and that the introduction of the new graphic warnings would foster a black market.[97, 98]

Articles in the lead up to the government’s final announcement, and in a smaller number of articles published a year later, reported that the tobacco industry had lobbied hard against the introduction of graphic cigarette packet warnings and that this had resulted in amendments of the size of the warnings and significant time delays.[99-102] Additional

arguments put forward by industry included: that the Australian Department of Health and Ageing bureaucrats had undertaken rushed and inadequate consultations; that industry would have to import new expensive machinery to print the new packages; that industry research with smokers demonstrated such warnings would be ineffective; that retailers would suffer harm; and that the government's small business credentials would be damaged. There was also mention of potential litigation under the Australian Constitution. Once the final announcement by government had occurred, there were neither tobacco company interviews nor positive framing of tobacco industry arguments in stories.

Health agency content was supportive of the proposed warnings, focussing on their benefits for health and their demonstrated effectiveness in promoting quitting. At the time of reported lobbying and changes to government's plans, health agencies argued for larger warnings and for a swift implementation. They also presented a case against the industry's arguments about ineffectiveness and raised questions about political donations, challenging the industry's motives.[103-105]

Stories in the lead up to the actual implementation of the warnings were all positive, covering the reasons for the warnings. There were also a small number of positive stories a few months after the warnings were introduced, at the time that an accompanying anti-tobacco television campaign was launched.[106-108]

A group of stories appeared about cigarette packet covers in the first half of 2006. Apart from one, these stories were confined to Adelaide where a sporting personality's wife was reported as selling cigarette packet covers in two teams' livery. The majority of these stories were in favour of the warnings, negative about covers and the association with the teams elicited very negative response by supporters of the sport. However, some letters to the editor at this time were negative about graphic warnings.[109-114]

In late 2006, the final few stories about graphic warnings generally referred to them as effective health interventions when discussing other topics such as potential health warnings and alcohol.[115, 116]

Point-of-sale Observations

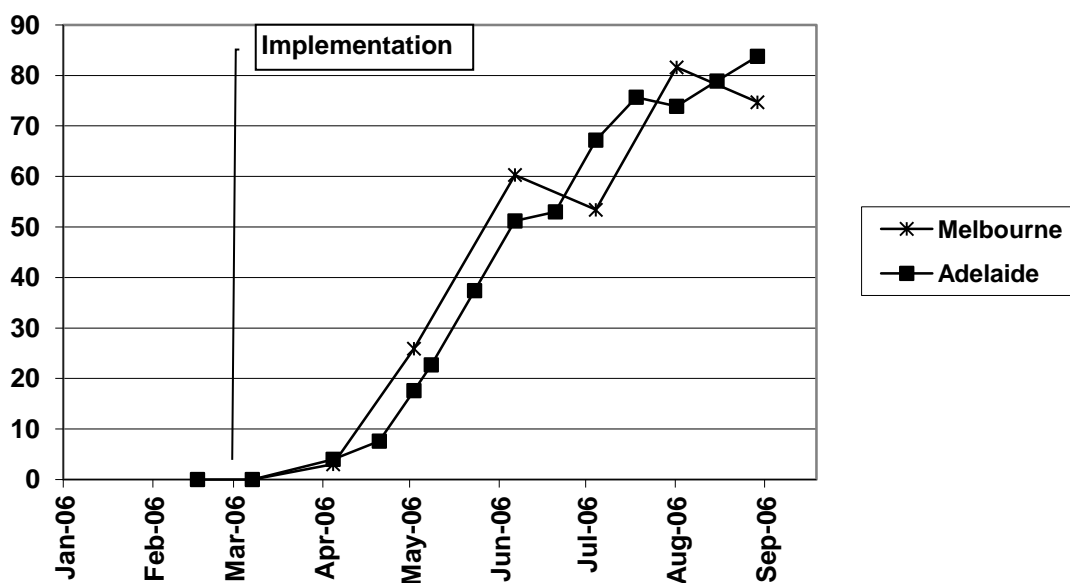
Participation

Eight stores were observed in each of Victoria and South Australia. Participation rates peaked at 100% (16 out of 16 stores) at the first visit, dropping to 88% (14 out of 16 stores) by the end of the study.

Pace of roll-out of new warnings at point-of-sale

At the time of legislative implementation (March 2006), there were no packets with new warnings in the stores visited. In April 2006, packets with new warnings were starting to appear and by June 2006, all of the observed stores had at least some cigarette packets with the new warnings. By September 2006, six months after the implementation date, around 80% of the eight top selling brands carried the new warnings (see Figure 2.2).

Figure 2.2: Percentage of cigarette packs with new warning



Other changes at point-of-sale

Between visit 1 (March 2006) and visit 7 (September 2006), two Melbourne stores had moved their cigarettes completely out of sight. In Adelaide, one store turned all cigarette packets upside down and back to front which considerably obscured new warnings. Otherwise, there were no changes to cigarette positioning or displays.

‘Special edition’ cigarette tins and cigarette packet covers were made available for sale at the time of the introduction of the legislation. These became less prevalent over time (March 2006: 4 out of 16 stores compared with September 2006: 1 out of 14 stores).

Intercept Survey

In total, 152 smokers participated in the survey; 61% of participants were female. Thirty-two smokers approached (17%) declined to participate.

Exposure to new warnings

Overall, 58% (n=88) of those interviewed were carrying a packet with them at the time with 86% of all participants (n=131) able to remember the warning on their current packet. Twenty-two participants (15%) had or reported having a packet with the old text style warnings and 109 (70%) had a packet with new graphic warnings on them. The remainder were unsure (n=17) or used a cigarette holder or tin or said that they didn't know (n=4).

Of all participants, only two (1%) said that they had never bought a packet with a new warning and were not interviewed further. The remainder (n=150) had bought a packet with the new warnings on them at some point. Six (4%) said their current pack was the first pack they had bought with new warnings, 15 (10%) had bought their first pack within the past fortnight, a further 39% had bought it within the past 3-4 weeks and 44% had bought one a month or more ago.

The pack messages that participants least recalled purchasing were “smoking – a leading cause of death” (47%) and “quitting will improve your health” (41%). The most recalled messages were “gangrene/ peripheral vascular disease” (82%) and “mouth and throat cancer” (70%).

Smokers' reactions to new warnings

Initial responses (i.e. unprompted) to the new warnings were disgust (36%), shock (6%), anger (4%), distress (1%), or feeling motivated to quit (3%). Thirty percent reported feeling indifferent. As shown in Table 1, prompted responses indicated that 55% reported feeling alert in response to the warnings, 38% (95% CI: 30-48) felt motivated to quit, and a lesser proportion 23% (95% CI: 16-30) were upset or distressed by them. Half (51%) reported that seeing new warnings increased their own risk perception of dying of a smoking-related illness.

During the course of the survey, a total of eighteen respondents indicated that they tried to avoid the warnings, with six respondents reporting buying tins and three reporting transferring cigarettes to packets with old (non-graphic) warnings.

Over half of respondents (60%) reported that the new cigarette warnings had a negative impact on the look of their brand. When offered the opportunity to comment at the end of

the interview, 47 (30%) commented in support of the new warnings. Many offered comments indicating that they thought such warnings were an important motivator to quitting and a deterrent to non-smokers, including young people. Overall, 24 (16%) offered negative comments, mostly relating to their perception that the warnings were unlikely to work.

Table 2.1: Positive and negative affect elicited by new graphic pack warnings

First reaction to the warnings (prompted) % <i>moderately to very much</i>	n=149 (95% CI)
Inspired (to quit)	29% (22-36)
Determined (to quit)	25% (18-32)
Alert	55% (47-63)
Scared	19% (13-25)
Afraid	17% (11-23)
Nervous	19% (13-25)
Upset	17% (11-23)
Distressed	10% (5-15)
Excited	3% (0-6)
Enthusiastic	4% (1-7)
Changes to perception of chances of dying from smoking related illness	n=148 (95% CI)
Increased	51% (43-59)
Decreased	1% (0-3)
No Difference	49% (41-57)
Do the warnings detract from the look of your brand?	n=149 (95% CI)
Yes	60% (52-68)
No	40% (32-48)

DISCUSSION

While Australia was among the first countries to legislate for graphic cigarette warnings, with only a handful of countries preceding it, the results of this research indicated that the introduction of graphic cigarette warnings was slower in Australia than elsewhere. In

Canada, there was a 6-month lead time from legislation to implementation and in Brazil there was a 12-month lead time. In Australia, there was a 9-month delay between the government publicly announcing its intention to legislate and its final decision about legislation content, with legislation not taking effect until a further 20 months. As reported in this paper, analysis of press coverage shows that the delays coincided, and were consistent, with the lobbying by the tobacco industry.

Australian legislation mandated a starting date for production of packets with new warnings rather than a starting date for sale in retail outlet. Thus, new packets did not appear in shops until a month after implementation and they were not prevalent until three months later. Six-months after implementation, new warnings were increasing in prevalence but had not yet reached saturation. Countries planning to introduce similar legislation may prefer to follow New Zealand's practice and legislate a sale date rather than a production date, thereby avoiding delays in implementation.

Promotion of cigarette tins and covers are often cited as a likely 'side-effect' of introducing warnings, undermining their impact. There was little evidence of retailers attempting to avoid displaying warnings by turning packets or taking other measures. The smoker intercept study also showed that while there was some use of tins and covers, they were far from generalised.

The policy intent for the new pack warning regime was to reduce tobacco use. The media coverage was supportive of graphic cigarette packet warnings, ultimately citing them as an effective intervention on which others could be modelled, e.g. alcohol. The negative news coverage was consistent in its themes, with a central theme covering the industry arguments that warnings would not be effective. Other neutral media coverage resulting from a Freedom of Information request also reported that industry lobbying of politicians was heavy and effective in delaying the introduction of the pack warnings.

Initial affective responses reported by smokers were encouraging indicating that the new packet warnings had increased their perceptions of dying from a smoking related illness, and/or they reported feeling motivated to quit in response to them. The packets with messages about mouth cancer (82%) and gangrene (70%) were the most recalled.

These results are limited in their generalisability and larger scale studies are required to validate the impact of the warnings at a population level, and to assess any impact on quitting behaviour.

Despite these limitations, the tobacco industry's public objection included the assertion that the policy would be ineffective in reducing tobacco use. It also raised brand identity and operational issues, either because it truly was the industry's main concern or because it needed a publicly-acceptable rationale for objecting. A striking feature of our results is the almost warm acceptance by many smokers of the new labelling regime. Given the 'friendship' it has been claimed smokers have for their very own brand of cigarettes[117-119] and the untiring efforts of tobacco companies to build this friendship and loyalty,[34, 120] we might expect more resentment from smokers for having their familiar pack defaced by unwelcome graphic images. It is encouraging that there was little evidence of such negativity, suggesting that even among current smokers there is at least a latent readiness to be confronted by the hard facts about the consequences of smoking.

Chapter 3

Smokers' recall of Australian graphic cigarette packet warnings & awareness of associated health effects, 2005-2008

PUBLICATION:

Miller CL, Quester PG, Hill DJ, Hiller JE. *Smokers' recall of Australian graphic cigarette packet warnings & awareness of associated health effects, 2005-2008*. BMC Public Health 2011, 11:238.

ABSTRACT

Background

In 2006, Australia introduced graphic cigarette packet warnings. The new warnings include one of 14 pictures, many depicting tobacco-related pathology. The warnings were introduced in two sets; Set A in March and Set B from November. This study explores their impact on smokers' beliefs about smoking related illnesses. This study also examines the varying impact of different warnings, to see whether warnings with visceral images have greater impact on smokers' beliefs than other images.

Methods

Representative samples of South Australian smokers were interviewed in four independent cross-sectional omnibus surveys; in 2005 (n=504), 2006 (n=525), 2007 (n=414) and 2008 (n=464).

Results

Unprompted recall of new graphic cigarette warnings was high in the months following their introduction, demonstrating that smokers had been exposed to them. Smokers also demonstrated an increase in awareness about smoking-related diseases specific to the warning messages. Warnings that conveyed new information and had emotive images demonstrated greater impact on recall and smokers' beliefs than more familiar information and less emotive images.

Conclusions

Overall graphic pack warnings have had the intended impact on smokers. Some have greater impact than others. The implications for policy makers in countries introducing similar warnings are that fresh messaging and visceral images have the greatest impact.

BACKGROUND

The World Health Organisation's Framework Convention on Tobacco Control (FCTC) is a global health treaty designed to help curb the global tobacco epidemic and associated burden of disease and mortality.[25] Countries that ratify the FCTC commit themselves to a schedule of tobacco control legislative reform in an effort to advance disease prevention and health promotion. The regulation of packaging and labelling of tobacco products is one component of a comprehensive approach (see Articles 6-14). Australia was one of the first 40 countries to ratify the FCTC, and so became a full Party on 27 February 2005. In early 2006, Australia followed Canada, Brazil, Singapore, Thailand, Venezuela and Panama in introducing new graphic cigarette packet warnings.[39] Many other countries have since introduced them or are in the process of doing so.

Cigarette packet warnings are an important form of health communication to consumers. Australia's graphic health warnings were designed to provide "a strong and confronting message to smokers about the harmful health consequences of tobacco products and convey the 'quit' message every time a person reaches for a cigarette".[36] The stated intention was that graphic images would increase consumer awareness of the health effects of smoking, which would in turn decrease likelihood of smoking.[36]

Theories of consumer behaviour and social psychology predict that a number of predisposing variables influence behaviour and the probability of behavioural change, with people's beliefs being an important contributor.[61, 66, 75, 121] Consumer behaviour theory holds that behaviour change, such as stopping smoking, can be induced by increasing consumer perception that the behaviour is a 'problem' for them, requiring behavioural modification.[75] By increasing a person's belief that smoking leads to negative health consequences, pack warnings could change the consumer's satisfaction with his/her current status as a smoker and induce (or increase) his/her desire to quit, increasing the chances that s/he would try to quit.

It has been widely demonstrated that beliefs which are 'top of mind' for people or salient are also more likely to influence behaviour.[1, 66] Hence, if pack warnings increase a person's awareness that smoking leads to particular negative health consequences, and the beliefs about those health consequence are salient for the smoker, they would be more likely to influence quitting behaviour.

Of course, other factors can also induce behavioural change such as other internal factors[61] and social and environmental factors also influence smoking behaviour.[66]

Beliefs are, however, an important antecedent of behaviour change, and one that has the potential to be influenced by information contained in graphic cigarette packet warnings.

In order to change beliefs, consumer information first has to be noticed and attended to. Tobacco health warnings have also been shown to be effective in attracting and maintaining attention, as well as assisting information processing, provided the messages are clear, noticeable, strong, direct and frequently rotated.[71] International studies have demonstrated greater knowledge about particular health effects in countries where those health effects are the subject of a cigarette packet warning than in countries where they are not.[82] These studies have confirmed that smaller text-based cigarette packet warnings have lesser impact while larger warnings, including those with clear, simple language and graphic images, are associated with: better knowledge; higher recall; greater motivation to quit; and quit attempts.[82, 83, 89, 122-124] Some smokers also take steps to avoid stronger warnings, particularly some graphic warnings.[89] Borland et al. found no evidence that warning avoidance, arguably a defensive reaction against fear-arousing warnings, had a negative effect on quitting behaviour.[125]

The new Australian graphic cigarette pack warnings (available for view elsewhere[40]) are larger than ever seen before on Australian cigarette packets and cover 30% of the front and 90% of the back of the pack. The graphic image of a health effect contrasts with the otherwise appealing aesthetics of the rest of the cigarette packaging. The Quitline number is ‘stamped’ on top of the graphic image on the backs of packs.

There are 14 different warnings divided into two sets; Set A and Set B.[36] The sets of warnings are rotated 12-monthly, including a 4 month transition period, during which any of the warnings from either set may appear. Set A only could appear on packs manufactured or imported from 1 March– 31 October 2006. Set B only could appear on packs manufactured or imported from 1 March– 31 October 2007.

The packs include a combination of new and familiar images and new and familiar messages. Some messages had been on text-based packets for some time; others had not. Some images and messages had been used before in televised anti-tobacco social marketing campaigns; others had not. Table 3.1 lists the new warnings and the extent to which the text and imagery is new to Australian smokers. For example, “Smoking causes peripheral vascular disease”, and “Smoking causes mouth and throat cancer” were unique in that they contained both new images and new messages and had not previously been the subject of text-based pack warnings or social marketing campaigns. Hence, these warnings would be novel for many smokers. By contrast “Smoking causes lung cancer” was

introduced as a text-based pack warning in 1987 and the image on the packet was used in a televised anti-tobacco campaign from 1997.

We wanted to explore the changes in recall of the new warnings over time as well as changes in beliefs about the health effects of smoking, associated with the new system of graphic warnings. We also looked at the differential impact of individual new health warnings on smokers, given that the extent to which each of the new warnings: captures attention; delivers new information (or old information in new ways); is comprehended; changes awareness or beliefs about health effects; and is recalled, are all important aspects of information processing. These variables influence the degree to which different warnings may influence behaviour change.

One study has already indicated that Australian warnings were noticed by the majority of adolescents and led to increased cognitive processing about the health risks covered.[126] Another study demonstrated that new Australian health warnings were read and noticed more than UK's text only warnings and that they stimulated thoughts about the harms of smoking, thoughts about quitting and the behaviour of foregoing cigarettes.[127] Our study measured changes in smokers' basic beliefs about the different harms of smoking, at the adult population level over time, as the various warnings were rolled out. The study also measured degree of recall of specific warnings. In this study, changes in beliefs and recall were measured across smokers in the community as a whole and among different subgroups, such as younger smokers. The purpose of these sub-group analyses was to ascertain whether graphic cigarette packet warnings had differential impact with different demographic groups of smokers or whether any impact was universal. Anti-tobacco television campaigns have consistently demonstrated that images and messages eliciting a visceral response and messages that are novel or "new news" are more likely to be attended to and have impact on quitting behaviour.[128-130] Hence, it is hypothesized that new packet warnings which are most novel or contain the newest 'news' for smokers will result in the greatest attention to the pack warnings themselves, greatest recall of warnings and greatest increases in basic beliefs about smoking related illnesses. It is further hypothesized that visceral images will have greater impact on these variables than other images.

Table 3.1: New cigarette packet warnings and previous use of warning components in Australia

Text	Image	First use of warning components		Previous TV anti-smoking campaign on health effect
		Text	Image	
<u>Set A</u>				
Smoking causes peripheral vascular disease	Gangrenous foot	2006 (Mar)	2006 (Mar)	No
Smoking causes emphysema	Dissected lung	2006 (Mar)	1997	Yes
Smoking causes mouth and throat cancer	Cancerous lip	2006 (Mar)	2006 (Mar)	No
Smoking clogs your arteries	Dissected artery	2006 (Mar)	1997	Yes
Don't let children breathe your smoke	Child on oxygen	2006 (Mar)	2006 (Mar)	Yes
Smoking - a leading cause of death	Bar chart	2006 (Mar)	2006 (Mar)	Yes
Quitting will improve your health	Quitline caller	2006 (Mar)	1998*	Yes
<u>Set B</u>				
Smoking causes blindness	Eye close up	2006 (Nov)	2000	Yes
Smoking doubles your risk of stroke	Dissected brain	2006 (Nov)	1998	Yes
Tobacco smoke is toxic	Beaker of chemicals	2006 (Nov)	2000*	Yes
Smoking harms unborn babies / (Smoking while pregnant may harm the unborn child)	Premature baby	2006 (Nov) / 1995	2006 (Nov)	No
Smoking is addictive	Stained fingers	1995	2006 (Nov)	Yes
Smoking causes lung cancer	Tumour close up	1987	1997	Yes
Smoking causes heart disease	Heart surgery	1987	2006 (Nov)	Yes

* Essentially equivalent image to that was used in television campaign

Other factors likely to influence behaviour change, including perceived ability to change behaviour, social and environmental factors are beyond the scope of the current study.

METHODS

Sample

Data were collected as a part of the South Australian Health Omnibus Surveys; annual independent cross-sectional surveys of the South Australian population, undertaken from September to November. These population surveys involve a multistage, systematic, clustered area sample of households, with Australian Bureau of Statistics Collector's Districts as the sampling frame. Greater details on sampling are provided elsewhere.[131] At each selected household, one person aged 15 years or older whose birthday was due next was selected for interview. Structured interviews were conducted in the respondents' own homes by trained interviewers. Up to six call-back visits were made to each household in an attempt to obtain an interview if the respondent was not home.

The South Australian Health Omnibus Survey tool used the same methods each year. Data were weighted by household size, age, gender and local government area, so that estimates would reflect the South Australian population. Hence, the samples are directly comparable from year to year. Studies measuring changes over time in behaviour and attitudes in the South Australian population, using this tool and its comparable samples, have been accepted in many areas of inquiry.[132-136]

Data for this study were collected in the South Australian Health Omnibus Surveys of 2005, 2006, 2007 and 2008. The survey achieved response rates of 70.9%, yielding 3047 interviews in total and 571 smokers in 2005; 63.8% with N=2969 (609 smokers) in 2006; 62.7% with N=2401 (478 smokers) in 2007; and 53.6% with N=2824 (553 smokers) in 2008. Despite different response rates the samples from the four survey years did not differ significantly in age, gender or quitting experience. Respondents were classified as smokers if in response to the question: "Do you currently smoke: daily; at least weekly (but not daily); less often than weekly; or not at all", they answered other than "not at all". Similarly, respondents were classified as smokers of manufactured cigarettes according to their responses to the question "How often do you smoke manufactured cigarettes: Daily, weekly; less than weekly; or not at all". This study is restricted to the responses of smokers of manufactured cigarettes. Non-smokers (never-smokers and ex-smokers) were not

included in this study because it was not expected that they would be exposed to or attuned to cigarette packet warnings.

The 2005 survey occurred before any new packet warnings were introduced, the 2006 survey occurred after Set A warnings were introduced and became prevalent in stores[137] but before Set B warnings were rolled out. The 2007 survey occurred after Set B warnings were introduced.

