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Disciplines

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INCREASING THE EFFICACY OF BREAST CANCER RISK COMMUNICATIONS: CONTRIBUTIONS FROM BEHAVIOURAL SCIENCE AND MARKETING

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Abstract

Breast cancer is the most common cancer diagnosed in women in Australia. Women are faced with numerous decisions in relation to breast cancer including: actions they can take to reduce their risk of developing breast cancer; whether to participate in screening programs; and selection of the most appropriate treatment option if diagnosed with breast cancer. This paper discusses ways in which theories and findings from two disciplines, behavioural science and marketing, can be used collaboratively to design effective communications to increase the uptake of health behaviours that have the potential of reducing morbidity and mortality from breast cancer. From marketing we borrow the concepts of audience segmentation, media selection, and mass communication message design. From behavioural science we import the Theory of Planned Behaviour (TPB) as a framework for intervening, and dependent variables to guide the strategy for measuring message effects. From related work in individual cognitive and affective psychology we utilise recent findings on the processing of propositional arguments when designing the risk messages.

Introduction

Breast Cancer in Australia

Breast cancer is the most common cancer diagnosed in women in Australia (apart from non-melanocytic skin cancers), with 9,000 women being diagnosed with breast cancer annually and 2500 dying from the disease (NBCC, 1999a). The lifetime risk of an Australian woman developing breast cancer is estimated at one in 12, and of dying is one in 49. Women are faced with numerous decisions in relation to breast cancer, including actions they can take: to reduce their likelihood of developing breast cancer (e.g., exercise); to participate in screening programs (e.g., mammography); and to select the most appropriate treatment option given the characteristics of their cancer (e.g., lumpectomy with radiotherapy or a modified radical mastectomy). To make informed decisions on these and similar matters it is essential that women have access to information that is understandable, usable and non-biased.

Early detection of breast cancers by mammographic screening has the potential to dramatically reduce mortality rates. Compliance with screening recommendations is associated with women's awareness of these recommendations, attitudes towards screening, knowledge of the risk factors for breast cancer, and perceptions of survivability if they are diagnosed with breast cancer (Meissner *et al.*, 1992; Pearlman *et al.*, 1999; Rauscher *et al.*, 2004). In Australia, mammographic screening is actively promoted to women aged 50-69, and is available free of charge to all women over 40. In the time period January 1, 1999 to December 31, 2000, 56.4% of the target population (women aged 50-69) were screened by BreastScreen Australia.

Risk Communication

Research has provided us with some generalisations about the reactions of people to risk communications (for a summary, see National Research Council, 1989). For example, we know that people tend to simplify information, to remember what they see as opposed to what they hear, and to pay more attention to risk communications when the issue is perceived to have personal relevance. Due to their limited scientific knowledge and lack of experience in interpreting numerical data, laypeople cannot readily determine if there are omissions in risk communications, and have trouble detecting quantitative and qualitative inconsistencies in these communications. However, when more

attention is paid to the risk communication – that is, it is processed systematically rather than heuristically, people focus more on the quality of the arguments presented (Chaiken, 1980; Zuckerman and Chaiken, 1998).

Numerous studies have shown that women tend to overestimate their risk of developing breast cancer {e.g., Black *et al.*, 1995; Lerman *et al.*, 1991) and it has argued that this overestimation may partly be due to sensationalist and misleading coverage of breast cancer in the mainstream media (Jones, 2004; NBCC , 1999b). It has generally been found that there is a positive association between risk perception and screening behaviour and the higher a woman’s perceived risk, the greater likelihood of compliance with screening recommendations (Lerman *et al.*, 1990; Bondy *et al.*/ 1992; Lipkus *et al.*, 1996; McCaul *et al.*, 1996). However, given the evidence that a most women overestimate their risk of breast cancer, it is more useful to see the goal of risk communication as helping women *more accurately* understand their health risks (Vernon 1999; Bottorff *et al.*, 2004).

In this paper we aim to demonstrate how theories and findings from two disciplines, behavioural science and social marketing, can be used collaboratively to design effective risk communication strategies to increase uptake of health behaviours (such as mammographic screening) that should reduce morbidity and mortality from breast cancer.

Theoretical Contributions from Social Marketing

Social marketing is defined as the application of commercial marketing technologies to the analysis, planning, execution, and evaluation of programs designed to influence the voluntary behaviour of target audiences in order to improve their personal welfare and that of their society (Andreasen, 1995). In essence, social marketing borrows principles and frameworks from commercial marketing and applies them to a behaviour change (or health promotion) context. Within the limited scope of this analysis, we have considered two strategies from social marketing including market segmentation (using two demographic variables) and promotion (from the marketing mix where the product, distribution and price are also important considerations).

