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Doctoral Thesis

A Psychological Approach to Understanding and Resisting the Influence of Advertising from the Pharmaceutical Industry

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Contents

List of Figures

List of Tables

Abstract

There is a growing concern that the marketing of pharmaceutical products exerts undue influence over healthcare professionals. However, there is a lack of empirical evidence to substantiate or refute this. Furthermore, the pharmaceutical industry's marketing strategy has evolved to a two-pronged approach, incorporating consumer-directed marketing activities alongside the more traditional direct-to-physician marketing. In response, my thesis reports on two parallel lines of research that tackles each prong. In a series of randomised controlled experiments, I have 1) sought to provide more empirical evidence for the impact of pharmaceutical promotion on healthcare professionals and 2) evaluated an educational intervention developed to combat consumer-directed disease awareness advertisements disseminated by the pharmaceutical industry.

First, I attempted to replicate and advance Grande, Frosch, Perkins, and Kahn (2009)'s work by investigating whether exposure to pharmaceutical print advertising can shift medical students' implicit attitude towards the advertised product, such that the individual exhibits a stronger positive association with the advertised product relative to a non-advertised product. Implicit attitudes were measured using an Implicit Association Test (IAT) designed to assess the strength of association between the advertised/non-advertised product and a list of positive/negative words. I could not replicate Grande and colleagues' (2009) findings because of difficulties recruiting enough participants. A lack of statistical power meant that I could not make any inferences or draw any conclusions with confidence. However, the experiment did illuminate methodological issues associated with the IAT.

Next, I investigated the effectiveness of an educational intervention that informs the general public about industry-sponsored disease awareness campaigns and encourages the cultivation of healthy scepticism (i.e. having a critical eye when evaluating information) towards such potentially biased and misleading sources of health information. Specifically, I investigated the impact of this intervention on participants' ability to identify the sponsor of a disease awareness advertisement, their attitudes towards such ads, their perceptions of the medical conditions discussed in the ads, their scepticism towards pharmaceutical advertising, and their behavioural intentions after viewing the ads. Across three experiments, I consistently demonstrated that the intervention increased participants' sponsor identification accuracy and their scepticism towards pharmaceutical advertising. Healthy scepticism was consistently observed with regards to the perceived value of an ad. Participants who underwent the intervention were less likely to agree that an ad was valuable only when it was industry-sponsored. However, there was more inconsistency for measures, such as participants' reported behavioural intentions, that required them to think through the implications of their attitude changes.

Declaration of Authorship

I, Brennan Ong, certify that this thesis titled, "A Psychological Approach to Understanding and Resisting the Influence of Advertising from the Pharmaceutical Industry" and the work presented in it contains no material which has been accepted for the award of any other degree or diploma in my name, in any university or other tertiary institution 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. In addition, I certify that no part of this work will, in the future, be used in a submission in my name, for any other degree or diploma in any university or other tertiary institution without the prior approval of The University of Adelaide and where applicable, any partner institution responsible for the joint-award of this degree.

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Chapter 1

Introduction

Pharmaceutical promotion can be defined as any informational or persuasive activity which can induce or encourage the purchase, sale, supply and/or use of a therapeutic product (Medicines Australia, 2013b, p. 80). Promotional activities include pharmaceutical representative detailing, print/television advertising, the provision of gifts, and the sponsorship of events.

This thesis adopts a psychological approach to address two shortfalls of the current literature on pharmaceutical promotion: the lack of empirical research on the impact of promotion on healthcare professionals and the lack of educational interventions on industry-sponsored health information for the general public.

To orientate the reader, this introductory chapter begins with a brief overview of the current regulatory restrictions imposed on pharmaceutical promotion and the industry's common promotional practices. Next, the debate surrounding pharmaceutical promotion is introduced and its potential negative impact discussed. This is followed by an overview of the past approaches taken to combat pharmaceutical promotion. Finally, a summary of the new research reported in this thesis, including its aims, methodology, and findings, is presented.