Measurements

Participants were asked a series of questions. To measure top of mind awareness of the effects of smoking, participants were first asked “Which illnesses are caused by smoking?” Participants were not prompted with response options. Some but not all of the pre-coded response options matched the new warnings, as listed in Table 2. To assess recall of pack warnings, participants were asked “In the past 6 months, how often, if at all, have you noticed advertising or information that talks about the dangers of smoking, or encourages quitting”. Prompted response options were “never”, “rarely”, “sometimes”, “often” or “very often”. If they did not respond “never” they were then asked “Where did you see that information?” Unprompted pre-coded responses included “TV”, “radio”, “cigarette packets”, “cinema” and “internet”. Smokers and ex-smokers were later asked “As far as you know, what do the warnings on cigarette packets say?” Pre-coded options for the unprompted responses included all new and previous cigarette packet warnings as well as “Quitline number”, “Pictures of effects of smoking” and “Don’t know/can’t remember”. Participants were also asked “Can you tell me the name of any services or programs available to help people quit smoking”. Unprompted response options were “Quitline”, “Quit campaign”, “Nicotine Replacement Therapy”, “Zyban/bupropion”, “Talking to a doctor”, “Alternative Therapy”, “Other” and “Don’t know”. Subsequent to that, smokers were asked whether “During the past year, you have done any of the following: “Called the Quitline”, and so on for other quitting services. All of these questions have been routinely used in the South Australian Health Omnibus Survey for 10 years.

Newness or novelty of text and images included in the graphic cigarette packet warnings is defined by their use in previous population based tobacco control interventions, namely text-based cigarette packet warnings and mass media cessation campaigns. Table 1 provides information about previous use of pack warnings text content and images. When text has been used previously in text-based cigarette packet warnings it is classified as “old”. When text has not been used previously in text-based cigarette packet warnings it is

classified as “new”. When images have been used in mass media campaigns previously they are classified as “old” and when they have not they are classified as “new”.

Statistical Analyses

Data analyses were undertaken using STATA v10.0. STATA provides survey estimating tools required to account for this survey design. The survey estimating tools adjust the standard errors to account for the design which involved clustering by Australian Census District, stratification (metropolitan vs rural) and data that are weighted to the population. Inter-year and intra-year differences between proportions were analysed using Pearson chi-square statistics which are then converted in to F-statistics to account for survey design.

RESULTS

Respondents

The South Australian Health Omnibus Survey samples reflected the South Australian population. In the 2005 survey, for example, 49.0% of respondents were male. Overall, 23.7% were aged 15-29, 27.9% were aged 30-44, 24.0% were aged 45-59 and 24.3% were aged 60+. In 2005, 77.5% of respondents were Australian born (with 3.5% of respondents being Indigenous Australians), 9.4% were from the UK or Ireland; 6.4% were European born and 6.1% were born in other countries. Overall, 6.5% of respondents were still at school, 12.5% did not complete high school, 28.2% had high school education only, 36.3% had completed a trade or certificate and 15.9% had completed a university degree. In 2005, 18.7% of the sample were current smokers and 16.5% (n=504) were smokers of manufactured cigarettes. In 2006, 20.5% were smokers and 17.7% (n=525) smoked manufactured cigarettes. In 2007, 19.9% were smokers and 17.2% (n=414) smoked manufactured cigarettes. In 2008, 19.6% were smokers and 16.4% (n=464) smoked manufactured cigarettes.

Awareness of health effects

Table 3.2 shows the changes in awareness about different health consequences of smoking over time. Top-of-mind responses that smoking caused gangrene increased 6-fold between

baseline (2005) and the next year when those warnings were introduced (2006). Awareness that smoking caused mouth cancer more than doubled. Top-of-mind awareness that smoking caused blocked arteries, blindness, stroke, throat cancer and harm to unborn babies all rose significantly after the related warnings were introduced.

Table 3.2: Awareness of health effects, Quitline and use of Quitline (unprompted) (*smokers of manufactured cigarettes only*)

		2005 (n=504)	2006 (n=525)	2007 (n=414)	2008 (n=464)
Beliefs that smoking causes illness and/or damage to the body					
<u>Set A related beliefs</u>	<u>Text/Image</u>				
Emphysema	New/Old	60%	59%	57%	52%
Mouth cancer	New/New	10%	24% ^a	21% ^a	21% ^a
Throat cancer	New/New	14%	17%	17%	22% ^b
Gangrene	New/New	4%	27% ^a	25% ^a	28% ^a
Blocked arteries	New/Old	10%	19% ^b	14%	12% ^β
<u>Set B related beliefs</u>					
Blindness / Eye damage	New/Old	16%	11%	25% ^b	16% ^φ
Stroke	New/Old	9%	8%	17% ^b	11% ^φ
Harms unborn babies*	New/Old	8%	5%	13% ^c	13%
Addiction [#]	Old/New	7%	10%	10%	10%
Heart disease [#]	Old/New	39%	34%	36%	33%
Lung cancer [#]	Old/New	55%	53%	55%	55%
<u>'Control' beliefs</u>					
Asthma	n/a	20%	19%	15%	6% ^a
Cough	n/a	9%	6%	8%	12%
Blood pressure	n/a	11%	7%	7%	7%
Impotence	n/a	0%	0%	<1%	<1%
What services are available to help smokers quit					
Quitline		71%	75%	81% ^a	78% ^c
Correct recall of Quitline number		5%	n/a	14% ^b	n/a
Method of quit attempt (of those who tried to quit in the past year)		(n=201)	(n=209)	(n=163)	(n=164)
Called the Quitline		7%	8%	11%	12%

* Similar to previous warning "smoking in pregnancy may harm the unborn child"

Old warnings and new warning

^a Significant difference from baseline (2005) p<0.001

^b Significant difference from baseline (2005) p<0.01

^c Significant difference from baseline (2005) p<0.05

^β Significant difference from 2006 p<0.01

^φ Significant difference from 2007 p<0.05

Between baseline and 2006 and/or 2007 and/or 2008, significant increases in awareness occurred for nearly all diseases which were also the subject of new pack warnings. No

increases were observed in awareness about emphysema, lung cancer, heart disease or addiction, all of which started from a high baseline and/or were already warnings on packs. No increases were observed in health effects unrelated to pack warnings e.g. asthma and impotence.

Unprompted awareness of the Quitline as a service available to help smokers quit rose significantly over time, as did the proportion of smokers able to recite the Quitline number.

Recall of warnings

Table 3.3 shows that general recall of anti-tobacco advertising among smoking participants increased markedly in the year that pack warnings were introduced. This effect was specific to cigarette pack warnings, in that while there was a more than doubling in participants reporting (unprompted) they had noticed anti-tobacco information on cigarette packets, virtually no change was observed in relation to television or other sources. Cigarette packets became the second most cited source of anti-tobacco messaging after television. When prompted, 86% of smokers reported noticing new warnings on cigarette packets.

Immediately after the two-phased introduction of the new pack warnings, for all the new health warnings significant increases were observed in the proportion of smokers recalling new messages. There was no increased recall of any of the new graphic warnings that retained old messages. The long standing warning “Smoking causes lung cancer” remained the most recalled (48%), followed by the totally new “Smoking causes peripheral vascular disease” (40%), “Smoking causes throat and mouth cancer” (32%), “Smoking causes heart disease” (31%) and “Smoking harms unborn babies” (31%). Recall was lowest for “Tobacco smoke is toxic” (4%), “Quitting will improve your health” (6%), “Smoking – a leading cause of death” (10%). The graphic new version “Smoking is addictive” remained low at 8%. The mean absolute change for “new”/“new” warnings (i.e. packs with new images and new text; n=4) was 23% and the mean absolute change for “new”/“old” and “old”/“new” packs (n=9) was 7%.

Differences between subgroups

Table 3.4 shows the difference responses of sub-groups to the new warnings. All groups were significantly more likely to report noticing cigarette warnings after the new warnings were introduced.

“Smoking harms unborn babies” was more recalled by younger smokers. Female smokers were more likely to recall warnings relating to gangrene, mouth cancer and children than their male counterparts. These were the exception; more often than not, there were no significant differences in recall of the warnings between sub-groups. Generally, warnings with the highest increased recall overall (e.g. “gangrene” and “mouth and throat cancer”), were also the warnings with the highest increases in recall among all sub-groups. Generally, warnings that had weaker recall overall were also the weakest within the sub-groups.

Younger smokers were significantly better able to recount the Quitline number than older smokers after it was introduced onto cigarette packets, showing a dramatic increase from baseline. After the new warnings were introduced, awareness of the Quitline number increased in both smokers interested to quit in the next 6 months and those not interested. A greater gain was observed among smokers not (yet) seriously considering quitting.

Effects over time

Tables 3.2 and 3.3 present data from 2005 to 2008. Data in Table 3.3 show that cigarette packets remained a noticed source of anti-tobacco advertising. Table 3 shows indications of decline in recall of warnings introduced in early 2006 (Set A) during 2007, with some recall rebounding again in 2008. Similarly, some fall off of Set B warnings recall occurred in 2008. Table 3.2 shows very little evidence of decline in recall of health effects of smoking specific to new packet warnings, 2 years post first implementation. Table 3.3 shows that two-years post implementation, “Smoking causes lung cancer” remained the highest recalled pack (46%), followed by a second tier: “peripheral vascular disease”, “heart disease”, “emphysema”, “unborn babies”, “mouth and throat cancer” ranging from 30% to 24% unprompted recall. Those with lowest impact initially remained low, with recall ranging down to 4% for “toxic” and “addictive”.

Table 3.3: Noticing warnings and recall of specific pack warnings (unprompted)
(*smokers of manufactured cigarettes only*)

Noticed anti-tobacco advertising in the past 6 months		2005 (n=504)	2006 (n=525)	2007 (n=414)	2008 (n=464)
% often or very often		67%	89% ^a	91% ^a	93% ^a
Where - % on TV		89%	93%	91%	93% ^c
Where - % on radio		19%	22%	20%	24%
Where - % on Internet		<1%	1%	1%	2% ^c
Where - % on cigarette packs		20%	56% ^a	57% ^a	53% ^a
Notice warnings on cigarette packets (prompted)					
% Often or very often		63%	86% ^a	-	-
Recall of new warnings					
Pictures		0%	14% ^a	9% ^a	12% ^a
Quitline number		<1%	9% ^a	10% ^a	12% ^a
Set A	Text/Image				
Smoking causes emphysema	New/Old	3%	23% ^a	20% ^a	27% ^a
Smoking causes mouth and throat cancer	New/New	<1%	32% ^a	16% ^{a,α}	24% ^a
Smoking causes peripheral vascular disease	New/New	0%	40% ^a	26% ^{a,α}	30% ^{a,α}
Smoking clogs your arteries	New/Old	<1%	11% ^a	7% ^{a,χ}	14% ^{a,δ}
Smoking – a leading cause of death	New/New	2%	10% ^a	5% ^c	10% ^a
Quitting will improve your health	New/Old	0%	6% ^a	5% ^a	7% ^a
Don't let children breath in your smoke	New/New	1%	13% ^a	2% ^α	7% ^{c, α, δ}
Set B					
Smoking causes blindness	New/Old	<1%		17% ^a	12% ^{a,φ}
Smoking doubles your risk of stroke	New/Old	<1%		9% ^a	5% ^a
Tobacco smoke is toxic	New/Old	<1%		4% ^a	4% ^b
Smoking harms unborn babies*	Old*/New	29%		31%	25%
Smoking is addictive [#]	Old/New	8%		8%	4% ^c
Smoking causes heart disease [#]	Old/New	38%		31% ^c	28% ^b
Smoking causes lung cancer [#]	Old/Old	56%		48% ^c	46% ^b
Don't know/can't remember		2%	3%	5% ^c	5% ^c

* Very similar to previous warning "smoking in pregnancy may harm the unborn child"

Old warnings and new warning

^a Significant difference from baseline (2005) p<0.001

^b Significant difference from baseline (2005) p<0.01

^c Significant difference from baseline (2005) p<0.05

^α Significant difference from 2006 p<0.001

^χ Significant difference from 2006 p<0.05

^δ Significant difference from 2007 p<0.001

^φ Significant difference from 2007 p<0.05

Table 3.4: Unprompted recall of health warnings by sub-group (smokers of manufactured cigarettes only)

	Notice packs (unprompted)		Gangrene		Emphysema		Mouth & Throat		Arteries		Don't let children		Cause of death		Quitting	
	2005	2006	2005	2006	2005	2006	2005	2006	2005	2006	2005	2006	2005	2006	2005	2006
Age groups																
15-29 years (n ₂₀₀₅ =135; n ₂₀₀₆ =159)	26.1	60.7 ^α	0.0	39.5 ^α	2.2	19.8 ^α	1.7	36.5 ^α	0.0	7.6 ^χ	0.7	18.4 ^α	2.2	12.2 ^β	0.0	2.6
30-44 (n ₂₀₀₅ =205; n ₂₀₀₆ =168)	15.4	56.5 ^α	0.5	46.5 ^α	3.4	29.4 ^α	0.3	31.2 ^α	0.5	11.7 [⊥]	1.2	12.6 ^α	1.4	8.0 ^χ	0.0	7.0 ^β
45-59 (n ₂₀₀₅ =109; n ₂₀₀₆ =130)	20.5	52.8 ^α	0.4	37.0 ^α	5.8	21.8 ^α	1.6	28.3 ^α	0.0	13.6 ^α	0.9	8.4 ^α	2.1	10.1 ^χ	0.4	9.0 ^α
60+ (n ₂₀₀₅ =55; n ₂₀₀₆ =68)	25.7	46.9 ^χ	0.0	30.2 ^α	1.6	18.7 ^α	0.0	28.8 ^α	0.9	15.4 ^β	0.0	7.4	0.0	5.7 ^χ	0.0	4.2
Sex																
Male (n ₂₀₀₅ =258; n ₂₀₀₆ =284)	18.9	52.5 ^α	0.2	33.4 ^α	2.9	24.9 ^α	0.8	24.1 ^α	0.4	8.5 ^α	0.8	8.0 ^α	2.6	6.5	0.2	4.4 ^α
Female (n ₂₀₀₅ =246; n ₂₀₀₆ =241)	22.1	59.3 ^α	0.4	47.6 ^α	4.0	21.2 ^α	0.9	40.8 ^α	0.2	14.8 ^α	1.0	18.1 ^α	0.6	13.0 ^α	0.0	7.5 ^α
Planning to quit in next 6 months																
Yes (n ₂₀₀₅ =275; n ₂₀₀₆ =287)	18.9	54.7 ^α	0.0	38.8 ^α	3.2	21.6 ^α	0.6	34.5 ^α	0.4	9.2 ^α	1.4	14.0 ^α	1.6	8.5 ^β	0.0	6.0 ^α
No/Can't say (n ₂₀₀₅ =229; n ₂₀₀₆ =235)	22.3	56.7 ^α	0.6	41.3 ^α	3.7	25.2 ^α	1.3	28.5 ^α	0.2	14.1 ^α	0.3	11.0 ^α	1.6	10.7 ^α	0.2	5.6 ^α
TOTAL (n₂₀₀₅=504; n₂₀₀₆=525)	20.5	55.6^α	0.3	40.0^α	3.4	23.2^α	0.9	31.8^α	0.3	11.4^α	0.9	12.7^α	1.6	9.5^α	0.1	5.8^α
	Correct recall Quitline no.		Unborn babies		Blindness		Lung cancer		Heart disease		Stroke		Addictive		Toxic	
	2005	2007	2005	2007	2005	2007	2005	2007	2005	2007	2005	2007	2005	2007	2005	2007
Age groups																
15-29 years (n ₂₀₀₅ =135; n ₂₀₀₇ =119)	7.2	d 26.8 ^β	27.4	d 41.3	0.9	11.9 ^α	b 59.3	50.2	45.9	28.7 ^χ	0.7	5.4 ^χ	c 12.9	11.6	c 1.9	4.1
30-44 (n ₂₀₀₅ =205; n ₂₀₀₇ =148)	5.8	11.9	33.6	34.2	0.2	19.9 ^α	62.6	56.0	36.9	38.0	0.7	10.5 ^α	8.9	8.3	0.0	5.6 ^α
45-59 (n ₂₀₀₅ =109; n ₂₀₀₇ =109)	1.0	6.8 ^β	25.6	22.4	0.0	20.3 ^α	51.6	41.0	35.0	26.9	0.7	10.7 ^β	2.6	4.2	0.0	3.5 ^χ
60+ (n ₂₀₀₅ =55; n ₂₀₀₇ =39)	0.0	1.8	18.3	13.0	0.0	13.1 ^β	33.2	38.3	26.7	22.0	0.0	7.5 ^χ	5.4	8.3	0.0	3.6
Sex																
Male (n ₂₀₀₅ =258; n ₂₀₀₇ =200)	5.9	10.7	29.4	28.0	0.2	14.5 ^α	58.1	45.1 ^χ	39.1	29.2	0.9	8.3 ^α	6.9	7.9	0.0	4.4 ^β
Female (n ₂₀₀₅ =246; n ₂₀₀₇ =214)	3.6	16.8 ^α	27.6	34.1	0.5	19.5 ^α	54.1	52.1	36.4	32.6	0.3	9.3 ^α	9.6	8.5	1.0	4.5 ^χ
Planning to quit in next 6 months																
Yes (n ₂₀₀₅ =275; n ₂₀₀₇ =209)	5.9	12.9 ^χ	27.9	35.8	0.2	18.3 ^α	59.2	51.2	41.0	32.8	0.5	9.8 ^α	7.6	8.0	0.3	3.7 ^β
No/Can't say (n ₂₀₀₅ =229; n ₂₀₀₇ =205)	2.8	14.8 ^β	29.3	26.4	0.5	15.8 ^α	52.5	46.2	33.9	29.0	0.8	7.8 ^α	9.0	8.4	0.8	5.1 ^χ
TOTAL (n₂₀₀₅=504; n₂₀₀₇=414)	4.5	13.9^β	28.5	31.1	0.3	17.1^α	56.1	48.7^α	37.8	30.9^α	0.6	8.8^α	8.2	8.2	0.5	4.4^α

Significant difference between years: Chi-square: α = p<0.001; β = p<0.01; χ = p<0.05

Significant differences within year (between subgroups): Chi-square: a = p<0.001; b = p<0.01; c = p<0.05; Chi-square for trend: d = p<0.001

DISCUSSION

This study demonstrates that new graphic cigarette packet warnings coincided with increased awareness among smokers of the health consequences of smoking observed in cross-sectional surveys of South Australian smokers across four years. While it is possible that these increases in awareness of smoking related illnesses may have happened due to other influences or by chance, new graphic cigarette packet warnings are the most likely cause of the increases in awareness of smoking related disease.

Over the time that new graphic cigarette pack warnings were introduced, we observed substantial increases in top-of-mind awareness of diseases that were the subject of new warnings, and no increases in awareness of other health effects. Further supporting evidence was provided by the increased proportion of smokers who reported noticing warnings on cigarette packets after the new warnings were introduced. We also observed significant increases in smokers' unprompted recall of pack warnings as a source of anti-tobacco information. Again, this effect was isolated to pack warnings and not generalised to other sources such as television. After the new warnings were introduced, cigarette packets became second only to television as a recalled source of anti-tobacco messages for smokers. Arguably, noticing anti-tobacco messages on television could be at saturation point, after 20 years of regular anti-smoking campaigns. However, there was no increase in noticing messages on the less used media of radio or on the internet.

As observed in this study, it has been demonstrated previously that new messages delivered via television campaigns can markedly increase awareness of smoking related diseases in a 6-month period. As was the case in this study, the effects on awareness were specific to the diseases highlighted in the advertisements and not generalised to all smoking related illnesses.[128]

Similar to the Canadian experience,[89] cigarette packets became a prominent important source of anti-tobacco information after graphic cigarette warnings were introduced, and they remained so in the 2 years after they were introduced. In this study there was some evidence of a spike of recall of new warnings with some short term attrition, followed by more steady results. Importantly, most of the data in this study are on unprompted recall, so it is to be expected that top-of-mind recall of warnings and associated health beliefs would be highest in the year that new warnings are introduced, and that it might subsequently be displaced from top of mind by more recent warnings. This would be consistent with Fishbein & Ajzen's[66] contention that people's salient beliefs about the consequences of any contemplated action do not exceed 5-9 in number. Warning and

health effect recall does appear to stabilise but more longitudinal data are required to ascertain longer term effects.

The impact varied greatly between warnings. “Smoking causes:-heart disease” and “lung cancer” are warnings that have been on Australian cigarette packets for a long time (as text-based warnings). They are also diseases which a high proportion of smokers were already aware were caused by smoking, at baseline. Awareness of these diseases and recall of these pack warnings remained high but demonstrated no improvement once the new graphic warnings were introduced. “Smoking is addictive” was also a graphic adaptation of an old text-based warning. Like “heart disease” and “lung cancer” messages, no significant increase was observed in awareness of the relationship with smoking, or in recall of the warnings. However, unlike “heart disease” and “lung cancer”, “addictive” stayed at a low level on both measures. At baseline, smokers already had a high awareness of the relationship between smoking and emphysema. The introduction of the completely new “emphysema” warning (with a familiar graphic – see Table 6.1), did increase recall of the warnings but did not shift the already high awareness of the disease among smokers. These four cases suggest that adding a graphic image (or at least these graphic images) to an old warning or an “old news” disease did nothing to improve awareness or recall.

By contrast, when baseline awareness of a disease/damage caused by smoking was low, and the disease/damage had not previously been used as a pack warning, awareness grew very significantly. Greatest growth in awareness was observed in relation to gangrene (4% to 27%) and mouth cancer (10% to 24%), both of which were “new news” and contained new images. Even topics that involved new warnings but images and messages which had been the subject of previous tobacco control campaigns (see Table 6.1) induced significant growth in awareness: “blocked arteries” increased 8%; “blindness” increased 9%; and “stroke” increased 8%. Hence, based on these examples, adding a new graphic image (or at least these graphic images) to a new warning would seem to improve awareness considerably, as does adding a familiar graphic image to a new warning.

Moreover, those warnings most recalled across the board and in different subgroups were those which were “new news”, and used new images and particularly images of body parts likely to elicit a visceral “yuck” response. “Gangrene” (40% unprompted recall) and “mouth cancer” (32%) were dominant in this sense. Although “heart disease”, “lung cancer” and “harms unborn babies” were also recalled well (49%, 31% and 31% respectively) and contained visceral or emotive images, the new packs failed to provoke an

improvement in recall over baseline, suggesting their high recall cannot be attributed to the graphic imagery.