Market Segmentation

We know that people have unique needs and wants. However, it is not possible to target each individual so we target sub-groups or *classes* of individuals. To do this, we divide the target market into segments, evaluate the segments and choose one or more of them for targeting. While markets can be segmented based on demographic, geographic and behavioural criteria, two demographic criteria (age and education) were selected for the purposes of this analysis as they have been shown to be of primary importance in breast cancer screening.

Segmentation by Age

Breast cancer incidence increases with age. As can be seen in Table 1, the risk of a 70 year old woman developing breast cancer in the next 10 years is almost three times that of a 40 year old woman over the same period, with even lower risk for younger women (Merrill *et al.*, 1999).

Table 1: Risk of a white female being diagnosed with breast cancer

10.7%	For a woman to age 79 years
4.2%	For a 70 year old woman within 10 yrs
3.6%	For a 60 year old woman within 10 yrs
2.6%	For a 50 year old woman within 10 yrs
1.5%	For a 40 year old woman within 10 yrs

Segmentation by Education

Health literacy (the ability to recognise and comprehend basic health information) and numerical literacy (the ability to understand numerical information and conduct basic numerical calculations) are vital considerations in the development of health information messages. In the U.S., 21% of adults are functionally illiterate and 27% are marginally illiterate. This problem is illustrated in a recent U.S. study in which 46% of adults incorrectly estimated probability related to a coin flip, and 80% incorrectly converted 1 in 1000 to 0.1% (Davis *et al.*, 1998; Schwartz *et al.*, 1997). Table 2 outlines some of the cognitive differences between high-literate and low-literate adults in terms of their processing of written health risk information (Doak *et al.*, 1998).

Table 2: Message processing styles by literacy level

High Literacy	Low Literacy
Interpret word meanings	Take words literally
Have vocabulary fluency	Listen and read slowly
Find meanings for uncommon terms	Skip uncommon terms
Can scan visuals to find key concept	Have difficulty finding key concept in visuals
Can separate key points from details	Focus on details but cannot prioritise them

Promotion

An important component of the marketing mix is promotion, particularly the selection of appropriate media and development of effective communication messages. Due to the space limitations of this paper, we have chosen to focus only on this component of the marketing mix.

Selecting Appropriate Media

First, we need to consider what media the target audience utilises and, more importantly, trusts as a source of information about breast cancer risk. We know from the 1996 Breast Health Survey that for Australian women “the media” is their most common source of information and advice about breast cancer, and that the proportion of women reporting using different forms of media ranges from 18% for radio to 67% for television, with women’s magazines at 49% (Barratt *et al.*, 1997). Interestingly, there is almost no difference across media in terms of women’s perceptions of the information that is judged as being useful (from 96% for radio to 99% for public displays).

Second, we need to consider the relevant characteristics of different media to determine their appropriateness for conveying information about breast cancer. That is, some forms of media are better for communicating small amounts of information and making calls to action, whereas others are better for communicating detailed information (for a review of the relevant characteristics of media types and limitations on use, see Rossiter and Percy, 1997).

Designing Effective Media Communications

Marketing has provided us with extensive guidelines for the preparation of effective media messages. Some of these guidelines, with examples of how they have been operationalised in the current BreastScreen media campaign, are:

- Present one target audience with one key message, or a related set of messages (“If you’re a woman and you’re over 50, read this now...The biggest risk factor is age, not family history”)
- Be credible and don’t exaggerate the effects of a behaviour or the likelihood of an effect (“a mammogram can find a cancer as small as a grain of rice”)
- Personalise and use characters people can identify with (using Sara Henderson as the spokesperson)
- Use modelling (Sara Henderson often speaks about her own experiences with breast cancer screening)
- Provide supporting reasons (“Early detection is your best protection, giving you the very best opportunity for successful treatment and recovery”).

Theoretical Contributions from Behavioural Science

Setting Objectives and Goals

We know from health promotion that a successful campaign must have clear – and measurable – objectives and goals. There are three main categories of objectives that we need to consider in relation to breast cancer risk communication:

Knowledge Objectives

These objectives relate to conveying to the target audience(s) key facts, information, and statistics in relation to breast cancer risk. While some target audiences have minimal (if any) knowledge about breast cancer risk, a more common problem is having incorrect knowledge. For example, it is a common misperception that breast cancer risk is high among young women and low among elderly women; the former is due in large part to mass media coverage of breast cancer among young (generally celebrity) women (Jones, 2004), and the latter is largely due to the government policy of promoting screening only up to the age of 70. Thus a primary objective of breast cancer risk communication campaigns is to educate women that breast cancer risk increases with age.