The warnings with weakest recall were “Tobacco smoke is toxic” (4%), “Smoking is addictive” (8%), “Quitting will improve your health” (6%), “Smoking – a leading cause of death” (11%). With the exception of “Smoking is addictive” all of these warnings are general rather than specific about the consequences of smoking and none of these warnings contain images of body parts. Anti-tobacco television campaigns have consistently demonstrated that images and messages eliciting a visceral response and messages that are novel or “new news” are more likely to be attended to and have impact on quitting behaviour.[76, 129, 130] This study demonstrates that these findings are generalisable to cigarette pack warnings. This study also demonstrates that these findings apply to smokers in general, as well as to and different subgroups of smokers.

The addition of the Quitline number to the cigarette packet appears to have increased general top-of-mind awareness of the availability of the Quitline service. This is noteworthy because the Australian Quitline has been operating for over two decades and already enjoyed high levels of awareness. Although not significant, a coincident trend was observed in increased use of the Quitline as a source of help to quit. The proportion of smokers who knew the Quitline number doubled; and in 2007, one in eight smokers could recite the number accurately. An independent study demonstrated that calls to the Australian Quitline doubled in the year after the new warnings were introduced.[138]

Health promotion often aims to segment different messages for different markets in the expectation of having greater impact. The case has been made, using mass-media quit campaigns as the example, that this is unnecessary and even counter-productive because it comes at a cost, namely the dilution of resources required for population-wide campaigns.[139] Comparisons between warnings as well as comparisons between population sub-groups show that what “works”, works well across the board and what “doesn’t work” across the board, also doesn’t work well with any subgroup. The only exception in this study was the greater propensity shown by women and younger smokers to respond to warnings about unborn babies and children, presumably because of their closer specific personal relevance. Overall, this study provides another example of a population-based intervention working well with both smokers generally and within subgroups, building the case for non-segmented interventions.

This study provides clear evidence that Australia’s new graphic cigarette packets succeeded in attracting the attention of Australian smokers. A limitation of this study is

that it did not explicitly ask smokers what, about the different warnings, attracted their attention, nor did it ask smokers directly about their perceptions of the credibility of different warnings. Some warnings may have been better recalled than others because smokers thought they made outrageous and incredible claims. However, this study provides evidence that smokers did find the highly recalled warnings credible. The fact that smokers' unprompted recall of illnesses caused by smoking increased, in line with the increased recall of warnings is evidence of this. Changes in awareness about the harms of smoking are an important antecedent to behaviour change for many smokers. Whether behaviour change did follow was not been measured in the current study.

This study provides support for the Framework Convention on Tobacco Control Article 11, mandating large cigarette packet warnings and recommending graphic imagery. Tobacco control policies, such as the FCTC and Australia's National Tobacco Control Strategies, recognise the complexity of smoking behaviour and the multiple behavioural and structural interventions required to reduce tobacco's toll. Graphic cigarette packet warnings play a role as one component of a comprehensive suite of tobacco control interventions.

CONCLUSIONS

In conclusion, Australian graphic cigarette packet warnings have been shown in this study to have caught the attention of Australian smokers who have extended the range of their beliefs about the harmful consequences of smoking. Lessons for policy makers planning to introduce graphic warnings are that, as with anti-tobacco television campaigns, "new news" attracts more attention than "old news" and visceral images are more powerful than other graphics. The importance of "new news" should also be considered by policy makers in countries where graphic warnings have already been introduced, as many of the health effects of smoking are unfamiliar to many smokers and an opportunity exists to increase awareness by updating and rotating warnings.

Chapter 4

Impact on the Australian Quitline of new graphic cigarette pack warnings including the Quitline number

PUBLICATION:

Miller CL, Hill DJ, Quester PG, Hiller JE. *Impact on the Australian Quitline of new graphic cigarette pack warnings including the Quitline number*. Tobacco Control 2009, 18(3):235-237.

ABSTRACT

Background: In March 2006, Australia introduced graphic pictorial warnings on cigarette packets. For the first time, packs include the Quitline number.

Objective: To measure the combined effect of graphic cigarette pack warnings and printing the Quitline number on packs on calls to the Australian Quitline service.

Methods: Calls to the Australian Quitline were monitored over 4 years, two years before and after the new packets were introduced.

Results: There were twice as many calls to the Quitline in 2006 (the year of introduction), as there were in each of the preceding two years. The observed increase in calls exceeds that which is explained by the accompanying television advertising alone. While call volume tapered back in 2007, it remained higher than before the introduction of new packets. No change was observed in the proportion of first time callers.

Conclusion: Introducing graphic cigarette packet warnings and the Quitline number on cigarette packets boosts demand for Quitline services with likely flow on effects to cessation.

What this paper adds: Many countries are moving to introduce graphic cigarette packet warnings; some with a Quitline or helpline number. However, the impact on calls to the Quitline of graphic (in contrast to text-only) warnings with accompanying Quitline number has not yet been quantified. This study shows that even in a 'mature' tobacco control environment like Australia, such an intervention has considerable positive impact on demand for a Quitline, with positive implications for quitting.

INTRODUCTION

In March 2006, graphic health warnings were included on cigarette and other tobacco packs in Australia. In addition, and for the first time, the Australian Quitline number was printed on packets. Prior to 2006, Australia had text based warnings. There was an infoline number printed in small text on the side of the pack. This number diverted to the Quitline.

Like the text-based warnings that preceded them, the graphic health warnings are mandated under Australia's Trade Practices Act[39] which includes regulations to inform and protect consumers. Graphic images and explanatory messages cover 30% of the front and 90% of the back of the pack. The message "You CAN quit smoking. Call the Quitline 131 848, talk to your doctor or pharmacist, or visit www.quitnow.info.au" is also included on the back of all packs. The Quitline number is also 'stamped' on top of the graphic image on the backs of packs. Regulations prescribe the details of the size of the elements.[39] There are 14 different warnings divided into two sets,[93, 94] rotated semi-annually. Many but not all of the messages and images were new to Australian smokers. Currently, there is no provision to update the messages or images on packets which were introduced to consumers in 2006.

A series of mass-media campaign activities accompanied the introduction of the new cigarette packet warnings. The Australian Government screened an *awareness raising campaign* in February 2006.[42] In addition, a collaboration of Australian state and territory based non-government health agencies developed a campaign to reinforce the pack warnings and promote quitting. This *quit campaign* featured two television commercials (TVCs) linked directly to the new graphic cigarette packet warnings; *Amputation*[43] linked to the warning *Smoking causes peripheral vascular disease* and *Mouth Cancer*[44] linked to the warning *Smoking causes mouth and throat cancer*. *Amputation* first aired in May 2006 and *Mouth Cancer* first aired in July 2006.

Australia is not the first country to introduce a Quitline or smokers' helpline number on cigarette packets. In 2002, a smoking cessation message and quit line number were included on Dutch cigarette packets, along with prominent text warnings. This led to a 3.5 fold increase in calls to the Dutch Quitline.[86] In the UK, written pack warnings, accompanied by a smoking helpline number, were reported as the second largest driver of callers to the National Health Service Stop Smoking Helpline.[140] However, to date, no data have been published on the impact of the graphic cigarette packet warnings, accompanied by a Quitline number, on demand for a Quitline service.

It is well established that television advertising to promote quitting can increase calls to Quitlines[141-143] and, therefore, quitting itself.[144] This study measures the impact of new style cigarette packets, which included graphic cigarette packet warnings and the Quitline number, on calls to the Australian Quitline, and the extent to which call volume exceeded that which would be expected from the usual mass-media cessation advertising.

METHODS

Quitline call data

The Australian Quitline can be accessed from anywhere in Australia by dialling 131848 or 13 QUIT (137848) for the price of a local call. The Telstra Analyser®, software of the telecommunications provider, provides data on volume of calls, call source (broken down by state and region), time and duration of calls.

Individual states and territories have their own databases of caller details. These data were examined in one jurisdiction (South Australia), where callers who spoke to a counsellor (51% of all callers) were asked routinely whether they had called the Quitline before.

Advertising data

Television anti-smoking advertising is quantified using Target Audience Rating Points (TARPs), provided by media agency ACNielsen (Sydney, Australia). TARPs are a standard measure of television advertising weight. TARPs are used to indicate the number of people within a certain demographic group that were exposed to an advertisement within a given period of time. For example, 100 TARPs for one week is equal to an average of one exposure per person in the target population within that week of the campaign. In the present study, the TARPs relate to the target audience of Australians aged ≥ 18 years.

Analyses

Data analyses were conducted with SPSS v15.

Linear regression analyses were used to estimate the effect on calls to the Quitline of television advertising and the introduction of graphic pack warnings using data from January 2004 to December 2007 inclusive. In regression modelling, calls to the Quitline

were the dependent variable, TARPs were a continuous independent variable and separate dummy variables were created for 2006 and 2007. Although data were not distributed normally, data were not transformed as this did nothing to strengthen the resulting model.

RESULTS

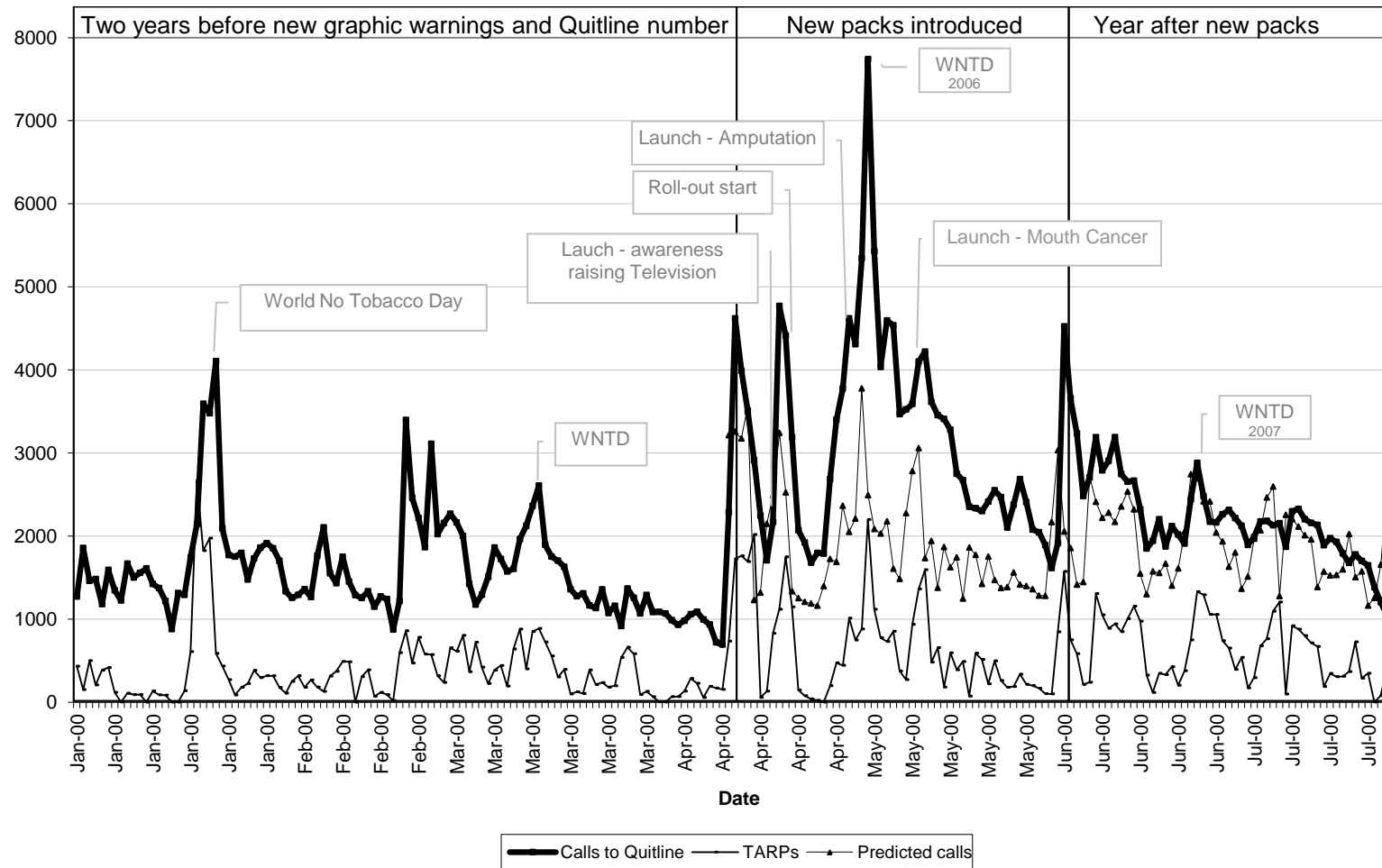
Figure 4.1 shows the volume of calls to the Australian Quitline service over a four-year period. Every year, calls to the Quitline peak at New Year, around World No Tobacco Day (31 May) and coinciding with other major cessation campaigns. In 2006, the Australian Quitline received 164 850 calls. This compares with 81 490 calls in 2004, 84 442 calls in 2005 and 117 544 calls in 2007. The number of calls received in 2006, the year that new graphic cigarette packet warnings including the Quitline number were introduced, represents a doubling of calls received in either of the two preceding years. The number of calls received in 2006 was 40% higher than those received in 2007, the year after the warnings were introduced.

Calls increased markedly when new cigarette packet warnings were first introduced. Call volume levelled off in the weeks following the initial launch but built up again in subsequent months when the accompanying quit campaign TVCs were launched.

The linear regression model showed significant relationships between the independent variables and the dependent variable overall and had good overall explanatory value ($F=133.4$; $p<0.001$; $\text{Adj } R^2=0.657$). The model predicted a base number of calls (constant $B=1161$; $t=17.0$, $p<0.001$); a significant linear relationship between every 100 TARPs and calls to the Quitline ($B=119.0$; $t=12.6$; $p<0.001$); and separate independent increases in calls were observed for years 2006 ($B=1236.2$; $t=11.7$; $p<0.001$); and 2007 ($B=341.0$; $t=3.2$; $p=0.001$), above what was explained by TARPs alone. Call volume was still elevated in 2007, compared to 2004 and 2005, although there was erosion in call volume from 2006.

When a South Australia sub-sample of callers to the Quitline was examined further, it revealed that there was no increase in the proportion of first time callers in 2006 (77%), the year in which new pack warnings including the Quitline number were introduced, compared to 2005 (78%).

Figure 4.1: Calls to the Australian Quitline prior to and after the introduction of graphic cigarette packet warnings



DISCUSSION

Australia is a 'mature' tobacco control market where most forms of tobacco promotion are banned, increasing the significance of the packet as a medium for marketing.[28, 34] The introduction of graphic health warnings on cigarette packets represented a major change in Australia. The new warnings are larger than the old text based warnings, they are in colour, many feature confronting images known to have a strong impact on smokers[137] and, for the first time, they feature the Quitline number prominently. Graphic cigarette packet warnings provided a chance to communicate new information to Australian smokers in a new way. They went some way towards countering the glamorisation and promotion of tobacco through packet appearance.

Since the 1980's, most Australian state and territories have established strong anti-tobacco (quit) mass-media campaigns, supported by the Australian Quitline. Because of the clear relationships between high-quality mass-media campaigns, calls to the Quitline and quitting behaviour,[141, 144] the introduction of graphic cigarette packet warnings was viewed by health agencies as an opportunity to reinforce and sustain any impact with tailored new mass media quit campaigns. As a consequence, it is not possible to completely separate the independent effects of the packs themselves and the accompanying mass-media communications themed around the pack warnings.

However, the rise in calls to the Australian Quitline service observed in this study was substantial and sustained. The size and timing of the rise in calls, compared to the previous two years, indicates that this is highly likely to be due to the introduction of the new graphic cigarette packet warnings which included the Quitline number. The regression analysis also demonstrates that it is very unlikely that mass-media alone explained the observed increase in calls because the introduction of the warnings had an independent effect. Further evidence that mass media quit campaigns were not the primary cause of increased calls is the fact that some of the increase in calls was observed prior to the launch of the quit campaigns. The Quitline number is a prominent but integrated component of the new-style warnings on Australian cigarette packets. There was no prominent display of the Quitline number on Australian cigarette packets prior to this, only the low-profile infoline number. Therefore it is not possible to separate the contributions of the components of the new warnings: namely the visual

image, the large warning text, the detailed warning on the back of the packet or the Quitline number. Their impact has been measured as a whole.

There was no change in the proportion of first time callers, compared to the previous year, indicating that the intervention had a positive effect upon both new quitters and repeat callers. The observed increase in call volume did persist in the year following the introduction of the warnings (2007). Although there are 14 different warnings, with a scheduled rotation mechanism, it is likely that the reduction in call volume was due to a degree of 'wear out'. This provides another example of a health promotion intervention having a positive effect more akin to a spring than a screw.[145] The analogy is one about sustainability. Once driven down, a screw stays where it is whereas a spring needs ongoing pressure to avoid a rebound due to opposing force. Tobacco control initiatives, such as graphic warnings, compete in an environment with opposing forces, including below-the-line tobacco promotion and consumer adaptation levels to warnings. The apparent 'wear out' of the initial impact of the warnings suggests the need for governments to be able to change warnings both for the sake of maintaining novelty (and avoiding desensitisation) and to inform smokers of the hazards that come to light from research published since the set of warnings was prescribed.

In conclusion, the Australian Quitline experienced a doubling of calls upon introduction of graphic cigarette packet warnings which included a prominent Quitline number. Other countries with mature tobacco markets could expect a similar impact upon introduction of graphic warnings, especially if accompanied by reinforcing mass-media activities. The flow-on effects in terms of quitting are likely to be substantial. Previous research has demonstrated that at 12 months, around 30% of callers to the Australian Quitline have succeeded in quitting smoking,[141] making such warnings an important source of consumer information but also a worthwhile cessation intervention.

Chapter 5

The impact of Australia's new graphic cigarette packet warnings on smokers' beliefs and attitudes

REFERNCE:

Miller CL, Hill DJ, Quester PG, Hiller JE. *The impact of Australia's new graphic cigarette packet warnings on smokers' beliefs and attitudes*. Australasian Marketing Journal 2011, 19:181-188.

ABSTRACT

In 2006 Australia introduced graphic cigarette health warnings (GHW) on cigarette packets, depicting a range of tobacco-related pathology. This intervention, controlling the appearance of a consumer product, was designed to raise consumers' awareness of the harms of tobacco use, motivate quitting, and discourage uptake of smoking.

This study applies the reasoned action approach to assess the relevance of GHW-related beliefs and attitudes to smokers' behavioural intentions and smoking behaviour.

A sample of 587 smokers was recruited through a random representative population survey in 2005, prior to the introduction of new warnings. A subset of 158 was followed up a year later.

The results show that GHW-related beliefs and attitudes were predictive of intention to quit smoking. Intentions to quit were, in turn, predictive of quitting behaviour as measured in the follow up stage. New GHW, smokers are presumed to have been exposed to, were also associated with changes in beliefs over time.

INTRODUCTION

In Australia and New Zealand alike, non-communicable diseases including cancer and heart disease place a huge personal, social and economic burden on the community.[146] While the determinants of health outcomes are complex and diverse, much of the morbidity and mortality burden associated with such diseases is preventable and tobacco smoking is one of the most important contributors.[3] Around 17% of the Australian adult population smoke,[146] and every year 15,000 Australians die prematurely from a wide range of tobacco-related illnesses;[6] 10 times the number of deaths as occur from accidents on Australia's roads.

Opponents of tobacco control regulation and legislation often frame smoking as a "personal" and "rational" choice to use a "legal product".[147] This position has three major flaws. First, the extent to which most consumers' choice about using tobacco products is rational, is debatable. Economic theory presumes that people's behaviour can be understood as the rational pursuit of self-interest.[15] The concept of rational choice refers to people choosing the best course of action, for their preferences, at a given time, having weighed up the information that they have when the choice is made. Implicit in the argument of rational choice, as it is applied to tobacco consumption, is the assumption that people genuinely understand and weigh up the costs (health, economic, social) versus the benefits (physiological pleasure, social) of smoking, and choose to continue to smoke.

In the absence of perfect information, consumers' rational choice is severely impeded. While it is true that virtually all smokers are aware that smoking is harmful to health, far fewer accurately estimate the risk of disease or disability, or understand the breadth of illnesses tobacco causes or the possible consequences in middle age.[11, 16, 17, 148] The fact that smoking causes lung cancer and heart disease is widely known, but that smoking also causes cancer of the mouth and oropharynx, stomach, liver, pancreas, cervix, bladder, and leukemia (for those aged over 30 years) [6] is far less well understood. There is evidence in tobacco company documents that tobacco companies have known for a long time about the effects of tobacco and have failed to disclose or denied this information from consumers.[18] Historically, health warnings on tobacco products have faced a long history of opposition from the tobacco industry and have in no way provided full information about the harmfulness of the product.[19, 37] In

addition to such deficits in consumers' knowledge about the health costs of smoking, tobacco products have been marketed heavily and with sophistication, emphasizing alleged "benefits" and ignoring their addictive nature.

Second, tobacco smoking delivers nicotine, which is addictive.[20] Addiction distorts the consumer's ability to make a truly 'free' choice about a product. Third, while smoking is often argued to be an adult choice, only a minority of new smokers are over the age of 18. The majority of smoking experimentation and initiation occurs amongst adolescents well before adulthood. By the time many new smokers reach adulthood, they have already smoked for long enough and consumed enough tobacco to have become addicted. When market failure occurs, as it does in the case of tobacco consumption, there is clear justification for public policy intervention.

Tobacco control is the term used to describe the comprehensive range of policy and program measures, which work together to reduce the harm caused by tobacco. Examples of programs include: evidence-based mass-media social marketing campaigns (which make plain the effects of tobacco use and motivate people to quit) and quality services to smokers such as telephone help lines or 'Quitlines'. Policy measures aim to reduce the promotion of demand for and supply of tobacco products. Examples include: taxation of tobacco products; regulation of sale; tight controls over marketing and promotion; and consumer product warning labels.

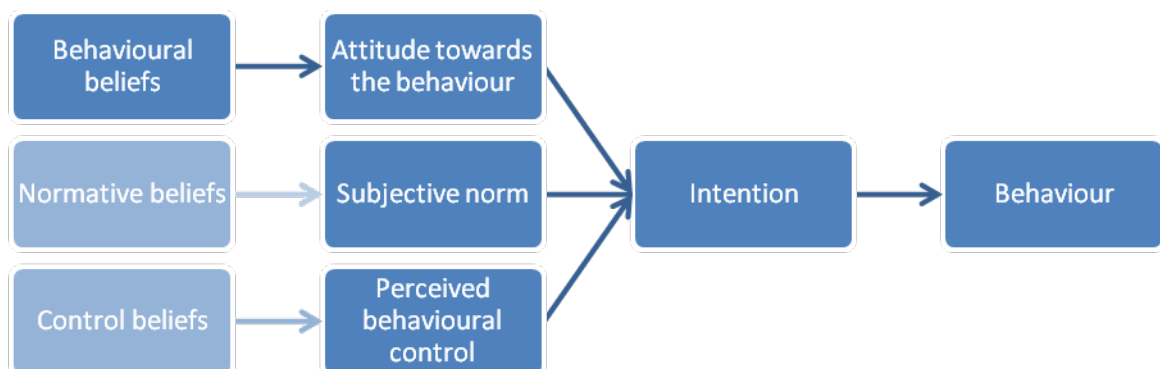
Government health warnings on cigarette packets are a significant part of tobacco control regulation. Like other consumer warning labels, warnings on tobacco packets are designed to increase consumers' awareness and understanding of the harms associated with the product,[36] as smokers and potential smokers are exposed to the warnings every time they purchase a tobacco product, and every time they handle it. It has been estimated that a 20-per-day smoker would be exposed to a health warning around 7000 times each year.[10]

Australia's first warnings appeared on tobacco products in 1973: "Warning – Smoking is a health hazard" in small font at the bottom of the packet. New generations of warnings were introduced in 1987 and 1995. In March 2006, Australia introduced cigarette packet warnings with graphic imagery depicting tobacco related pathology,

accompanied by a prominent Quitline number. The details are available elsewhere. New Zealand followed suit in 2008.

Raising consumers' awareness of the dangers of tobacco products via warnings is done with a view, ultimately, to changing smoking behaviour.[36] Theory and empirical studies have demonstrated that there is a range of factors that influence volitional behavior, including people's beliefs and attitudes. Fishbein and Ajzen's [1] reasoned action approach (which encompasses the Theory of Reasoned Action (TRA)[65, 66] and the Theory of Planned Behaviour (TPB)[67]), holds that people's volitional behaviours can be predicted by their behavioural intention. That is to say, at a given point in time people do what they intend to do. In turn, behavioural intentions are determined by three constructs: (i) attitudes towards the behaviour; (ii) subjective norms, or perceived social pressure to perform the behaviour; (iii) perceived control over the behavior (TPB only); (see Figure 5.1). In general, the more favourable the attitude and perceived norms and the greater the perceived behavioural control, the stronger should the person's intention be to perform the behaviour in question. The relative importance, or weight, of these three determinants on intentions will differ between individuals and between types of behaviour. The stronger the intention (operationalised as the subjective likelihood of occurrence), the more likely it is the behavior will be carried out.

Figure 5.1: Schematic presentation of the reasoned action approach and potential influence of new graphic cigarette packet warnings. Adapted from Fishbein & Ajzen (2010)



Fishbein and Ajzen argue that beliefs that people hold about a behaviour are the fundamental determinants of their decisions about whether to perform behaviour.[1] Attitudes towards the behaviour can range from highly favourable to highly unfavourable, and are determined by the perceived personal consequences of an action, and its perceived likelihood of occurrence. Those beliefs, in turn, have been formed from a variety of information sources, including past personal experiences.

While the Fishbein and Ajzen approach acknowledges the place of social influence and of confidence in one's ability to carry out an action, it is the beliefs that underpin the other determinant – attitude – that are the most accessible to intervention by communication to an individual from a third party. Importantly, *salient* beliefs are the ones determining attitudes. These are defined as 'top of mind' beliefs about a behaviour, that is to say they do not require to be prompted into consciousness, and are therefore assumed to be capable of determining intentions and behaviour on an ongoing basis. It is postulated that no more than 5-7 salient beliefs are held for any attitude object. Separating salient beliefs specific to an individual (the true determinants of attitudes) from other beliefs which are merely indicative of attitudes is difficult, particularly as beliefs that are merely indicative will also correlate highly with attitude. Some beliefs are causal for attitude formation; others arise because the person already has a firm attitude around which beliefs consistent with it aggregate.

It follows that the consumer warnings on cigarette packets, depicting graphically the harms of smoking, could influence attitudes, intentions and smoking behaviour by engendering salient beliefs about negative consequences of smoking that displace previously held salient beliefs. As well, graphic health warnings might change the outcome evaluation (e.g. increase the negative valence of gangrene as a consequence of smoking). Since it is the *product* of perceived likelihood and outcome evaluation that is relevant, change in either would have an impact on a person's attitude. Arguably, the packet warnings might also influence peers' perceptions of the risks and benefits of smoking and their approval or disapproval of the smoker's behaviour. In addition, it is also possible that the inclusion of the Quitline number on cigarette packets might influence the same smoker's perceptions of their own ability to quit smoking.

The reasoned action approach (TRA and TPB) has been widely applied and tested, predicting a range of behaviours, including health behaviours, such as smoking. To

date, however, it does not appear to have been applied to the examination of the impact on attitudes of interventions such as graphic health warnings on cigarette packets.

In order to influence beliefs, any consumer information must meet some basic requirements in order to attract and retain attention. For example, health warnings need to be noticeable and have clear strong messages.[71] Previous research has indicated that such warnings do attract sufficient attention for information to be processed. Introduction of stronger health warnings has demonstrably increased knowledge of the subject matter contained in the warnings both in Canada [149, 150] and in Australia.[72, 151] Overall, smokers have greater knowledge about particular health effects in countries where those health effects are the subject of warnings than in countries where they are not.[82, 150] Increased health knowledge among smokers was positively associated with higher intentions to quit, in four countries with different warnings regimes,[82] demonstrating the importance of awareness of health effects as a motivator for quitting. Comparison of different warning styles (e.g. graphic health warnings vs high and low profile text-based warnings) across countries and time has demonstrated that the stronger the warnings the greater their cognitive impact on smokers and the greater the behavioural reactions.[89]

Previous studies into the new Australian graphic health warnings on cigarette packets have documented their impact on Australian smokers' awareness in a variety of ways. The volume of Australian media coverage relating to the warnings to which Australian consumers may have been exposed has been documented.[137] The pace of the roll out and prevalence of new warnings on packs in retail outlets has also been described.[137] New Zealand has also documented observations of industry behaviour during their roll-out and lessons learned to improve the process of the introduction of graphic warnings in other countries.[152, 153]

A survey of smokers and recent quitters demonstrated high recall of the new Australian graphic health warnings.[150, 154] Another study demonstrated that new graphic health warnings were more salient than text only warnings (i.e. they were read and noticed) and that they stimulated thoughts about the harms of smoking, about quitting and the behaviour of foregoing cigarettes.[125] Further, it has been demonstrated that Australian graphic health warnings were noticed by Australian adolescents whose cognitive processing about the health risks covered by the warnings increased after their

introduction.[126] Both Australian and New Zealand warnings have prompted increased calls to local Quitline telephone cessation services.[138, 155]

This study was conducted in the context of the introduction on 1 March 2006, of the first phase of a new Australian tobacco control policy measure i.e. mandating of the following pictorial warnings as follows: *Smoking causes peripheral vascular disease; Smoking causes emphysema; Smoking clogs your arteries; and Don't let children breathe in your smoke.*

The present study applies Fishbein and Ajzen's reasoned action approach [1] to investigate the potential impact of new graphic cigarette packet warnings on determinants of smokers' behavioural intentions and actual behaviour. First, Fishbein and Ajzen's model (see Figure 5.1) is tested in this situation, where it is expected to be predictive. That is to say, we hypothesised that (smoking) behavioural intentions will be independently predicted by attitudes, social norms and perceived behavioural control. Consistent with the theory, we also hypothesised that (smoking) behavioural intentions will be predictive of actual behaviour.

The model proposes that attitudes consist of beliefs about the specific consequences of a behaviour and evaluations of those consequences. Behavioural beliefs and outcome evaluations can change in response to new information, resulting in changes in attitudes. In this study, we examine the influence of the new graphic health warnings on smokers. Specifically, we predict that the new graphic cigarette warnings will influence behavioural beliefs and outcome evaluations, which in turn influence attitudes about continuing to smoke.

If, as we hypothesise, graphic health warnings do influence smokers in accordance with Fishbein and Ajzen's model, the study will provide empirical validation of the theoretical literature [71] outlining how and why graphic cigarette packet warnings would be expected to influence smokers. The better the mechanisms of influence are understood, the more effective policy makers can be in designing new graphic cigarette packet warnings.

The model predicts that beliefs and attitudes influence behaviour via their influence on intentions, rather than directly. The focus on the first (baseline) part of this study, therefore, is on the relationships between beliefs, attitudes and intentions, rather than on

quitting behavior itself. The second (follow-up) study tests whether intentions predict behaviour, and looks for changes in beliefs, which would be expected to influence intentions and behaviour into the future and beyond the timeline of this study.

METHODS

Recruitment and follow-up

Participants were recruited and baseline data collected as a part of an annual cross-sectional survey of the South Australian population. The survey involves a multistage, systematic, clustered area sample of households, with Australian Bureau of Statistics Collector's Districts as the sampling frame. Greater details on sampling are provided elsewhere.[131] At each selected household, one person aged 15 years or older whose birthday was due next was selected for interview. Structured interviews were conducted in the respondents' own homes by trained interviewers. Up to six call-back visits were made to each household in an attempt to obtain an interview if the respondent was not home.

Participants from the population survey were eligible for inclusion in the sample for this study if they were a current smoker, had a landline and were willing to participate in a follow-up telephone survey. The baseline survey was conducted in September to November 2005.

A sub-set of the eligible sample was randomly selected to participate in a follow-up telephone survey. The cohort was followed up in August 2006; 6 months after the graphic cigarette packet warnings were legislated to start, by which time the packs were becoming prevalent in retail stores.[137]

Measures

Smoking *behaviour* was measured using standard Australian Institute of Health and Welfare measures.[146] A participant was classified as a smoker if they smoked "daily", "at least weekly", or "less than weekly". Behavioural *intention* is conceived as subjective probability and hence was measured by asking: "A year from now how likely

is it that you will be smoking: 1=definitely will; 2=probably will; 3=might or might not; 4=probably will not; 5=definitely will not”.

Table 5.1 shows the different scale items used for the purpose of measuring the relevant variables of interest. These variables were constructed in accordance with Fishbein & Ajzen’s recommendations for applying their reasoned action approach and constructing a reasoned action questionnaire.[1, 66] Their rationale is explained in detail elsewhere.[1] These variables are: *direct measure of attitude* towards quitting, *perceived norm* and *perceived behavioural control*. The question used to elicit smokers’ modal *salient beliefs* about quitting is also provided in Table 5.1. The responses to this open-ended question were recorded according to pre-coded categories determined from the most common responses offered during the pilot stage of the study.

Additional questions were added which related directly to different risks of smoking depicted on the graphic cigarette packet warnings. Ten questions assessed Graphic Health Warning related (*GHW*) *behavioural beliefs* (b_i) and 10 assessed *GHW outcome evaluations* (e_i). These variables were deliberately constructed to match the graphic health warnings, and unlike the modal *salient beliefs* above, cannot be interpreted as being pure measures of salient beliefs. However, the scales used for these questions were also consistent with Fishbein and Ajzen’s recommendations.[1, 66] Responses to each question were coded on bipolar 5-point scales. Also consistent with Fishbein & Ajzen’s recommendations,[1] *individual attitudinal components* $b_i e_i$ were calculated by multiplying the outcome evaluation (e_i) by the belief (b_i); yielding an attitude score with a range 1-25. (The belief and outcomes evaluations relating to “harming an unborn baby if you continued to smoke” were only asked of women below 45 years of age.)

Table 5.1: Survey measures

Question	Scale
Graphic Health Warning related (GHW) Outcome Evaluations (e_i)	
On a scale of 1 to 5 with 1 being it wouldn't bother me at all and 5 being one of the worst things that could happen how would it be if ...	
... you got peripheral vascular disease (or gangrene)?	1-5
... you got emphysema?	1-5
... you got clogged arteries?	1-5
...children you know got sick from breathing in your smoke?	1-5
... you got lung cancer?	1-5
...you got heart disease?	1-5
...you had a stroke?	1-5
...you became blind or got irreversible eye damage?	1-5
...you were addicted to smoking?	1-5
...your smoking harmed your unborn baby? [asked only of women of childbearing age]	1-5
GHW Beliefs (b_i)	
On a scale of 1 to 5 with 1 being certain not to happen and 5 being certain to happen, how likely is it that ...	
...you will get peripheral vascular disease if you continue to smoke	1-5
...you will get emphysema if you continue to smoke	1-5
...you will get clogged arteries if you continue to smoke	1-5
...children you know will get sick from breathing in your smoke if you smoke around them	1-5
...you will get lung cancer if you continue to smoke	1-5
...you will get heart disease if you continue to smoke	1-5
...you will have a stroke if you continue to smoke	1-5
...you will experience blindness or irreversible eye damage if you continue to smoke	1-5
...you will be addicted to smoking if you continue to smoke	1-5
...your smoking would harm your unborn baby if you continue to smoke during the pregnancy [asked only of women of childbearing age]	1-5
GHW Attitude (belief-evaluation product b_ie_i)	
e.g. Attitude _{emphysema} = belief _{emphysema} X outcome evaluation _{emphysema}	1-25
Modal beliefs	
Thinking about what quitting smoking completely would mean for you, what would be some of the good or bad things about quitting smoking completely..	Unprompted, pre-coded binary response options
Attitude (direct measure)	
On a scale of 1 to 7 with 1 being extremely good and 7 being extremely bad, how good or bad it would be to quit smoking completely	1-7
Perceived norm	
Thinking about the people whose opinions influence what you do, what proportion of them wants you to quit smoking completely?	0-100%
Perceived behavioural control	
On a scale of 1 to 7, with 1 being extremely difficult, how easy or difficult would it be for you to quit smoking if you wanted to?	1-7

Analyses

Statistical analyses were performed using PASW® Statistics 17.0.[156] Differences between proportions were analysed using chi-squares. Differences between means were assessed using t-tests for paired-samples and one-way ANOVAs, as indicated in the results. Dimension reduction was conducted using Principal Components Analysis. Multivariate relationships were examined using linear regression analyses.

RESULTS

Participants

In total, 587 smokers participated in the baseline survey. The mean age of the baseline sample was 43.1 (SD=15.0); 53.8% were women and 32.9% had attained a diploma or degree. Overall, 85.9% were daily smokers and mean cigarettes consumed per day was 13.1 (SD=10.3). Mean years smoking at baseline was 25.9 years (SD=14.6), and 27.7% smoked their first cigarette of the day less than 15 minutes after waking. Of this sample, a sub-set of 293 was randomly selected to participate in the cohort study of whom 158 (53.9%) were able to be recontacted and completed a follow-up interview. This group that completed a baseline and follow-up interview will be referred to as the follow-up sub-sample.

The follow-up sub-sample did not differ significantly at baseline from the remainder of the baseline sample on any of the demographic or smoking behaviour variables with mean age of 44.5 (SD=14.7), 58.2% female and 32.9% with a diploma or degree. At baseline, all participants were smokers (by definition), 83.5% were daily smokers and mean cigarettes consumed per day was 13.9 (SD=10.9). Mean years smoking was 27.8 (SD=13.6), and 24.8% had their first cigarette less than 15 minutes after waking.

Baseline Survey

First, to confirm the validity of the Fishbein and Ajzen approach in this application, linear regression was undertaken to explain intention to quit smoking, using direct measure of attitude, perceived social norm and perceived behavioural control as

independent variables. The resulting model explained 10.5% of the variance in intention to quit $F(3,565)=23.2$; $p<0.001$, and all of the independent variables were significant predictors of intention, with fairly even independent contributions from each (see Table 5.2).

Table 5.2: Linear regression for intention to quit smoking at baseline (n=568)

	Adj R2	F	B*	β^{**}
Model 1	0.105	23.2***		
Constant			3.157	
Direct measure of attitude			-0.110	0.168***
Social norm			0.007	0.217***
Perceived behavioural control			-0.100	0.169***

* Unstandardised regression coefficient

** Standardised regression coefficient

*** $p<0.001$.

Second, attitudes and their components were examined. The modal (eight most-mentioned) salient beliefs about quitting smoking are presented in Table 5.3, together with the associations between these salient beliefs and the direct measure of attitude towards quitting. Having more money (62.0%); better health and/or fitness (59.3%); and being less likely to get sick or die (32.5%) were the three most prevalent salient beliefs about quitting smoking. Smokers holding each of these three beliefs had more favourable mean (direct measure) attitudes towards quitting.

Table 5.3 shows that smokers whose more specific salient beliefs about quitting included: having better health ($F(2,568)=6.24$; $p<0.01$); and/or being less likely to get sick or die ($F(2,568)=4.35$; $p<0.05$); and/or kids/family would like it ($F(2,568)=5.24$; $p<0.01$); and/or “I won’t smell” ($F(2,568)=3.91$; $p<0.05$); also had significantly higher mean intentions to quit at baseline, than smokers for whom those beliefs were not salient. Such a difference was not observed for salient beliefs about having more money, finding it easier when going out, or improved sense of taste.

Table 5.3: Salient beliefs about the good and bad things about quitting smoking completely, at baseline

Salient beliefs	N=586	Mean direct attitude towards quitting (1=extremely good)	One-way ANOVA (F; p)	Mean intention to quit (5=definitely will not be smoking)	One-way ANOVA (F; p)
1. More money					
% Yes	62.0%	1.88	3.52	2.91	2.22
% No	38.0%	2.25	p<0.05	2.76	NSD
2. Better health and/or increased fitness					
% Yes	59.3%	1.82	5.45	2.98	6.24
% No	40.7%	2.30	p<0.01	2.66	p<0.01
3. Less likely to get sick or die					
% Yes	32.5%	1.75	3.62	3.03	4.35
% No	67.5%	2.14	p<0.01	2.77	p<0.05
4. Weight gain					
% Yes	12.3%	1.83	1.11	2.97	1.62
% No	87.7%	2.04	NSD	2.84	NSD
5. Kids / family would like it					
% Yes	11.4%	1.90	0.87	3.25	5.24
% No	88.6%	2.03	NSD	2.80	p<0.01
6. I won't smell					
% Yes	11.6%	1.75	1.62	3.21	3.91
% No	88.4%	2.05	NSD	2.80	p<0.05
7. Easier when going out					
% Yes	7.7%	1.76	1.20	3.02	1.72
% No	92.3%	2.04	NSD	2.84	NSD
8. Improved taste					
% Yes	7.2%	2.00	0.90	3.20	2.32
% No	92.8%	2.02	NSD	2.82	NSD

Table 5.2 demonstrated the overarching relationship between a favourable general attitude towards quitting and intention to quit. Table 5.3 demonstrates that when smokers' specific, unprompted, top-of-mind beliefs about quitting relate to health benefits of quitting (or eliminating health costs of smoking), their general attitudes towards quitting are more favourable and quitting intentions are higher. These data affirm the relevance of beliefs about health consequences as a factor in predicting smokers' intentions.

Table 5.4 presents the baseline GHW beliefs (b_i), GHW outcome evaluations (e_i) and GHW belief-evaluation products (or GHW attitude components) ($b_i e_i$) relating to the

smoking-related consequences depicted on the new graphic cigarette packet warnings. The first four listed belief items relate to the pack warnings about to be released at the time of the survey, and it is noteworthy that the belief strength of these tended to be lower than the others which had either already been featured on packs or which had been given a lower priority for introduction.

Table 5.4: Cigarette packet warnings related beliefs, outcome evaluations (e_i) and belief strength (b_i) products

			Mean (SD)	Correlation with attitude	Correlation with intention
Attitudes – GHW attitude components	Outcome (e_i) mean(SD)	Belief (b_i) mean(SD)			
<i>Peripheral vascular disease (or gangrene); n=580</i>	4.54 (0.97)	2.71 (1.20)	12.48 (6.30)	-.038	.142**
<i>Emphysema; n=581</i>	4.52 (0.92)	3.40 (1.22)	15.63 (6.68)	-.162***	.165***
<i>Clogged arteries; n=581</i>	4.39 (1.00)	3.37 (1.25)	15.22 (6.94)	-.125**	.177***
<i>Children you know got sick from breathing in your smoke; n=579</i>	4.72 (0.82)	2.64 (1.55)	12.73 (7.97)	-.062	.070
<i>Lung cancer; n=581</i>	4.65 (0.87)	3.41 (1.24)	16.20 (6.75)	-.141**	.144**
<i>Heart disease; n=581</i>	4.48 (0.97)	3.36 (1.28)	15.51 (7.03)	-.171***	.148***
<i>Stroke; n=581</i>	4.60 (0.90)	3.27 (1.24)	15.42 (6.76)	-.130***	.157***
<i>Blindness or irreversible eye damage; n=581</i>	4.62 (0.88)	2.93 (1.28)	13.80 (6.69)	-.089*	.138**
<i>Addicted to smoking; n=581</i>	3.87 (1.46)	4.12 (1.37)	16.13 (8.42)	-.113**	.104*
<i>Harm unborn baby if you continued to smoke during pregnancy ;n=185</i>	4.76 (0.79)	3.37 (1.60)	16.37 (8.27)	.069	.244**
Direct measure of attitude to quitting (1=extremely good; 7=extremely bad); n=587			2.02 (1.84)	1.000	-.212***
Perceived norm Proportion of people who want you to quit smoking completely (0-100%); n=584			58.98 (38.71)		.222**
Perceived behavioural control How easy or difficult for you to quit smoking if you wanted to (1=extremely easy; 7=extremely difficult); n=587			4.86 (2.04)		-.159**
Intention A year from now, how likely to be still smoking (1=definitely; 5=definitely not); n=571			2.85 (1.20)		1.000

*** Correlation is significant at the 0.001 level (2-tailed).
** Correlation is significant at the 0.01 level (2-tailed).