Belief Objectives

These objectives relate to generating appropriate – or countering inappropriate – attitudes, opinions and values among the target audience(s). While in some cases behaviours can precede beliefs – such as increased belief in the harmfulness of smoking following smoking cessation (Gibbons *et al.*, 1991), there is evidence that cancer screening beliefs do precede, and predict, behaviours (e.g., Rauscher *et al.*, 2004; Pearlman *et al.*, 1999). Two key objectives for breast cancer screening are encouraging the belief that mammographic screening is effective and countering the perception that mammograms are painful.

Behavioural Objectives

These objectives relate to the specific behaviours that we wish the target audience to undertake. Behavioural objectives must be clear, doable acts; that is, the behaviour itself must be simple, and appropriate resources must be made available to enable the target audience(s) to engage in the behaviour with few, if any, barriers. The key behavioural objective for breast cancer is for all women aged 50 to 69 years to have a mammogram every 2 years.

The Theory of Planned Behaviour

While there are a number of theories and models from behavioural science which are relevant to breast cancer screening, due to the length constraints of this paper we have chosen to focus on the Theory of Planned Behaviour (TPB). The TPB is an extension of the theory of reasoned action, and includes the concept of perceived behavioural control (Ajzen, 1985). The four key components of the TPB, and their application to breast cancer risk communication, are:

Attitude Toward the Behaviour

As discussed above, the two key attitudes to be targeted are increasing the belief that having regular mammograms will identify breast cancer in its earliest stages and countering the belief that having a mammogram is painful.

Subjective Norms

Two key areas for targeting are the patient-physician norm (My GP thinks I should have a mammogram, and the relationship I have with my GP is important to me) and the social group norm (Most women like me have regular mammograms).

Perceived Behavioural Control

This has two components: self-control of the behaviour (It is up to me whether or not I decide to have a mammogram) and the knowledge/skills to engage in the behaviour (I know how to get a free mammogram if I decide to have one).

Behavioural Intention

The behavioural goal is clearly, for all women aged 50 to 69 years, to have a mammogram every 2 years. For women who have not had a mammogram, or who had their last mammogram more than two years ago, the desired behavioural intention is to undergo screening in the near future (I intend to get a mammogram in the next 6 months).

Effective Risk Communication

Risk communication research is multi-disciplinary, spanning areas including marketing, public health, psychology, environmental science, and many others. Following is a very brief review of some of the key findings (and as yet unresolved issues) from research on risk communication (Edwards *et al.*, 2001; JNCI, 1999; Maibach and Parrott, 1995; NRC, 1989).

There are some things we do know about risk communication. For example, *positive framing (chances of survival)* is generally more effective than negative framing (chances of mortality) when people are choosing whether to engage in a screening behaviour; and *gain framing (benefits of screening)* is generally more effective than loss framing (risks of not being screened) in situations involving decisions to take actions such as cancer screening. Risk information can be presented in text form, numeric form, or graphic form – and we know that using *all of these forms* in combination increases a person's understanding and responsiveness (dual coding theory). We know that discussing risk *in terms of specific populations that are known to be at higher risk* is more effective than discussing it in general population terms (i.e., for breast cancer, talking about the risk for women aged over 50 years rather than for all women); and that presenting risk in *relative terms* rather than absolute terms results in less understanding but a greater response.

There are, however, a number of things we do not know about risk communication. For example, we *do not know* whether or not to use fear appeals, or what level of fear to use. The Extended Parallel Process Model (EPPM) suggests that in situations where specific actions are to be taken we must consider, among other things, the magnitude of the perceived risk and the perceived ability to control the risk. There is some evidence that extremely high fear appeals may have the potential to reduce screening intentions (Jones & Owen, in press). Further, we *do not know* whether to present risk information alone or in comparison to a known risk, as the appropriate decision depends on current awareness and perception of the risk. It is likely, however, that we could counter some of the current risk misperceptions by using a risk comparison strategy.

Conclusions

There is often a tendency for academics – and practitioners – to focus on the research undertaken in their own discipline and to overlook relevant knowledge from other fields. This paper has demonstrated how the communication of breast cancer risk information can be optimised by considering knowledge from two disciplines – marketing and behavioural science. Specific recommendations for increasing the effectiveness of risk communications include: segment the target audience(s) by age and by education level/literacy; set clear knowledge, belief and behavioural objectives; utilise the Theory of Planned Behaviour as a framework for developing the message; and implement findings from risk communication research (such as use positive framing and refer to the gains from screening, and use multiple forms of risk information presentation). We also identified some key areas for future research, notably determining whether or not to use fear appeals, and whether to present risk information alone or in comparison to a known risk.

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