* Correlation is significant at the 0.05 level (2-tailed).

Table 5.4 also shows the relationship between the GHW attitude components (b_i e_i), and general attitudes towards quitting and intentions to quit. All but one of the attitude components (b_i e_i) correlated with intentions to quit at baseline. Table 3 demonstrated the importance of beliefs about smoking-related health consequences, generally, as a factor in predicting smokers' intentions. These data indicate that the specific health consequences depicted in the graphic health warnings, are also relevant to quitting intentions.

Follow-up Survey

Smoking behaviour at follow-up

At follow-up, six months later, 19.5% of participants had quit smoking.

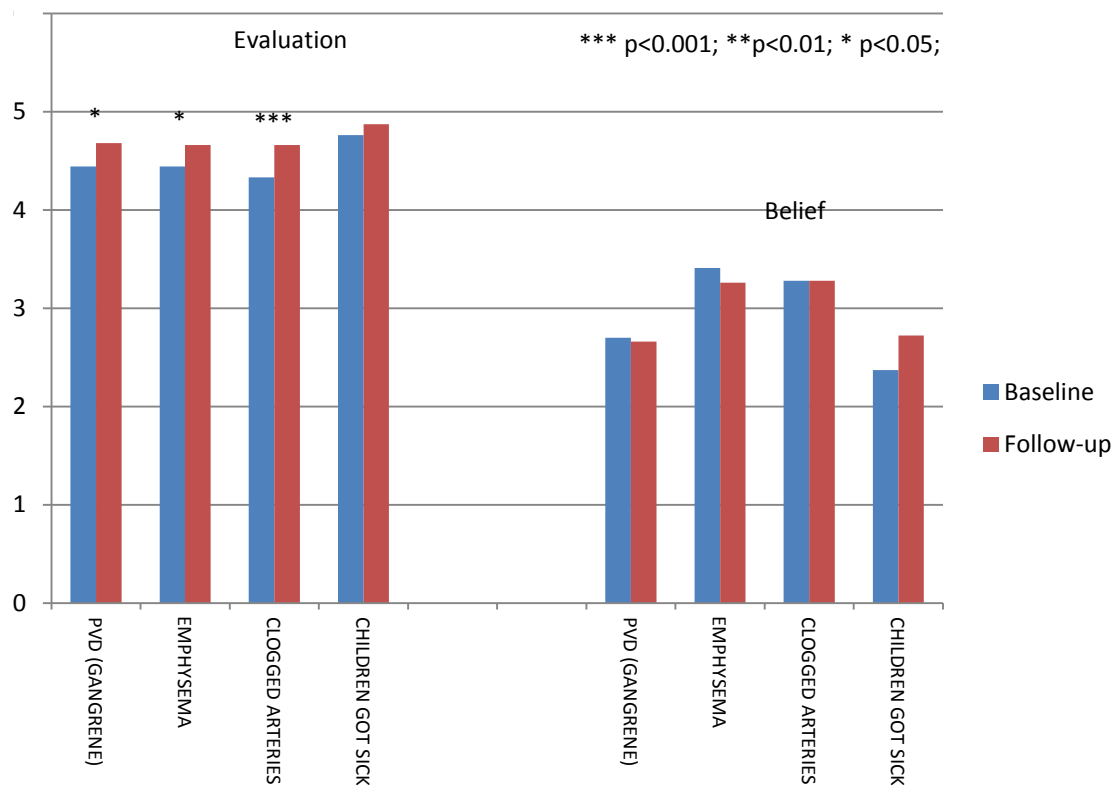
One-way ANOVA using the paired sample ($n=152$), revealed a significantly higher mean baseline intention to quit ($F_{(1,150)}=11.52$; $p=0.01$) among those that went on to quit at follow-up (3.53; $SD=0.98$) than among those who were still smoking at the time of the follow-up (2.73; $SD=1.23$). None of the variables: direct measure of attitude; perceived social norm; or perceived behavioural control, differed significantly, at baseline, between those who went on to quit and those who were still smoking at follow-up, which is not inconsistent with the reasoned action model's predictions, which emphasizes the mediating effect of behavioural intention.

Behavioural beliefs, outcomes evaluations and salient beliefs at follow-up

Figure 5.2 presents the mean values of GHW beliefs (b_i), and GHW outcome evaluations (e_i) among respondents who smoked at baseline and follow-up ($n=126$). For example, the mean outcome evaluation about getting peripheral vascular disease (or gangrene) increased significantly from 4.44 at baseline to 4.68 at follow-up, ($t=-2.14$; $df=124$; $p<0.05$). Statistically significant increases were observed 3 out of the 4 mean GHW outcome evaluation scores (e_i) about seriousness for smoking-related health consequences but mean GHW belief scores (b_i), about perceived likelihood remained unchanged.

The frequency of salient beliefs about the health benefits of quitting smoking did not show statistically significant change between baseline and follow-up, among those who continued to smoke (n=126). At baseline, 51.6% of this group cited improved health and/or fitness as a salient belief about quitting smoking, compared to 58.7% at follow-up (chi-square=1.3; df=1; p=0.25) and 26.0% cited being less likely to get sick or die at both time points. Kids or family would like it was cited by 14.3% at baseline and 23.0% at follow-up (chi-square=3.17; df=1; p=0.07). More money was cited by 62.7% at baseline and 51.6% follow-up (chi-square=3.18; df=1; p=0.07).

Figure 5.2: Mean outcome evaluation and mean beliefs at baseline and follow-up, among smokers



DISCUSSION

The baseline study was conducted six months prior to the legislated date of introduction of the first phase of Australia's new graphic cigarette packet warnings. Because of the delay in the appearance of new packs in stores the baseline survey was conducted nearly a full year before packs with new warnings were prevalent in stores. The follow-up survey was conducted six months after the legislated date for introduction, as packs with new warnings were becoming prevalent in stores and when most smokers

intercepted in city streets had new packs or had bought at least one pack with new warnings.[137] In other words, at the time of the follow-up, the new cigarette packet warnings were in the market but still relatively new. This is a limitation of this study, as is the fact that smokers were not asked explicitly about their personal exposure to the new graphic health warnings.

Although the total amount of variance in quitting intention explained by the regression model was modest, smokers' baseline attitudes towards quitting smoking, proved to be good predictors of intentions to quit smoking, consistent with the reasoned action approach (TRA and TPB). Regression modeling also confirmed the independent influence of attitudes towards quitting, social norms and perceived control on intentions to quit at baseline. The more positive the smokers' attitude was towards quitting; the higher the proportion of the smokers' referent groups who they perceived wanted them to quit smoking completely; and the easier smokers thought it would be to quit smoking, the less likely they were to expect to be smoking in a year.

Nearly one in five of the participants quit smoking between the baseline and the follow-up surveys and consistent with the reasoned action approach, those with stronger intentions to quit smoking at baseline were more likely to go on to quit smoking at follow-up than other smokers. Taken together, these findings affirm the relevance of Fishbein and Ajzen's model,[1] in predicting quitting intentions and behaviour, generally, and the importance of smokers' attitudes in predicting quitting, via the mediator of intentions.

The reasoned action approach submits that salient beliefs are the determinants of attitudes. Health consequences of smoking were at the forefront of smokers' minds, forming two of the three most prevalent salient beliefs about quitting smoking. Two social benefits of quitting were also in the top seven most prevalent salient beliefs. Consistent with the model, these salient beliefs were related to the direct measure of attitude towards quitting and intentions to quit. Other salient beliefs, not related to health effects or social pressure did not show the same relationship with quitting, further indicating the potential of beliefs about health and social effects to influence quitting intentions, which in turn influence smoking behaviour.

There is evidence that information about the specific consequences of smoking presented on Australian cigarette packets has the opportunity to influence beliefs, attitudes and intentions to quit smoking. All but one of the individual GHW attitude components (belief x evaluation: $b_i e_i$) correlated with intention to quit smoking.

At baseline, prior to the implementation of the new graphic health warnings on Australian cigarette packets, smokers' (outcome) evaluations (e_i) about pack-warnings related health consequences of smoking were already very high. Mean scores for 9 of the 10 beliefs measured were in excess of 4 out of a possible 5, with 5 being "one of the worst things that could happen". Smokers' beliefs (b_i) about the likelihood of experiencing those same health consequences were somewhat lower, ranging from 2.64 (with 5 being certain to happen) for "children you know get sick from breathing in your smoke" to 4.12 for "addicted to smoking". Despite a very high baseline, the follow-up survey of continuing smokers demonstrated significant increases in three out of four pack-warnings related outcome evaluations but beliefs about likelihood were unchanged. In other words, smokers' evaluations of the severity of the health outcomes of smoking depicted on new cigarette pack warnings increased. Although their perceptions of the likelihood of experiencing those consequences were unchanged, only one of the belief or outcome scores needs to show change to influence attitude. Despite some evidence of positive trends, there were no significant changes in salient beliefs about quitting smoking among those who continued to smoke.

As with any research of this kind, our study has limitations including its sample size. A larger study may be able to establish more conclusively any influence of the new information in graphic cigarette packet warnings on smokers' specific health related beliefs, salient beliefs and attitudes towards quitting. Another limitation of this study is its inability to determine if the follow-up participants reflected a biased sample, with respect to quitting behaviour. We cannot determine whether those who were followed-up successfully had quit in higher numbers than those who were not successfully recontacted, nor can we assess the beliefs, attitudes or intentions of those who were not contacted.

This study applied a well-tried theory to predict and explain smoking related intentions and behaviour. The Theory of Reasoned Action is in large part an information processing model, in which new information can be expected to influence behaviour.

Notwithstanding the huge role of addiction in tobacco smoking, we have produced some evidence that reasoned action plays a part. Our study demonstrates that providing evidence to smokers in the form of graphic health packet warnings on cigarette packets can make a difference in the decision making around smoking. Interestingly, the effect appears to have been related to the perceived severity of the consequences (an affective response) rather than to the subjective probability of occurrence.

Ahead of many other countries, Australia and New Zealand have recognized tobacco as a different consumer product to others, one that requires special controls, commensurate with the harm it causes. Australia and New Zealand have progressively put controls in place to prevent the promotions of the supposed “benefits” of the product and to limit the means by which by which tobacco smoking is glamorized. They have prohibited tobacco advertising on television, on radio and at the cinema. Within the context of increasing marketing restrictions, the cigarette packet itself has become an increasingly important component of marketing strategy for the tobacco industry.[34] In Australia, restrictions have been expanded to include controls over advertising at point-of sale and controls over the displays of the packets themselves. The Australian Government is now preparing to introduce plain packaging,[157] which New Zealand health groups have called for, for some time.[158]

Meanwhile, attempts to warn consumers of the health costs of smoking have increased via social marketing campaigns. The warnings on cigarette packets have increased from small, low-profile text based warnings on the bottom of packets noting that “Smoking is a health hazard” to large graphic warnings depicting gangrenous feet and lung cancer. Reducing the promotion to consumers, and potential consumers, of the supposed “benefits” of tobacco use and increasing consumers’ awareness of the true costs of smoking form essential, and according to our results, effective, components of a comprehensive suite of policy measures to control the harm caused by this deadly product.

Chapter 6: Conclusions

This chapter draws together the findings or implications from the series of studies conducted for this thesis. While it will not revisit the discussion contained within each of the four chapters, it will offer overarching comment about the original research questions. It will also assess the contribution that each of the sub-studies contained in this thesis has made. In the time since the studies contained in this thesis began in 2005, many more countries have introduced such warnings and the literature has expanded, which is discussed in another section below. Because the four papers (Chapters 2-5), encompassing six different studies, have been published in the international peer-reviewed literature during the course of this thesis, a substantial section of the findings and their implications have already been made widely available. A small subset of the findings included here has since been validated by published studies from other countries. This concluding chapter will also discuss the limitations of the work and comment on the directions for future research.

Summary of findings

This thesis examined a major public health policy intervention in Australia, the introduction of graphic cigarette packet warnings. At the time of their introduction, Australia was among the first handful of countries to introduce such warnings; it was ahead of what was required under the international obligations of the Framework Convention on Tobacco Control. These warnings constituted a major step forward from the text-based warnings that preceded them. The policy was introduced by the Australian Government despite heavy opposition from the tobacco industry which argued it the policy intervention would not ‘work’ and the mooting of legal challenges, as evidenced in Chapter 2.

The first research question was: *1). How did the implementation of this policy occur in Australia; and Are there lessons of process to help policy makers in other countries?* Chapter 2 documented the roll out and monitored the political environment via what was reported in the media. The tobacco industry has a long history of opposing tobacco control legislative measures and this proved to be no exception. Political pressure from the tobacco industry was evident in Australia, the apparent outcome of which was a two

year delay in the implementation of graphic warnings from the date of introduction originally announced by the Australian government. Tobacco industry arguments were reported in the media, including a handful of articles reporting on internal Australian government documents (obtained using Freedom of Information provisions) which inferred that this lobbying had affected government decision making. The final government announcement about a delayed implementation cited tobacco industry arguments, further increasing the appearance that industry lobbying tactics had been effective in delaying the introduction of graphic cigarette packet warnings in Australia. Australian legislation prescribed a date of production for new packs, rather than a date of sale, which created further opportunities for delays. It was noted in Chapter 2 that policy makers in other countries could prescribe a date for sale rather than a date for manufacture in order to avoid similar delays.

In the time since this work was completed an Indian study[159] has also documented apparent delays in introduction due to similar political pressure. A lesson from the implementation of the Australian legislation which influenced the introduction of warnings in New Zealand was that mandating a start date for production, as Australia did, rather than a start date for sale provided about 6 months extra delay until cigarette packets were distributed in stores and thereby delayed any impact of the intervention.

The literature used as a context for this thesis postulates that beliefs influence behaviour via attitudes and intentions. Therefore, beliefs about smoking are theoretically relevant important precursors to attitudes towards smoking and quitting, quitting intentions and quitting behaviour.

Chapters 2 and 3 addressed question 2). *Were the new warnings successful in attracting the attention of smokers, and communicating information about smoking to change smokers' beliefs?* The results from studies reported on in both these chapters indicate that graphic warnings did indeed attract attention, communicate information and change beliefs. The smoker intercept survey, conducted as soon as the packets with new warnings were common in stores (reported in Chapter 2), demonstrated that most smokers had been exposed to and were well aware of the new warnings. The findings of the major cross-sectional surveys reported in Chapter 3 showed that unprompted recall of new graphic cigarette warnings was high in the months following their introduction, further demonstrating that smokers had been exposed to them and had

noticed them. Cigarette packets were cited by smokers as a source of anti-smoking information much more frequently after graphic health warnings were introduced and they were second only to television as a source. Smokers also demonstrated an increase in awareness about smoking-related diseases specific to the warning messages. Warnings that conveyed new information and had emotive images demonstrated greater impact on recall and smokers' beliefs than more familiar information and less emotive images. The policy-relevant implications are that fresh messaging and visceral images have the greatest impact.

The fact that graphic health warnings attract smoker attention is now well established in the international literature. The International Tobacco Control policy evaluation project (ITC Project), which has run concurrent to this thesis and is discussed in greater detail in the next section, has demonstrated well the differential impact of graphic versus text style warnings in attracting attention and changing smoker awareness around outcomes of smoking.[82] A major review of the peer-reviewed and "gray" literature including government commissioned studies has reinforced that graphic health warnings are more likely than text only warnings to be noticed and read, are associated with stronger beliefs about the health consequences of smoking and increased motivation to quit.[160]

The ITC Project has also observed that warnings are second only to television as a source of information about the risks of smoking, across many countries.[150] The ITC Project studies focuses on warning styles at a macro level, between countries and across time. The studies contributing to this thesis were distinct in that they looked at the impact of Australia's graphic health warnings as a whole, but also looked at individual warnings and demonstrated that some warnings were more successful than others.

By way of an aside, New Zealand researchers have since attempted to monitor the distribution of different warnings on cigarette packets in that country. They published a study which showed some evidence of uneven distribution of different warnings, concluding that tobacco companies may be printing different proportions of warnings according to beliefs about their effectiveness as tools for tobacco control.[153]

This thesis then asked the questions: 3). *Did the new warnings lead to any attitude or other changes in smokers, predictive of future quitting? and furthermore, 4). Did the new warnings lead to change in behaviour?*

Chapter 5 looked at questions 3 and 4 in detail with a cohort of smokers, interviewed before and after the implementation of the graphic cigarette packet warnings.

The study reported in Chapter 5 found that Fishbein and Ajzen's theoretical model (see Figure 1.1; page 30) worked in this context, in that (i) attitudes, (ii) social norms and (iii) perceived control predicted intentions to quit smoking. A substantial proportion of participants in the cohort study (19%) quit smoking, and consistent with the model, intentions to quit smoking predicted actual cessation.

The model predicts that salient beliefs influence behaviour via the pre-cursors of attitude change and behavioural intentions. Again, this study affirmed the applicability of the model, demonstrating that salient health-related beliefs about smoking correlated with both attitudes and intentions to quit smoking.

The largest contribution that the cohort study makes to this thesis is by demonstrating the mechanism by which - *i.e. how* - graphic health warnings in cigarette packets work, to influence quitting intentions and quitting behaviour. It produced strong evidence *at baseline* that smoking related health beliefs, relevant to graphic health warnings, correlated to mediating variables which are the precursors of behaviour change. The study also observed considerable change in smoking behaviour, predicted by those same mediating variables, affirming the predictive validity of the theoretical model, and the *potential* for graphic health warnings to induce behaviour change via mediating variables including salient beliefs.

However the prospective cohort study sample was small and it only observed modest changes in those same smoking-related health beliefs over time. Therefore the cohort study only produced modest evidence of change in beliefs, attributable to graphic health warnings. Among that modest pool of evidence was good evidence of change in smokers' perceptions about the severity of the consequences of smoking, specifically relevant to individual health effects presented in warnings on cigarette packets. This belief change reflects an affective reaction to the warnings, and suggests that those warnings have made the effects of smoking more "real" for smokers.

Within the broader context of the thesis, the findings reported in Chapter 5 demonstrating *why* changes in beliefs were important and *how* graphic warnings would work and if they influenced beliefs, reinforce the significance of the findings reported in Chapter 3. Chapter 3 demonstrates that wide-scale changes to beliefs *did occur*, at a population level, and those belief changes are specific to graphic health warnings. Taken together, the results reported in Chapter 5 and Chapter 3 demonstrate that graphic health warnings influence smokers' beliefs with direct implications for quitting intentions and behaviour.

Chapter 4 also demonstrated very clear change in behaviour closely related to quitting; finding that calls to Australia's Quitline increased markedly in the year after the warnings were introduced. This finding was consistent with effects observed when the Dutch Quitline number was put on their (text-based) pack warnings. A more modest effect was subsequently observed in New Zealand. Regression modelling accounting for televised anti-smoking commercials, a proven predictor of call to the Quitline and quitting behaviour, found a doubling of calls to the Australian Quitline in the year the new warnings were introduced. Demand for the Quitline service tapered back the next year but remained substantially higher than before the warnings were introduced. It was also consistent with the findings about recall of the Quitline number from the population monitoring study presented in Chapter 3.

Limitations

This thesis set out to evaluate a major public health policy initiative and social marketing intervention, as it happened, in real time. The intervention under investigation was essentially a natural experiment and therefore well beyond the control of a PhD candidate. This presented a number of major challenges between research conception, design, implementation and interpretation. The greatest difficulty was that of timing. The Australian Government first announced its intention in September 2003, to introduce graphic health warnings on cigarette packets in 2004. Apparently in response to heavy lobbying by the tobacco industry, the Australian Government then revised its plans and re-announced, in June 2004, its intention to introduce graphic

health warnings on cigarette packets, with legislation to take effect from March 2006, some two years later.

Meanwhile, health groups developed a mass-media campaign linked directly to the messages on graphic cigarette packets which was planned to launch some months after March 2006. In fact the launches of the components of the campaign (see Chapter 2 - scheduled May 2006 and late July 2006) were originally planned with a view to reinvigorate the impact of the warnings on packets which were expected to have been prevalent in the market place for some time. In reality, the separate elements of the intervention (the graphic health warnings on packets and the mass-media campaigns) were compressed into one because the legislative detail included no requirement to have packs in store by any set date, and the roll-out of packs into stores was quite slow (see chapter 2).

Several studies were impacted. The Quitline study (reported in Chapter 4) was originally intended to demonstrate the independent impact of new graphic health warnings on packets and mass media campaigns on calls to the Quitline. This was going to be possible because a lag was anticipated between the onset of warnings and the onset of campaigns and a dummy variable marking time would have been used in regression modelling. Instead Chapter 4 reports the simultaneous combined impact of the pack warnings and mass-media on calls to the Quitline. The regression modelling was used to delineate the independent effect, without a dummy variable for time.

The smoker intercept study (reported in Chapter 2) was originally conceived of going into the field in late March 2006, but was delayed, month on month, until the retail monitoring study (also reported in Chapter 2) produced results, which indicated we could be reasonably confident that most smokers would have had the chance to be exposed to the new warnings and their initial reactions could be gauged. This study went into the field in July 2006, in the middle of Australia's winter, when it was more time consuming and difficult to recruit smokers on the street.

The cohort study (reported in Chapter 5) was originally designed with additional scope. The study was designed with two arms; to assess i) the independent impact of the graphic health warnings on cigarette packets, and ii) the mass-media campaigns. One arm of the cohort study was to be recontacted in April 2006 (between March when the

warnings were introduced and May when the first campaign was launched). The other arm of the study was to be recontacted after the mass-media campaigns went to air. This study had to be substantially redesigned into the final form presented in Chapter 5.

Another limitation of this thesis studying a real-life intervention was noise. Any policy measure happens in a noisy, busy environment. Graphic health warnings were introduced then delayed. There was considerable media debate, there were messages from health groups and from industry, and the airtime devoted to the topic coverage waxed and waned. The challenges of evaluating a changing intervention in a noisy environment meant that the control that a researcher has is greatly reduced. Studies needed to be designed and sometimes redesigned. Sometimes data were collected and discarded (e.g. for the original cohort study) because they no longer offered any value. The approach to this suite of research projects needed to be and was pragmatic. The fluctuating media coverage was turned into an opportunity for a monitoring study (included in Chapter 2), and another way to respond to the first research question: *What occurred during the introduction and implementation of graphic consumer warnings labels on Australian cigarette packets?*

Recruitment to studies, sample size, response rates and in particular retention, are a challenge for all research, particularly in real-life rather than lab-based settings. The studies in this thesis were no exception. Elements of data collection were outsourced, notably the population monitoring studies (presented in Chapter 3) and cohort study (presented in Chapter 5, meaning that they were essentially beyond the control of the researcher (PhD candidate). The population monitoring study was part of a larger Health Omnibus Survey commissioned by the South Australian State Government and contracted to a health and market research company. The survey series has been running for is over 20 years, is conducted face-to-face and is a major undertaking. Response rates have varied from year to year, and in 2008, one of the years used in this thesis, the response rate was markedly lower. While this was beyond the control of the researcher, steps were taken to check for biases within the sample that was achieved.

Changes to design brought about in response to changes in the intervention as well as external recruitment resulted in a smaller than originally planned sample for the cohort study (reported in Chapter 5). Because the sample size at follow-up was modest, the

study was limited in its power, or its ability to detect real changes, if they were present. This was a major limitation for this study's follow-up component.

Despite its limitations, the studies in this thesis answered all four of the research questions posed. Three of the four research questions posed in this thesis, asked whether the new warnings lead to changes in quitting behaviour and its pre-cursors. The cumulative finding from this thesis is that they did. The demonstration in this thesis, of changes to precursors of behaviour, notably beliefs, was stronger than demonstration of actual behaviour change. However, the case is even more compelling if taken within the context of the literature published since this thesis started, discussed in the next major section below.

Evidence of the impact of cigarette pack warnings since 2006

In the time since Australia introduced graphic cigarette packet warnings, a further 39 countries have adopted them or stated their intention to do so. Despite this, few additional jurisdictions have published data demonstrating the impact of those warnings in the peer-reviewed literature. The International Tobacco Control (ITC Project) policy evaluation project is the most notable exception. The project has published cross-country findings about the impact of warning style (i.e. graphic vs. text; comparing Canada, USA, UK and Australia; across 5 waves from 2002 to 2006). In 2007, they reported data up to 2005 that showed that large, comprehensive warnings such as those on Canadian cigarette packages were more likely to be noticed and rated as effective by smokers.[89] In 2009, they reported that pack warning style influenced: salience (operationalised as reading and noticing pack warnings); cognitive responses (thoughts of harm and quitting); and the behavioural responses of forgoing cigarettes and avoiding the warnings. They reported that all four indicators of impact increased markedly among Australian smokers following the introduction of graphic warnings.[127] They also reported that the Australian warnings stimulated more cognitive responses than newly introduced UK (text-only) warnings.[127] In addition, the same project published findings from 2002–2006 across the same four countries, noting that forgoing cigarettes as a result of noticing warnings and quit-related cognitive reactions to warnings were consistent prospective predictors of making quit

attempts.[125] Great strengths of the ITC Project and the studies that it produces are the project's longitudinal and multi-country design. The project allows ecological study of tobacco control policy interventions with real time controls in other countries, as well as trends over time within countries. The study findings are at a macro country level and the findings from within this thesis are complementary and more detailed.

Neither the ITC Project studies cited, nor this thesis examined adolescents' reactions. A study of nearly 2500 Australian adolescent school students,[126] conducted prior to and approximately 6 months after the introduction of Australian graphic health warnings, found that the majority (72%) of students had seen warnings at baseline (which were then older text based style warnings) and three-quarters (77%) had seen warnings at follow-up (the majority of which (88%) had seen new graphic warnings). At follow-up, students had read, attended to, and talked about warning labels more frequently than at baseline. As well as smoking students, a large proportion of susceptible non-smokers had seen them too. These authors' findings demonstrate some cut-through with Australian adolescents, reinforcing the findings from this thesis that the new warnings were successful in gaining attention. This study also noted among smoking students a decline in the positive image of cigarettes; a finding similar to that observed and reported in Chapter 2 of this thesis, where 60% of smokers reported that the new warnings detracted from the look of their brand. The authors concluded that the introduction of graphic warning labels may help to reduce smoking among adolescents, predominantly through their influence on beliefs.

An experimental study of adolescents in Canada, manipulated graphic warnings into gain-framed and loss-framed messages and assessed their impact on attitudes and behavioural intentions.[161] Authors of the Canadian study found that loss-framed tobacco warning labels appeared to be more effective in influencing adolescents' smoking-related attitudes and behavioural intentions. However, the study was very small in size and scope limiting the conclusions that can be drawn from the findings. Reports commissioned by the Canadian Government A second experimental study with more limited implications, looked at male Greek adolescents' reactions to European Union (EU) text-based warnings and EU recommended graphic warnings.[162] The authors reported that non-smoking adolescents rated the graphic warnings labels as likely to be more effective in preventing them from smoking than the existing EU text-

only warnings. The peer-reviewed literature on the impact that graphic health warnings has actually had on adolescents is still limited, creating opportunities for further research. A recent major review of the literature demonstrated that there is good evidence of effectiveness with youth, when the peer-reviewed findings literature is complied with government commissioned studies, most notably from Canada.[160] The same review has examined the evidence about warnings impact in initiation, concluding that there was not sufficient evidence to quantify impact but that health warnings discouraged initiation of smoking.

In 2008, two years after their introduction, the Australian Government commissioned and published online an evaluation of the Australian graphic health warnings.[154] The evaluation methodology included a series of focus groups and a telephone survey of 670 adult smokers and 120 recent quitters, selected using random digit dialling and quota sampling. This commissioned evaluation found that in 2008, most smokers (86%) had observed new graphic warnings. This was the same proportion that was observed in this thesis to have noticed new warnings (very) often in 2006, in the representative population survey reported in Chapter 3 of this thesis. In the government commissioned evaluation, those warnings with highest unaided recall were “smoking harms unborn babies” (43% among smokers and 48% among recent quitters) and “smoking causes lung cancer” (34% among smokers and 38% among recent quitters) and “smoking causes peripheral vascular disease: (34% and 26%), with aided recall being far higher. In Chapter 3 this thesis reports similar findings from the population surveys. In their year of introduction, highest recall was among smokers observed for smoking causes lung cancer (48%), smoking causes peripheral vascular disease (40%), smoking causes mouth and throat cancer (32%), smoking harms unborn babies (31%) and smoking causes heart disease (31%). The same commissioned evaluation measured prompted recall of warnings; a measure not undertaken in the studies on this thesis. Smoking causes lung cancer was again the most recalled warning (with prompting), cited by 94% of smokers, and followed by smoking harms unborn babies (90%). No warnings’ level of prompted recall fell below 60%.

Rates of unaided recall were higher in the results reported in this thesis, than in the later commissioned evaluation, but the warnings which were found to have performed strongly in the studies in this thesis, were also the ones that had higher recall relative to

other warnings, in the Australian government commissioned evaluation. The substantial body of peer-reviewed and gray literature now published reinforces the finding that graphic depictions of the health consequences of smoking, generating “negative” emotional reactions such as fear, are more effective warnings.[160] Similarly, evidence from population based surveys reinforces that positive-framed health warnings consistently perform less well.[160]

The Australian government commissioned evaluation reported high public support for the graphic health warnings and very high levels of “believability” (92% of smokers and 97% of recent quitters) and sound perceived effectiveness in terms of communicating health information (63% smokers and 74% recent quitters). Furthermore, 28% of smokers and 30% of recent quitters reported that when they saw the health warnings on packs, they thought “I should stop/quit”. Again, these findings reinforce the findings of this thesis. For example in Chapter 2, results from the small smoker intercept survey included 38% of smokers feeling motivated by the new warnings to quit, as part of their initial reactions.

The authors of the commissioned evaluation recorded an increase in familiarity with and use of the Australian Quitline which they attributed to the inclusion of the Quitline number prominently on graphic cigarette pack warnings.[154] In parallel, a New Zealand study[155] observed an increase in new registrations with their Quitline attributed to newly introduced graphic health warnings on cigarette packets in that country. These findings are reinforcing of, but less compelling than the doubling of actual calls to the Australian Quitline reported in Chapter 2.

The Australian and Canadian governments have both reported on qualitative feedback from smokers that would strengthen the existing warnings in those two countries. The Australian government commissioned report described qualitative feedback from smokers which suggested potential improvements to the Australian graphic health warnings, which were then two years old.[154] This feedback included smokers noting that the front-of-pack warnings were too small (taking up 30% of the pack), and the larger (90% of pack) back-of-pack warnings were more noticeable, with greater impact. Research conducted by the Canadian Government (also in 2008 and published online) with adults[163] and adolescents[164] also reported consumer feedback that the Canadian warnings (taking up 50% of the pack face) still allowed cigarette brand

imagery to dominate. They reported feedback that larger (90%) warnings would be more effective in communicating the risks of smoking, in connecting with consumers emotionally and persuading them to stay away from smoking. Qualitative feedback from Australian smokers[154] also noted that the use of white text on a red background on the back of the Australian packs, created a sense of danger thereby contributing to impact. Also noted by some, was that there was too much text on the back of the packs making them too cluttered. Others demonstrated that they had read and thought about the text and that the detail in the text added credibility. These responses are consistent with high vs. low cognitive elaboration or information processing discussed earlier, and emphasise the importance of ensuring graphic warnings are conducive to message acceptance in both cases.

A small amount of work has been published in the peer-reviewed literature on the implementation or roll-out of graphic cigarette packet warnings, and in particular the activity of the tobacco industry. An Indian study mentioned earlier reported that the introduction of graphic tobacco warnings had been repeatedly postponed in that country, and then watered down apparently due to political pressure exerted by the tobacco industry.[159] Also mentioned above, a New Zealand study,[153] measured industry compliance with the requirement to distribute different graphic warnings evenly among all cigarette packs produced (as opposed to printing more of some potentially weaker warnings and less of others). They used the proxy sample of discarded packs on city streets. They observed that those packs classified *a priori* to be weaker were indeed more common than stronger or “more disturbing” warnings, and concluded that the results were indicative that tobacco companies were not following the regulations.

The work that has been published in the time since this thesis was designed and while it was being conducted is largely complementary. The International Tobacco Control Policy Evaluation Project continues to demonstrate at a macro level, that graphic health warnings on cigarette packets influence smoking related cognitions, intentions and to some extent behaviours. This thesis, delved more deeply into the theories that underpin the measurement of smoking-related cognitions including Fishbein and Ajzen’s reasoned action approach. In Chapter 6, validity of that well-tested model was confirmed in the context of this intervention, showing that smoking related beliefs

influence attitudes, attitudes predict intentions, and intentions predict behaviour. The ITC Project publications have focussed on different countries' cigarette packet warnings as a whole or as a set, and this thesis looked at the impact of the warnings as a whole and also at individual warnings. This thesis found that, consistent with the literature outlined in Chapter 1, serious, emotive, negative-framed messages had greatest impact and statistic-based, less tangible, or positively framed messages had less impact in general.

Future Directions

In terms of future directions, while the combined literature on graphic pack warnings, including this thesis, comes from a limited number of countries, the case for their effectiveness is well made. In terms of their consolidation as a policy initiative, the FCTC has now published its guideline recommending graphic warnings, giving them greater status for signatories to that WHO global health treaty.

There are some areas touched on in this thesis which warrant further investigation. The actual impact of graphic health warnings on young smokers or people at risk of smoking is an area with potential for further research in addition to that already published.[126] This thesis showed some evidence that smokers thought that graphic health warnings in cigarette packets impacted negatively on the look of their brand of cigarettes (reported in Chapter 2). The Canadian Government has published compelling qualitative research demonstrating that smokers believe that branding still dominates the packet.[163, 164]

Plain packaging is the new frontier in the packaging and labelling of cigarette products to protect consumers. At the time of writing the Australian Government had announced its intention to introduce plain packaging (including larger graphic cigarette warnings), making it the world leader. There is still benefit for countries yet to introduce graphic cigarette packet warnings, in publishing subsequent evaluations, and there is work to be done to encourage governments to rotate warnings and use the most effective ones. However, the efforts for future research in the area of cigarette packaging and labelling would now yield best marginal returns in the field of plain packaging, instead of in the

field of graphic warnings on branded cigarette packets. This is where Australian tobacco control research effort would be best placed.

Concluding remarks

Taken as a whole, the studies presented in this thesis provide a case study of the roll-out of Australian graphic cigarette packet warning labels and evidence of their impact on smokers. Information presented here from the Australian roll-out offers insight for policy makers in other countries. The studies provide very strong evidence that the new warnings labels were successful in attracting the attention of smokers and in communicating to smokers, information that influenced their beliefs about the consequences of smoking. The studies also provided good evidence of translation into interest in quitting and some evidence of quitting behaviour, the ultimate aim of the public policy intervention.

This thesis emphasised and demonstrated that there is an important role for theory in public policy interventions, which include a component of persuasive communication i.e. social marketing interventions. Theory provided a lot of relevant insights about how people process information, and elements of messages which make them more or less likely to be persuasive. Different graphic health warnings on Australian cigarette packets had different impacts. In general, these differences were as theory would predict. This generates a lesson for public health advocates and policy makers in Australia, namely that this evidence base about persuasive messaging should be used consciously in the development of new phases of warnings and when new warnings are developed they should be tested to ensure that they meet the necessary conditions of attracting attention, and engaging smokers in ways that maximise the changes of beliefs and attitude and motivate behaviour change.

Tobacco control has a long history of employing theory and evidence in developing interventions. The need for this culture of evidence-informed practice is driven, in part, by the need to make compelling cases to government in the face of opposition from a powerful tobacco industry, and the need for persuasive communications to the community asking them to change a behaviour which is well entrenched, and involves consuming an addictive substance. However, this discipline has served tobacco

control efforts well and tobacco control is arguably one of the great success stories of health promotion and public health.

The implications of this call for evidence-informed practice and evidence to support policy change go well beyond tobacco control. For example, excess alcohol consumption and obesity are emerging areas of significance in cancer control and public health, requiring a mix of public policy interventions and individual behaviour change. Policy makers will need to be persuaded with evidence of harm and evidence that making a political and/or financial investment in different interventions will be effective in reducing that harm. The community will need to be persuaded to accept public policy changes and to change beliefs, attitudes, social norms and entrenched behaviours. Industry groups with profits at stake will inevitably work very hard to protect their interests and counter public health initiatives. The same bodies of theoretical and empirical literature about persuasive and effective communication, and the culture of evidence in practice will empower social marketing efforts to overcome these emerging public health monsters.

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Appendices

Australian Graphic Health Warnings

Reprints of published papers

NOTE:

Appendix 1 is included in the print copy of the thesis held in the University of Adelaide Library.

Australian Government of Health and Aging, 2007, *Graphic Health Warnings on Tobacco Product Packaging Pamphlet*, QuitNow, Canberra.

NOTE:

Appendix 2 is included in the print copy of the thesis held in the University of Adelaide Library.

Miller, C.L., Hill, D.J., Quester, P.G. & Hiller, J.E. (2009) Response of mass media, tobacco industry and smokers to the introduction of graphic cigarette pack warnings in Australia. *European Journal of Public Health*, v. 19 (6), pp. 644 -649

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RESEARCH ARTICLE

Open Access

Smokers' recall of Australian graphic cigarette packet warnings & awareness of associated health effects, 2005-2008

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Abstract

Background: In 2006, Australia introduced graphic cigarette packet warnings. The new warnings include one of 14 pictures, many depicting tobacco-related pathology. The warnings were introduced in two sets; Set A in March and Set B from November. This study explores their impact on smokers' beliefs about smoking related illnesses. This study also examines the varying impact of different warnings, to see whether warnings with visceral images have greater impact on smokers' beliefs than other images.

Methods: Representative samples of South Australian smokers were interviewed in four independent cross-sectional omnibus surveys; in 2005 (n = 504), 2006 (n = 525), 2007 (n = 414) and 2008 (n = 464).

Results: Unprompted recall of new graphic cigarette warnings was high in the months following their introduction, demonstrating that smokers' had been exposed to them. Smokers also demonstrated an increase in awareness about smoking-related diseases specific to the warning messages. Warnings that conveyed new information and had emotive images demonstrated greater impact on recall and smokers' beliefs than more familiar information and less emotive images.

Conclusions: Overall graphic pack warnings have had the intended impact on smokers. Some have greater impact than others. The implications for policy makers in countries introducing similar warnings are that fresh messaging and visceral images have the greatest impact.

Background

The World Health Organization's Framework Convention on Tobacco Control (FCTC) is a global health treaty designed to help curb the global tobacco epidemic and associated burden of disease and mortality [1]. Countries that ratify the FCTC commit themselves to a schedule of tobacco control legislative reform in an effort to advance disease prevention and health promotion. The regulation of packaging and labelling of tobacco products is one component of a comprehensive approach (see Articles 6-14). Australia was one of the first 40 countries to ratify the FCTC, and so became a full Party on 27 February 2005. In early 2006, Australia followed Canada, Brazil, Singapore, Thailand, Venezuela and Panama in introducing new graphic cigarette packet

warnings [2]. Many other countries have since introduced them or are in the process of doing so.

Cigarette packet warnings are an important form of health communication to consumers. Australia's graphic health warnings were designed to provide "a strong and confronting message to smokers about the harmful health consequences of tobacco products and convey the 'quit' message every time a person reaches for a cigarette" [3]. The stated intention was that graphic images would increase consumer awareness of the health effects of smoking, which would in turn decrease likelihood of smoking [3].

Theories of consumer behaviour and social psychology predict that a number of predisposing variables influence behaviour and the probability of behavioural change, with people's beliefs being an important contributor [4-7]. Consumer behaviour theory holds that behaviour change, such as stopping smoking, can be induced by increasing consumer perception that the

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behaviour is a 'problem' for them, requiring behavioural modification [4]. By increasing a person's belief that smoking leads to negative health consequences, pack warnings could change the consumer's satisfaction with his/her current status as a smoker and induce (or increase) his/her desire to quit, increasing the chances that s/he would try to quit.

It has been widely demonstrated that beliefs which are 'top of mind' for people or salient are also more likely to influence behaviour [5,8]. Hence, if pack warnings increase a person's awareness that smoking leads to particular negative health consequences, and the beliefs about those health consequence are salient for the smoker, they would be more likely to influence quitting behaviour.

Of course, other factors can also induce behavioural change such as other internal factors [6] and social and environmental factors also influence smoking behaviour [5]. Beliefs are, however, an important antecedent of behaviour change, and one that has the potential to be influenced by information contained in graphic cigarette packet warnings.

In order to change beliefs, consumer information first has to be noticed and attended to. Tobacco health warnings have also been shown to be effective in attracting and maintaining attention, as well as assisting information processing, provided the messages are clear, noticeable, strong, direct and frequently rotated [9]. International studies have demonstrated greater knowledge about particular health effects in countries where those health effects are the subject of a cigarette packet warning than in countries where they are not [10]. These studies have confirmed that smaller text-based cigarette packet warnings have lesser impact while larger warnings, including those with clear, simple language and graphic images, are associated with: better knowledge; higher recall; greater motivation to quit; and quit attempts [10-15]. Some smokers also take steps to avoid stronger warnings, particularly some graphic warnings [14]. Borland et al. [16] found no evidence that warning avoidance, arguably a defensive reaction against fear-arousing warnings, had a negative effect on quitting behaviour.

The new Australian graphic cigarette pack warnings (available for view elsewhere [17]) are larger than ever seen before on Australian cigarette packets and cover 30% of the front and 90% of the back of the pack. The graphic image of a health effect contrasts with the otherwise appealing aesthetics of the rest of the cigarette packaging. The Quitline number is 'stamped' on top of the graphic image on the backs of packs.

There are 14 different warnings divided into two sets; Set A and Set B [3]. The sets of warnings are rotated 12-monthly, including a 4 month transition period,

during which any of the warnings from either set may appear. Set A only could appear on packs manufactured or imported from 1 March-31 October 2006. Set B only could appear on packs manufactured or imported from 1 March-31 October 2007.

The packs include a combination of new and familiar images and messages. Some messages had been on text-based packets for some time; others had not. Some images and messages had been used before in televised anti-tobacco social marketing campaigns; others had not. Table 1 lists the new warnings and the extent to which the text and imagery is new to Australian smokers. For example, "Smoking causes peripheral vascular disease", and "Smoking causes mouth and throat cancer" were unique in that they contained both new images and new messages and had not previously been the subject of text-based pack warnings or social marketing campaigns. Hence, these warnings would be novel for many smokers. By contrast "Smoking causes lung cancer" was introduced as a text-based pack warning in 1987 and the image on the packet was used in a televised anti-tobacco campaign from 1997.

We wanted to explore the changes in recall of the new warnings over time as well as changes in beliefs about the health effects of smoking, associated with the new system of graphic warnings. We also looked at the differential impact of individual new health warnings on smokers, given that the extent to which each of the new warnings: captures attention; delivers new information (or old information in new ways); is comprehended; changes awareness or beliefs about health effects; and is recalled, are all important aspects of information processing. These variables influence the degree to which different warnings may influence behaviour change.

One study has already indicated that Australian warnings were noticed by the majority of adolescents and led to increased cognitive processing about the health risks covered [18]. Another study demonstrated that new Australian health warnings were read and noticed more than UK's text only warnings and that they stimulated thoughts about the harms of smoking, thoughts about quitting and the behaviour of foregoing cigarettes [19]. Our study measured changes in smokers' basic beliefs about the different harms of smoking, at the adult population level over time, as the various warnings were rolled out. The study also measured degree of recall of specific warnings. In this study, changes in beliefs and recall were measured across smokers in the community as a whole and among different subgroups, such as younger smokers. The purpose of these sub-group analyses was to ascertain whether graphic cigarette packet warnings had differential impact with different demographic groups of smokers or whether any impact was universal. Anti-tobacco television campaigns have

Table 1 New cigarette packet warnings and previous use of warning components in Australia

Text	Image	First use of warning components		Previous TV anti-smoking campaign on health effect
		Text	Image	
<u>Set A</u>				
Smoking causes peripheral vascular disease	Gangrenous foot	2006 (Mar)	2006 (Mar)	No
Smoking causes emphysema	Dissected lung	2006 (Mar)	1997	Yes
Smoking causes mouth and throat cancer	Cancerous lip	2006 (Mar)	2006 (Mar)	No
Smoking clogs your arteries	Dissected artery	2006 (Mar)	1997	Yes
Don't let children breathe your smoke	Child on oxygen	2006 (Mar)	2006 (Mar)	Yes
Smoking - a leading cause of death	Bar chart	2006 (Mar)	2006 (Mar)	Yes
Quitting will improve your health	Quitline caller	2006 (Mar)	1998*	Yes
<u>Set B</u>				
Smoking causes blindness	Eye close up	2006 (Nov)	2000	Yes
Smoking doubles your risk of stroke	Dissected brain	2006 (Nov)	1998	Yes
Tobacco smoke is toxic	Beaker of chemicals	2006 (Nov)	2000*	Yes
Smoking harms unborn babies/(Smoking while pregnant may harm the unborn child)	Premature baby	2006 (Nov)/ 1995	2006 (Nov)	No
Smoking is addictive	Stained fingers	1995	2006 (Nov)	Yes
Smoking causes lung cancer	Tumour close up	1987	1997	Yes
Smoking causes heart disease	Heart surgery	1987	2006 (Nov)	Yes

* Essentially equivalent image to that was used in television campaign

consistently demonstrated that images and messages eliciting a visceral response and messages that are novel or “new news” are more likely to be attended to and have impact on quitting behaviour [20-22]. Hence, it is hypothesized that new packet warnings which are most novel or contain the newest ‘news’ for smokers will result in the greatest attention to the pack warnings themselves, greatest recall of warnings and greatest increases in basic beliefs about smoking related illnesses. It is further hypothesized that visceral images will have greater impact on these variables than other images.

Other factors likely to influence behaviour change, including perceived ability to change behaviour, social and environmental factors are beyond the scope of the current study.

Methods

Sample

Data were collected as a part of the South Australian Health Omnibus Surveys; annual independent cross-sectional surveys of the South Australian population, undertaken from September to November. These population surveys involve a multistage, systematic, clustered

area sample of households, with Australian Bureau of Statistics Collector's Districts as the sampling frame. Greater details on sampling are provided elsewhere [23]. At each selected household, one person aged 15 years or older whose birthday was due next was selected for interview. Structured interviews were conducted in the respondents' own homes by trained interviewers. Up to six call-back visits were made to each household in an attempt to obtain an interview if the respondent was not home.

The South Australian Health Omnibus Survey tool used the same methods each year. Data were weighted by household size, age, gender and local government area, so that estimates would reflect the South Australian population. Hence, the samples are directly comparable from year to year. Studies measuring changes over time in behaviour and attitudes in the South Australian population, using this tool and its comparable samples, have been accepted in many areas of inquiry [24-28].

Data for this study were collected in the South Australian Health Omnibus Surveys of 2005, 2006, 2007 and 2008. The survey achieved response rates of 70.9%, yielding 3047 interviews in total and 571 smokers in

2005; 63.8% with N = 2969 (609 smokers) in 2006; 62.7% with N = 2401 (478 smokers) in 2007; and 53.6% with N = 2824 (553 smokers) in 2008. Despite different response rates the samples from the four survey years did not differ significantly in age, gender or quitting experience. Respondents were classified as smokers if in response to the question: "Do you currently smoke: daily; at least weekly (but not daily); less often than weekly; or not at all", they answered other than "not at all". Similarly, respondents were classified as smokers of manufactured cigarettes according to their responses to the question "How often do you smoke manufactured cigarettes: Daily, weekly; less than weekly; or not at all". This study was restricted to the responses of smokers of manufactured cigarettes. Non-smokers (never-smokers and ex-smokers) were not included in this study because it was not expected that they would be exposed to or attuned to cigarette packet warnings.

The 2005 survey occurred before any new packet warnings were introduced, the 2006 survey occurred after Set A warnings were introduced and became prevalent in stores [29] but before Set B warnings were rolled out. The 2007 survey occurred after Set B warnings were introduced.

Measurements

Participants were asked a series of questions. To measure top of mind awareness of the effects of smoking, participants were first asked "Which illnesses are caused by smoking?" Participants were not prompted with response options. Some but not all of the pre-coded response options matched the new warnings, as listed in Table 2. To assess recall of pack warnings, participants were asked "In the past 6 months, how often, if at all, have you noticed advertising or information that talks about the dangers of smoking, or encourages quitting". Prompted response options were "never", "rarely", "sometimes", "often" or "very often". If they did not respond "never" they were then asked "Where did you see that information?" Unprompted pre-coded responses included "TV", "radio", "cigarette packets", "cinema" and "internet". Smokers and ex-smokers were later asked "As far as you know, what do the warnings on cigarette packets say?" Pre-coded options for the unprompted responses included all new and previous cigarette packet warnings as well as "Quitline number", "Pictures of effects of smoking" and "Don't know/can't remember". Participants were also asked "Can you tell me the name of any services or programs available to help people quit smoking". Unprompted response options were "Quitline", "Quit campaign", "Nicotine Replacement Therapy", "Zyban/bupropion", "Talking to a doctor", "Alternative Therapy", "Other" and "Don't know". Subsequent to that, smokers were asked whether "During the past year, have you done any of the following: "Called

the Quitline", and so on for other quitting services. All of these questions have been routinely used in the South Australian Health Omnibus Survey for 10 years.

Newness or novelty of text and images included in the graphic cigarette packet warnings is defined by their use in previous population based tobacco control interventions, namely text-based cigarette packet warnings and mass media cessation campaigns. Table 1 provides information about previous use of pack warnings text content and images. When text has been used previously in text-based cigarette packet warnings it is classified as "old". When text has not been used previously in text-based cigarette packet warnings it is classified as "new". When images have been used in mass media campaigns previously they are classified as "old" and when they have not they are classified as "new".

Statistical Analyses

Data analyses were undertaken using STATA v10.0. STATA provides survey estimating tools required to account for this survey design. The survey estimating tools adjust the standard errors to account for the design which involved clustering by Australian Census District, stratification (metropolitan vs. rural) and data that are weighted to the population. Inter-year and intra-year differences between proportions were analysed using Pearson chi-square statistics which are then converted in to F-statistics to account for survey design.

Results

Respondents

The South Australian Health Omnibus Survey samples reflected the South Australian population. In the 2005 survey, for example, 49.0% of respondents were male. Overall, 23.7% were aged 15-29, 27.9% were aged 30-44, 24.0% were aged 45-59 and 24.3% were aged 60+. In 2005, 77.5% of respondents were Australian born (with 3.5% of respondents being Indigenous Australians), 9.4% were from the UK or Ireland; 6.4% were European born and 6.1% were born in other countries. Overall, 6.5% of respondents were still at school, 12.5% did not complete high school, 28.2% had high school education only, 36.3% had completed a trade or certificate and 15.9% had completed a university degree. In 2005, 18.7% of the sample were current smokers and 16.5% (n = 504) were smokers of manufactured cigarettes. In 2006, 20.5% were smokers 17.7% (n = 525) and smoked manufactured cigarettes. In 2007, 19.9% were smokers and 17.2% (n = 414) smoked manufactured cigarettes. In 2008, 19.6% were smokers and 16.4% (n = 464) smoked manufactured cigarettes.

Awareness of health effects

Table 2 shows the changes in awareness about different health consequences of smoking over time. Top-of-mind

Table 2 Awareness of health effects, Quitline and use of Quitline (unprompted) (smokers of manufactured cigarettes only)

		2005 (n = 504)	2006 (n = 525)	2007 (n = 414)	2008 (n = 464)
Beliefs that smoking causes illness and/or damage to the body					
<u>Set A related beliefs</u>					
	Text/Image				
Emphysema	New/Old	60%	59%	57%	52%
Mouth cancer	New/New	10%	24%^a	21% ^a	21% ^a
Throat cancer	New/New	14%	17%	17%	22% ^b
Gangrene	New/New	4%	27%^a	25% ^a	28% ^a
Blocked arteries	New/Old	10%	19%^b	14%	12% ^β
<u>Set B related beliefs</u>					
Blindness/Eye damage	New/Old	16%	11%	25%^b	16% ^φ
Stroke	New/Old	9%	8%	17%^b	11% ^φ
Harms unborn babies*	New/Old	8%	5%	13%^c	13%
Addiction [#]	Old/New	7%	10%	10%	10%
Heart disease [#]	Old/New	39%	34%	36%	33%
Lung cancer [#]	Old/New	55%	53%	55%	55%
<u>'Control' beliefs</u>					
Asthma	n/a	20%	19%	15%	6% ^a
Cough	n/a	9%	6%	8%	12%
Blood pressure	n/a	11%	7%	7%	7%
Impotence	n/a	0%	0%	<1%	<1%
What services are available to help smokers quit					
Quitline		71%	75%	81% ^a	78% ^c
Correct recall of Quitline number		5%	n/a	14% ^b	n/a
Method of quit attempt (of those who tried to quit in the past year)		(n = 201)	(n = 209)	(n = 163)	(n = 164)
Called the Quitline		7%	8% ^b	11%	12%

* Similar to previous warning "smoking in pregnancy may harm the unborn child" # Old warnings and new warning.

^aSignificant difference from baseline (2005) $p < 0.001$.

^bSignificant difference from baseline (2005) $p < 0.01$.

^cSignificant difference from baseline (2005) $p < 0.05$.

^βSignificant difference from 2006 $p < 0.01$.

^φSignificant difference from 2007 $p < 0.05$.

responses that smoking caused gangrene increased 6-fold between baseline (2005) and the next year when those warnings were introduced (2006). Awareness that smoking caused mouth cancer more than doubled. Top-of-mind awareness that smoking caused blocked arteries, blindness, stroke, throat cancer and harm to unborn babies all rose significantly after the related warnings were introduced.

Between baseline and 2006 and/or 2007 and/or 2008, significant increases in awareness occurred for nearly all diseases which were also the subject of new pack warnings. No increases were observed in awareness about emphysema, lung cancer, heart disease or addiction, all of which started from a high baseline and/or were

already warnings on packs. No increases were observed in health effects unrelated to pack warnings e.g. asthma and impotence.

Unprompted awareness of the Quitline as a service available to help smokers quit rose significantly over time, as did the proportion of smokers able to recite the Quitline number.

Recall of warnings

Table 3 shows that general recall of anti-tobacco advertising among smoking participants increased markedly in the year that pack warnings were introduced. This effect was specific to cigarette pack warnings, in that while there was a more than doubling in participants

Table 3 Noticing warnings and recall of specific pack warnings (unprompted) (smokers of manufactured cigarettes only)

		2005 (n = 504)	2006 (n = 525)	2007 (n = 414)	2008 (n = 464)
Noticed anti-tobacco advertising in the past 6 months					
% often or very often		67%	89% ^a	91% ^a	93% ^a
Where - % on TV		89%	93%	91%	93% ^c
Where - % on radio		19%	22%	20%	24%
Where - % on Internet		<1%	1%	1%	2% ^c
Where - % on cigarette packs		20%	56% ^a	57% ^a	53% ^a
Notice warnings on cigarette packets (prompted)					
% Often or very often		63%	86% ^a	-	-
Recall of new warnings					
Pictures		0%	14% ^a	9% ^a	12% ^a
Quitline number		<1%	9% ^a	10% ^a	12% ^a
<u>Set A</u>	<u>Text/Image</u>				
Smoking causes emphysema	New/Old	3%	23% ^a	20% ^a	27% ^a
Smoking causes mouth and throat cancer	New/New	<1%	32% ^a	16% ^{a,α}	24% ^a
Smoking causes peripheral vascular disease	New/New	0%	40% ^a	26% ^{a,α}	30% ^{a,α}
Smoking clogs your arteries	New/Old	<1%	11% ^a	7% ^{a,χ}	14% ^{a,δ}
Smoking - a leading cause of death	New/New	2%	10% ^a	5% ^c	10% ^a
Quitting will improve your health	New/Old	0%	6% ^a	5% ^a	7% ^a
Don't let children breath in your smoke	New/New	1%	13% ^a	2% ^α	7% ^{c, α, δ}
<u>Set B</u>					
Smoking causes blindness	New/Old	<1%		17% ^a	12% ^{a,φ}
Smoking doubles your risk of stroke	New/Old	<1%		9% ^a	5% ^a
Tobacco smoke is toxic	New/Old	<1%		4% ^a	4% ^b
Smoking harms unborn babies*	Old*/New	29%		31%	25%
Smoking is addictive [#]	Old/New	8%		8%	4% ^c
Smoking causes heart disease [#]	Old/New	38%		31% ^c	28% ^b
Smoking causes lung cancer [#]	Old/Old	56%		48% ^c	46% ^b
Don't know/can't remember		2%	3%	5% ^c	5% ^c

*Very similar to previous warning "smoking in pregnancy may harm the unborn child".

#Old warnings and new warning.

^aSignificant difference from baseline (2005) p < 0.001.

^bSignificant difference from baseline (2005) p < 0.01.

^cSignificant difference from baseline (2005) p < 0.05.

^αSignificant difference from 2006 p < 0.001.

^χSignificant difference from 2006 p < 0.05.

^δSignificant difference from 2007 p < 0.001.

^φSignificant difference from 2007 p < 0.05.

reporting (unprompted) they had noticed anti-tobacco information on cigarette packets, virtually no change was observed in relation to television or other sources. Cigarette packets became the second most cited source of anti-tobacco messaging after television. When prompted, 86% of smokers reported noticing new warnings on cigarette packets.

Immediately after the two-phased introduction of the new pack warnings, for all the new health warnings significant increases were observed in the proportion of smokers recalling new messages. There was no increased recall of any of the new graphic warnings that retained old messages. The long standing warning "Smoking causes lung cancer" remained the most recalled (48%),

followed by the totally new “Smoking causes peripheral vascular disease” (40%), “Smoking causes throat and mouth cancer” (32%), “Smoking causes heart disease” (31%) and “Smoking harms unborn babies” (31%). Recall was lowest for “Tobacco smoke is toxic” (4%), “Quitting will improve your health” (6%), “Smoking - a leading cause of death” (10%). The graphic new version “Smoking is addictive” remained low at 8%. The mean absolute change for “new”/“new” warnings (i.e. packs with new images and new text; $n = 4$) was 23% and the mean absolute change for “new”/“old” and “old”/“new” packs ($n = 9$) was 7%.

Differences between subgroups

Table 4 shows the different responses of sub-groups to the new warnings. All groups were significantly more likely to report noticing cigarette warnings after the new warnings were introduced.

“Smoking harms unborn babies” was more recalled by younger smokers. Female smokers were more likely to recall warnings relating to gangrene, mouth cancer and children than their male counterparts. These were the exception; more often than not, there were no significant differences in recall of the warnings between sub-groups. Generally, warnings with the highest increased recall overall (e.g. “Gangrene” and “mouth and throat cancer”), were also the warnings with the highest increases in recall among all sub-groups. Generally, warnings that had weaker recall overall were also the weakest within the sub-groups.

Younger smokers were significantly better able to recount the Quitline number than older smokers after it was introduced onto cigarette packets, showing a dramatic increase from baseline. After the new warnings were introduced, awareness of the Quitline number increased in both smokers interested to quit in the next 6 months and those not interested. A greater gain was observed among smokers not (yet) seriously considering quitting.

Effects over time

Tables 2 and 3 present data from 2005 to 2008. Data in Table 3 show that cigarette packets remained a noticed source of anti-tobacco advertising. Table 3 shows indications of decline in recall of warnings introduced in early 2006 (Set A) during 2007, with some recall rebounding again in 2008. Similarly, some fall off of Set B warnings recall occurred in 2008. Table 2 shows very little evidence of decline in recall of health effects of smoking specific to new packet warnings, 2 years post first implementation. Table 3 shows that two-years post implementation, “Smoking causes lung cancer” remained the highest recalled pack (46%), followed by a second tier: “peripheral vascular disease”, “heart disease”, “emphysema”, “unborn

babies”, “mouth and throat cancer” ranging from 30% to 24% unprompted recall. Those with lowest impact initially remained low, with recall ranging down to 4% for “toxic” and “addictive”.

Discussion

This study demonstrates that new graphic cigarette packet warnings coincided with increased awareness among smokers of the health consequences of smoking observed in cross-sectional surveys of South Australian smokers across four years. While it is possible that these increases in awareness of smoking related illnesses may have happened due to other influences or by chance, new graphic cigarette packet warnings are the most likely cause of the increases in awareness of smoking related disease.

Over the time that new graphic cigarette pack warnings were introduced, we observed substantial increases in top-of-mind awareness of diseases that were the subject of new warnings, and no increases in awareness of other health effects. Further supporting evidence was provided by the increased proportion of smokers who reported noticing warnings on cigarette packets after the new warnings were introduced. We also observed significant increases in smokers’ unprompted recall of pack warnings as a source of anti-tobacco information. Again, this effect was isolated to pack warnings and not generalised to other sources such as television. After the new warnings were introduced, cigarette packets became second only to television as a recalled source of anti-tobacco messages for smokers. Arguably, noticing anti-tobacco messages on television could be at saturation point, after 20 years of regular anti-smoking campaigns. However, there was no increase in noticing messages on the less used media of radio or on the internet.

As observed in this study, it has been demonstrated previously that new messages delivered via television campaigns can markedly increase awareness of smoking related diseases in a 6-month period. As was the case in this study, the effects on awareness were specific to the diseases highlighted in the advertisements and not generalised to all smoking related illnesses [21].

Similar to the Canadian experience [14], cigarette packets became a prominent important source of anti-tobacco information, after graphic cigarette warnings were introduced, and they remained so in the 2 years after they were introduced. In this study there was some evidence of a spike of recall of new warnings with some short term attrition, followed by more steady results. Importantly, most of the data in this study are on unprompted recall, so it is to be expected that top-of-mind recall of warnings and associated health beliefs would be highest in the year that new warnings are introduced, and that it might subsequently be displaced

Table 4 Unprompted recall of health warnings by sub-group (smokers of manufactured cigarettes only)

	Notice packs (unprompted)		Gangrene		Emphysema		Mouth & Throat		Arteries		Don't let children		Cause of death		Quitting	
	2005	2006	2005	2006	2005	2006	2005	2006	2005	2006	2005	2006	2005	2006	2005	2006
Age groups																
15-29 years (n ₂₀₀₅ = 135; n ₂₀₀₆ = 159)	26.1	60.7 ^α	0.0	39.5 ^α	2.2	19.8 ^α	1.7	36.5 ^α	0.0	7.6 ^χ	0.7	18.4 ^α	2.2	12.2 ^β	0.0	2.6
30-44 (n ₂₀₀₅ = 205; n ₂₀₀₆ = 168)	15.4	56.5 ^α	0.5	46.5 ^α	3.4	29.4 ^α	0.3	31.2 ^α	0.5	11.7 ^α	1.2	12.6 ^α	1.4	8.0 ^χ	0.0	7.0 ^β
45-59 (n ₂₀₀₅ = 109; n ₂₀₀₆ = 130)	20.5	52.8 ^α	0.4	37.0 ^α	5.8	21.8 ^α	1.6	28.3 ^α	0.0	13.6 ^α	0.9	8.4 ^α	2.1	10.1 ^χ	0.4	9.0 ^α
60+ (n ₂₀₀₅ = 55; n ₂₀₀₆ = 68)	25.7	46.9 ^χ	0.0	30.2 ^α	1.6	18.7 ^α	0.0	28.8 ^α	0.9	15.4 ^β	0.0	7.4	0.0	5.7 ^χ	0.0	4.2
Sex																
Male (n ₂₀₀₅ = 258; n ₂₀₀₆ = 284)	18.9	52.5 ^α	0.2	33.4 ^α	2.9	24.9 ^α	0.8	24.1 ^α	0.4	8.5 ^α	0.8	8.0 ^α	2.6	6.5	0.2	4.4 ^α
Female (n ₂₀₀₅ = 246; n ₂₀₀₆ = 241)	22.1	59.3 ^α	0.4	47.6 ^α	4.0	21.2 ^α	0.9	40.8 ^α	0.2	14.8 ^α	1.0	18.1 ^α	0.6	13.0 ^α	0.0	7.5 ^α
Planning to quit in next 6 months																
Yes (n ₂₀₀₅ = 275; n ₂₀₀₆ = 287)	18.9	54.7 ^α	0.0	38.8 ^α	3.2	21.6 ^α	0.6	34.5 ^α	0.4	9.2 ^α	1.4	14.0 ^α	1.6	8.5 ^β	0.0	6.0 ^α
No/Can't say (n ₂₀₀₅ = 229; n ₂₀₀₆ = 235)	22.3	56.7 ^α	0.6	41.3 ^α	3.7	25.2 ^α	1.3	28.5 ^α	0.2	14.1 ^α	0.3	11.0 ^α	1.6	10.7 ^α	0.2	5.6 ^α
TOTAL (n ₂₀₀₅ = 504; n ₂₀₀₆ = 525)	20.5	55.6 ^α	0.3	40.0 ^α	3.4	23.2 ^α	0.9	31.8 ^α	0.3	11.4 ^α	0.9	12.7 ^α	1.6	9.5 ^α	0.1	5.8 ^α
	Correct recall Quitline no.		Unborn babies		Blindness		Lung cancer		Heart disease		Stroke		Addictive		Toxic	
	2005	2007	2005	2007	2005	2007	2005	2007	2005	2007	2005	2007	2005	2007	2005	2007
Age groups																
15-29 years (n ₂₀₀₅ = 135; n ₂₀₀₇ = 119)	7.2	26.8 ^β	27.4	41.3	0.9	11.9 ^α	59.3	50.2	45.9	28.7 ^χ	0.7	5.4 ^χ	12.9	11.6	1.9	4.1
30-44 (n ₂₀₀₅ = 205; n ₂₀₀₇ = 148)	5.8	11.9	33.6	34.2	0.2	19.9 ^α	62.6	56.0	36.9	38.0	0.7	10.5 ^α	8.9	8.3	0.0	5.6 ^α
45-59 (n ₂₀₀₅ = 109; n ₂₀₀₇ = 109)	1.0	6.8 ^β	25.6	22.4	0.0	20.3 ^α	51.6	41.0	35.0	26.9	0.7	10.7 ^β	2.6	4.2	0.0	3.5 ^χ
60+ (n ₂₀₀₅ = 55; n ₂₀₀₇ = 39)	0.0	1.8	18.3	13.0	0.0	13.1 ^β	33.2	38.3	26.7	22.0	0.0	7.5 ^χ	5.4	8.3	0.0	3.6
Sex																
Male (n ₂₀₀₅ = 258; n ₂₀₀₇ = 200)	5.9	10.7	29.4	28.0	0.2	14.5 ^α	58.1	45.1 ^χ	39.1	29.2	0.9	8.3 ^α	6.9	7.9	0.0	4.4 ^β
Female (n ₂₀₀₅ = 246; n ₂₀₀₇ = 214)	3.6	16.8 ^α	27.6	34.1	0.5	19.5 ^α	54.1	52.1	36.4	32.6	0.3	9.3 ^α	9.6	8.5	1.0	4.5 ^χ
Planning to quit in next 6 months																
Yes (n ₂₀₀₅ = 275; n ₂₀₀₇ = 209)	5.9	12.9 ^χ	27.9	35.8	0.2	18.3 ^α	59.2	51.2	41.0	32.8	0.5	9.8 ^α	7.6	8.0	0.3	3.7 ^β
No/Can't say (n ₂₀₀₅ = 229; n ₂₀₀₇ = 205)	2.8	14.8 ^β	29.3	26.4	0.5	15.8 ^α	52.5	46.2	33.9	29.0	0.8	7.8 ^α	9.0	8.4	0.8	5.1 ^χ
TOTAL (n ₂₀₀₅ = 504; n ₂₀₀₇ = 414)	4.5	13.9 ^β	28.5	31.1	0.3	17.1 ^α	56.1	48.7 ^α	37.8	30.9 ^α	0.6	8.8 ^α	8.2	8.2	0.5	4.4 ^α

Significant difference between years: Chi-square: α = p < 0.001; β = p < 0.01; χ = p < 0.05.

Significant differences within year (between subgroups): Chi-square: a = p < 0.001; b = p < 0.01; c = p < 0.05; Chi-square for trend: d = p < 0.001.

from top-of-mind by more recent warnings. This would be consistent with Fishbein & Ajzen's [5] contention that people's salient beliefs about the consequences of any contemplated action do not exceed 5-9 in number. Warning and health effect recall does appear to stabilise but more longitudinal data are required to ascertain longer term effects.

The impact varied greatly between warnings. "Smoking causes heart disease" and "lung cancer" are warnings that have been on Australian cigarette packets for a long time (as text-based warnings). They are also diseases which a high proportion of smokers were already aware were caused by smoking, at baseline. Awareness of these diseases and recall of these pack warnings

remained high but demonstrated no improvement once the new graphic warnings were introduced. "Smoking is addictive" was also a graphic adaptation of an old text-based warning. Like "heart disease" and "lung cancer" messages, no significant increase was observed in awareness of the relationship with smoking, or in recall of the warnings. However, unlike "heart disease" and "lung cancer", "addictive" stayed at a low level on both measures. At baseline, smokers already had a high awareness of the relationship between smoking and emphysema. The introduction of the completely new "emphysema" warning (with a familiar graphic - see Table 1), did increase recall of the warnings but did not shift the already high awareness of the disease among smokers. These four cases suggest that adding a graphic image (or at least these graphic images) to an old warning or an "old news" disease did nothing to improve awareness or recall.

By contrast, when baseline awareness of a disease/damage caused by smoking was low, and the disease/damage had not previously been used as a pack warning, awareness grew very significantly. Greatest growth in awareness was observed in relation to gangrene (4% to 27%) and mouth cancer (10% to 24%), both of which were "new news" and contained new images. Even topics that involved new warnings but images and messages which had been the subject of previous tobacco control campaigns (see Table 1) induced significant growth in awareness: "blocked arteries" increased 8%; "blindness" increased 9%; and "stroke" increased 8%. Hence, based on these examples, adding a new graphic image (or at least these graphic images) to a new warning would seem to improve awareness considerably, as does adding a familiar graphic image to a new warning.

Moreover, those warnings most recalled across the board and in different subgroups were those which were "new news", and used new images and particularly images of body parts likely to elicit a visceral "yuck" response. "Gangrene" (40% unprompted recall) and "mouth cancer" (32%) were dominant in this sense. Although "heart disease", "lung cancer" and "harms unborn babies" were also recalled well (49%, 31% and 31% respectively) and contained visceral or emotive images, the new packs failed to provoke an improvement in recall over baseline, suggesting their high recall cannot be attributed to the graphic imagery.

The warnings with weakest recall were "Tobacco smoke is toxic" (4%), "Smoking is addictive" (8%), "Quitting will improve your health" (6%), "Smoking - a leading cause of death" (11%). With the exception of "Smoking is addictive" all of these warnings are general rather than specific about the consequences of smoking and none of these warnings contain images of body parts. Anti-tobacco television campaigns have

consistently demonstrated that images and messages eliciting a visceral response and messages that are novel or "new news" are more likely to be attended to and have impact on quitting behaviour [20,22,30]. This study demonstrates that these findings are generalisable to cigarette pack warnings. This study also demonstrates that these findings apply to smokers in general, as well as to different subgroups of smokers.

The addition of the Quitline number to the cigarette packet appears to have increased general top-of-mind awareness of the availability of the Quitline service. This is noteworthy because the Australian Quitline has been operating for over two decades and already enjoyed high levels of awareness. Although not significant, a coincident trend was observed in increased use of the Quitline as a source of help to quit. The proportion of smokers who knew the Quitline number doubled; and in 2007, one in eight smokers could recite the number accurately. An independent study demonstrated that calls to the Australian Quitline doubled in the year after the new warnings were introduced [31].

Health promotion often aims to segment different messages for different markets in the expectation of having greater impact. The case has been made, using mass-media quit campaigns as the example, that this is unnecessary and even counter-productive because it comes at a cost, namely the dilution of resources required for population-wide campaigns [32]. Comparisons between warnings as well as comparisons between population sub-groups show that what "works", works well across the board and what "doesn't work" across the board, also doesn't work well with any subgroup. The only exception in this study was the greater propensity shown by women and younger smokers to respond to warnings about unborn babies and children, presumably because their closer specific personal relevance. Overall, this study provides another example of a population-based intervention working well with both smokers generally and within subgroups, building the case for non-segmented interventions.

This study provides clear evidence that Australia's new graphic cigarette packets succeeded in attracting the attention of Australian smokers. A limitation of this study is that it did not explicitly ask smokers what, about the different warnings, attracted their attention, nor did it ask smokers directly about their perceptions of the credibility of different warnings. Some warnings may have been better recalled than others because smokers thought they made outrageous and incredible claims. However, this study provides evidence that smokers did find the highly recalled warnings credible. The fact that smokers' unprompted recall of illnesses caused by smoking increased in line with the increased recall of warnings is evidence of this. Changes in awareness

about the harms of smoking are an important antecedent to behaviour change for many smokers. Whether behaviour change did follow was not measured in the current study.

This study provides support for the Framework Convention on Tobacco Control Article 11, mandating large cigarette packet warnings and recommending graphic imagery. Tobacco control policies, such as the FCTC and Australia's National Tobacco Control Strategies, recognise the complexity of smoking behaviour and the multiple behavioural and structural interventions required to reduce tobacco's toll. Graphic cigarette packet warnings play a role as one component of a comprehensive suite of tobacco control interventions.

Conclusions

In conclusion, Australian graphic cigarette packet warnings have been shown in this study to have caught the attention of Australian smokers who have extended the range of their beliefs about the harmful consequences of smoking. Lessons for policy makers planning to introduce graphic warnings are that, as with anti-tobacco television campaigns, "new news" attracts more attention than "old news" and visceral images are more powerful than other graphics. The importance of "new news" should also be considered by policy makers in countries where graphic warnings have already been introduced, as many of the health effects of smoking are unfamiliar to many smokers and an opportunity exists to increase awareness by updating and rotating warnings.

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Authors' contributions

All authors participated in the conceptual development, the study design, the writing and editing of the article. In addition, CLM was also responsible for data analysis and drafting of the manuscript. All authors read and approved the final manuscript.

Competing interests

The authors declare that they have no competing interests.

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Impact on the Australian Quitline of new graphic cigarette pack warnings including the Quitline number

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ABSTRACT

Background: In March 2006, Australia introduced graphic pictorial warnings on cigarette packets. For the first time, packs include the Quitline number.

Objective: To measure the combined effect of graphic cigarette pack warnings and printing the Quitline number on packs on calls to the Australian Quitline service.

Methods: Calls to the Australian Quitline were monitored over 4 years, 2 years before and after the new packets were introduced.

Results: There were twice as many calls to the Quitline in 2006 (the year of introduction), as there were in each of the preceding 2 years. The observed increase in calls exceeds that explained by the accompanying television advertising alone. While call volume tapered back in 2007, it remained at a level higher than before the introduction of new packets. No change was observed in the proportion of first time callers.

Conclusion: Introducing graphic cigarette packet warnings and the Quitline number on cigarette packets boosts demand for Quitline services, with likely flow on effects to cessation.

In March 2006, graphic health warnings were included on cigarette and other tobacco packs in Australia. In addition, and for the first time, the Australian Quitline number was printed on packets. Prior to 2006, Australia had text-based warnings. There was an infoline number printed in small text on the side of the pack. This number diverted to the Quitline.

Like the text-based warnings that preceded them, the graphic health warnings are mandated under Australia's Trade Practices Act,¹ which includes regulations to inform and protect consumers. Graphic images and explanatory messages cover 30% of the front and 90% of the back of the pack. The message "You CAN quit smoking. Call the Quitline 131 848, talk to your doctor or pharmacist, or visit www.quitnow.info.au" is also included on the back of all packs. The Quitline number is also "stamped" on top of the graphic image on the backs of packs. Regulations prescribe the details of the size of the elements.¹ There are 14 different warnings divided into 2 sets,^{2,3} rotated semi-annually. Many but not all of the messages and images were new to Australian smokers. Currently, there is no provision to update the messages or images on packets that were introduced to consumers in 2006.

A series of mass media campaign activities accompanied the introduction of the new cigarette packet warnings. The Australian Government

screened an awareness raising campaign in February 2006.⁴ In addition, a collaboration of Australian state and territory-based non-government health agencies developed a campaign to reinforce the pack warnings and promote quitting. This quit campaign featured two television commercials (TVCs) linked directly to the new graphic cigarette packet warnings; "Amputation",⁵ linked to the warning "Smoking causes peripheral vascular disease" and "Mouth Cancer",⁵ linked to the warning "Smoking causes mouth and throat cancer". "Amputation" first aired in May 2006 and "Mouth Cancer" first aired in July 2006.

Australia is not the first country to introduce a Quitline or smokers' helpline number on cigarette packets. In 2002, a smoking cessation message and quit line number were included on Dutch cigarette packets, along with prominent text warnings. This led to a 3.5-fold increase in calls to the Dutch Quitline.⁶ In the UK, written pack warnings, accompanied by a smoking helpline number, were reported as the second largest driver of callers to the UK National Health Service Stop Smoking Helpline.⁷ However, to date, no data have been published on the impact of the graphic cigarette packet warnings, accompanied by a Quitline number, on demand for a Quitline service.

It is well established that television advertising to promote quitting can increase calls to Quitlines⁸⁻¹⁰ and, therefore, quitting itself.¹¹ This study measures the impact of new style cigarette packets, which included graphic cigarette packet warnings and the Quitline number, on calls to the Australian Quitline, and the extent to which call volume exceeded that which would be expected from the usual mass media cessation advertising.

METHODS

Quitline call data

The Australian Quitline can be accessed from anywhere in Australia by dialling 131848 or 13 QUIT (137848) for the price of a local call. The Telstra Analyser (Telestra, Melbourne, Australia), software of the telecommunications provider, provides data on volume of calls, call source (broken down by state and region), time and duration of calls.

Individual states and territories have their own databases of caller details. These data were examined in one jurisdiction (South Australia), where callers who spoke to a counsellor (51% of all callers) were asked routinely whether they had called the Quitline before.



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Brief report

Advertising data

Television anti-smoking advertising is quantified using target audience rating points (TARPs), provided by a media agency ACNielsen (Sydney, Australia). TARPs are a standard measure of television advertising weight. TARPs are used to indicate the number of people within a certain demographic group that were exposed to an advertisement within a given period of time. For example, 100 TARPs for 1 week is equal to an average of 1 exposure per person in the target population within that week of the campaign. In the present study, the TARPs relate to the target audience of Australians aged ≥ 18 years.

Analyses

Data analyses were conducted with SPSS V. 15 (SPSS, Chicago, Illinois, USA). Linear regression analyses were used to estimate the effect on calls to the Quitline of television advertising and the introduction of graphic pack warnings using data from January 2004 to December 2007 inclusive. In regression modelling, calls to the Quitline were the dependent variable, TARPs were a continuous independent variable and separate dummy variables were created for 2006 and 2007. Although data were not distributed normally, data were not transformed as this did nothing to strengthen the resulting model.

RESULTS

Figure 1 shows the volume of calls to the Australian Quitline service over a 4-year period. Every year, calls to the Quitline peak at New Year, around World No Tobacco Day (31 May) and coinciding with other major cessation campaigns. In 2006, the Australian Quitline received 164 850 calls. This compares with 81 490 calls in 2004, 84 442 calls in 2005 and 117 544 calls in 2007. The number of calls received in 2006, the year that new

graphic cigarette packet warnings including the Quitline number were introduced, represents a doubling of calls received in either of the preceding 2 years. The number of calls received in 2006 was 40% higher than those received in 2007, the year after the warnings were introduced.

Calls increased markedly when new cigarette packet warnings were first introduced. Call volume levelled off in the weeks following the initial launch but built up again in subsequent months when the accompanying quit campaign TVCs were launched.

The linear regression model showed significant relationships between the independent variables and the dependent variable overall and had good overall explanatory value ($F = 133.4$; $p < 0.001$; adjusted $R^2 = 0.657$). The model predicted a base number of calls (constant $B = 1161$; $t = 17.0$, $p < 0.001$); a significant linear relationship between every 100 TARPs and calls to the Quitline ($B = 119.0$; $t = 12.6$; $p < 0.001$); and separate independent increases in calls were observed for years 2006 ($B = 1236.2$; $t = 11.7$; $p < 0.001$); and 2007 ($B = 341.0$; $t = 3.2$; $p = 0.001$), above what was explained by TARPs alone. Call volume was still elevated in 2007, compared to 2004 and 2005, although there was erosion in call volume from 2006.

When a South Australia subsample of callers to the Quitline was examined further, it revealed that there was no increase in the proportion of first time callers in 2006 (77%), the year in which new pack warnings including the Quitline number were introduced, compared to 2005 (78%).

DISCUSSION

Australia is a "mature" tobacco control market where most forms of tobacco promotion are banned, increasing the significance of the packet as a medium for marketing.¹² The introduction of graphic health warnings on cigarette packets

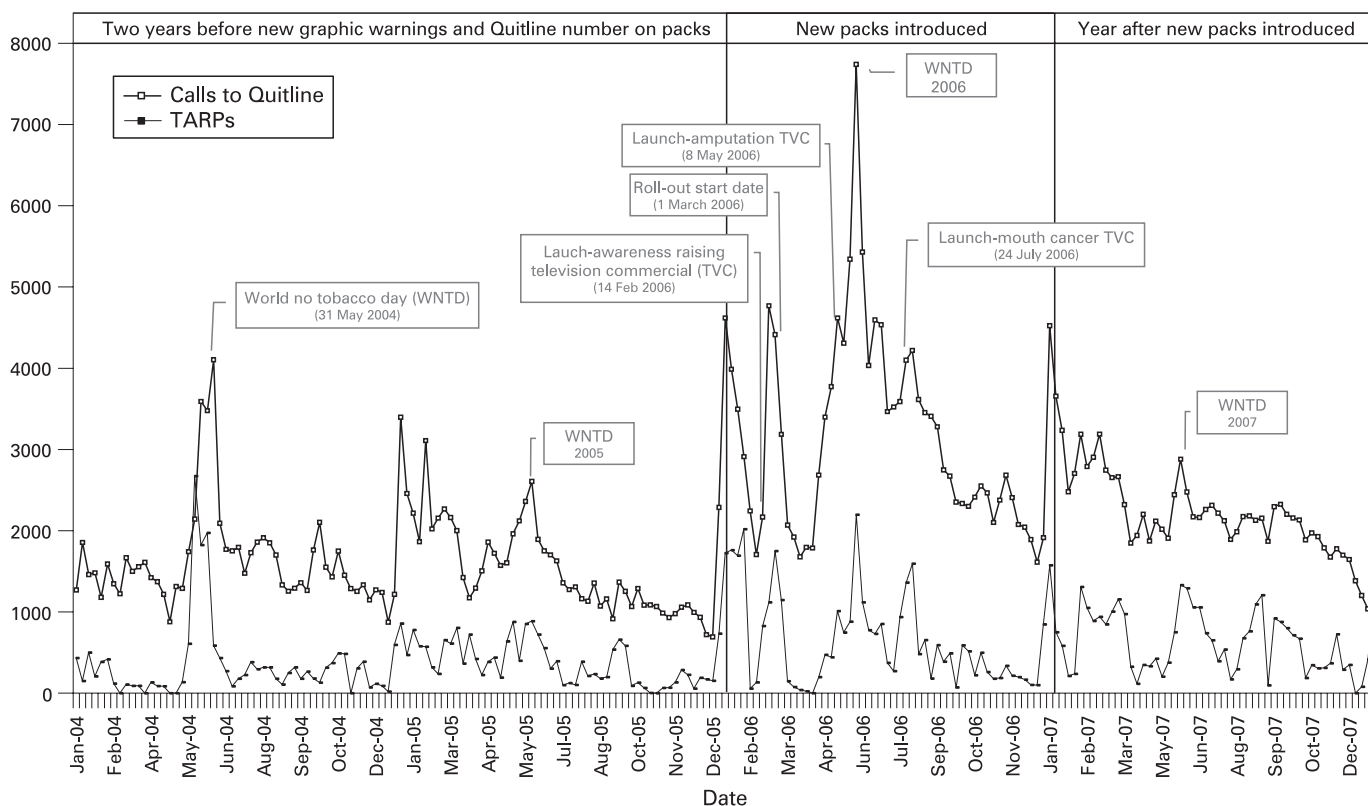


Figure 1 Calls to the Australian Quitline prior to and after the introduction of graphic cigarette packet warnings.

What this paper adds

- ▶ Many countries are moving to introduce graphic cigarette packet warnings; some with a Quitline or helpline number.
- ▶ However, the impact on calls to the Quitline of graphic (in contrast to text-only) warnings with accompanying Quitline number has not previously been quantified.
- ▶ This study shows that even in a "mature" tobacco control environment such as Australia, such an intervention has considerable positive impact on demand for a Quitline, with positive implications for quitting.

represented a major change in Australia. The new warnings are larger than the old text-based warnings, they are in colour, many feature confronting images known to have a strong impact on smokers (unpublished results) and, for the first time, they feature the Quitline number prominently. Graphic cigarette packet warnings provided a chance to communicate new information to Australian smokers in a new way. They went some way towards countering the glamourisation and promotion of tobacco through packet appearance.

Since the 1980s, most Australian state and territories have established strong anti-tobacco (quit) mass media campaigns, supported by the Australian Quitline. Because of the clear relationships between high-quality mass media campaigns, calls to the Quitline and quitting behaviour,^{9–11} the introduction of graphic cigarette packet warnings was viewed by health agencies as an opportunity to reinforce and sustain any impact with tailored new mass media quit campaigns. As a consequence, it is not possible to completely separate the independent effects of the packs themselves and the accompanying mass media communications themed around the pack warnings.

However, the rise in calls to the Australian Quitline service observed in this study was substantial and sustained. The size and timing of the rise in calls, compared to the previous 2 years, indicates that this is highly likely to be due to the introduction of the new graphic cigarette packet warnings that included the Quitline number. The regression analysis also demonstrates that it is very unlikely that mass media alone explained the observed increase in calls because the introduction of the warnings had an independent effect. Further evidence that mass media quit campaigns were not the primary cause of increased calls is the fact that some of the increase in calls was observed prior to the launch of the quit campaigns. The Quitline number is a prominent but integrated component of the new-style warnings on Australian cigarette packets. There was no prominent display of the Quitline number on Australian cigarette packets prior to this, only the low-profile infoline number. Therefore it is not possible to separate the contributions of the components of the new warnings: namely the visual image, the large warning text, the detailed warning on the back of the packet or the Quitline number. Their impact has been measured as a whole.

There was no change in the proportion of first time callers, compared to the previous year, indicating that the intervention had a positive effect upon new quitters and repeat callers.

The observed increase in call volume did persist in the year following the introduction of the warnings (2007). Although

there are 14 different warnings, with a scheduled rotation mechanism, it is likely that the reduction in call volume was due to a degree of "wear out". This provides another example of a health promotion intervention having a positive effect more akin to a spring than a screw.¹³ The analogy is one about sustainability. Once driven down, a screw stays where it is whereas a spring needs ongoing pressure to avoid a rebound due to opposing force. Tobacco control initiatives, such as graphic warnings, compete in an environment with opposing forces, including below-the-line tobacco promotion and consumer adaptation levels to warnings. The apparent "wear out" of the initial impact of the warnings suggests the need for governments to be able to change warnings for the sake of maintaining novelty (and avoiding desensitisation) and to inform smokers of the hazards that come to light from research published since the set of warnings was prescribed.

In conclusion, the Australian Quitline experienced a doubling of calls upon introduction of graphic cigarette packet warnings that included a prominent Quitline number. Other countries with mature tobacco markets could expect a similar impact upon introduction of graphic warnings, especially if accompanied by reinforcing mass media activities. The flow-on effects in terms of quitting are likely to be substantial. Previous research has demonstrated that at 12 months, around 30% of callers to the Australian Quitline have succeeded in quitting smoking,⁹ making such warnings an important source of consumer information but also a worthwhile cessation intervention.

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NOTE:

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