1.1 The Regulation of Pharmaceutical Promotion

1.1.1 Regulation in Australia

The promotion of prescription medicines to the Australian general public is prohibited by the Therapeutic Goods Act (1989) while the dissemination of promotional and educational material by the pharmaceutical industry is self-regulated by Medicines Australia – the industry's representative association. Their code of conduct, which was recently revised in 2012, covers materials directed at healthcare professionals as well as the general public (see Medicines Australia,

2013b for more details). Medicines Australia does not pre-vet materials prior to their release (D. V. Hall & Jones, 2007), but instead, only engages in selective monitoring of published materials (Medicines Australia, 2013b). As such, it is largely reliant on complaints to effectively manage breaches of their code of conduct. Unsurprisingly, because the industry is most familiar with the code of conduct and companies have a vested interest in restricting their competitors' promotional activities, the majority of complaints are made by pharmaceutical companies against their competitors – 12 out of the 18 new complaints made during the 2012-2013 financial year (Medicines Australia, 2013a) and 5 out of 10 between 2013-2014 (Medicines Australia, 2014).

1.1.2 Regulation outside of Australia

In most industrialised countries, pharmaceutical promotion is self-regulated within limits set by the government (Francer et al., 2014). Currently, the United States (US) and New Zealand are the only industrialised countries that allow direct-to-consumer advertising of branded prescription medicines (Gellad & Lyles, 2007; Hoek & Gendall, 2002). Both these countries have witnessed a boom in the direct-to-consumer advertising of pharmaceuticals since regulatory changes in the mid-90s made such practices cost-effective for the industry (Gellad & Lyles, 2007; Hoek & Gendall, 2002).

1.2 Promotional Practices

Up until the 1980s, pharmaceutical promotion was limited to direct-to-physician activities. However, once regulatory changes made other forms of promotional activity legal and cost-effective in the US and New Zealand, pharmaceutical companies began to diversify their marketing strategies by engaging in direct-to-consumer advertising. This two-pronged approach of promoting to both healthcare professionals and the general public is commonly referred to, in marketing, as the *push and pull communications strategy* (Cavusgil & Calantone, 2011). Direct-to-physician promotional activities have the goal of "pushing" doctors to prescribe a company's product, while direct-to-consumer marketing aims to increase consumer demand for a product. In countries that prohibit the direct-to-consumer advertising of prescription drugs, the strategy is limited to pulling patients into the doctor's office. Where prescription drug advertising is available, the pull strategy encourages the patient to demand a specific product from the doctor.

Pharmaceutical promotion is big business. In 2011, the industry spent an estimated US$10.7 billion on promotional activities in the US alone (IMS Health Inc., 2011). The majority of the expenditure was on direct-to-physician promotion (63.4%), with the rest spent on direct-to-consumer advertising (IMS Health Inc., 2011).

1.2.1 Direct-to-Physician Practices

Direct-to-physician promotional activities include detailing by pharmaceutical sales representatives to healthcare professionals, the provision of educational or promotional materials via advertising or continuing medical education programs, the distribution of product samples, the sponsorship of events such as conferences, and the provision of small gifts or free meals.

Given the vast array of promotional activities adopted by the industry, it is unsurprising that interactions between healthcare professionals and the industry are commonplace. A 2003-4 survey of US doctors found that 94% of respondents indicated some form of relationship with the pharmaceutical industry, with receiving gifts (83%) and drug samples (78%) being the most common forms of interaction (Campbell et al., 2007). Furthermore, family practitioners (similar to Australian general practitioners) reported significantly more frequent interactions with industry compared to the other specialities surveyed (Campbell et al., 2007).

Promotional activities are not limited to just doctors. On average, US medical students either receive a free gift or are involved in a pharmaceutical industry sponsored activity every week (Sierles et al., 2005). More recently, US medical students reported frequent contact with pharmaceutical representatives. Approximately, 16.7% of first-years, 40% of fourth-years, and 35.9% of residents attended an industry-sponsored lecture in the previous six months (Austad et al., 2013). In addition, receiving industry-sponsored gifts was common, with a third of first-years, 56.8% of fourth-years, and 54% of residents receiving gifts in the previous six months (Austad et al., 2013). Similarly, German medical students averaged nine contacts with the industry per semester during the clinical component of their studies and almost 90% of them have accepted a gift from a pharmaceutical company or attended a sponsored event (Lieb, Koch, & Devitt, 2013).

1.2.2 Direct-to-Consumer Practices

Whilst direct-to-physician promotion remains the pharmaceutical industry's main marketing expenditure (Gagnon & Lexchin, 2008), over the last three decades, spending on direct-to-consumer advertising has steadily increased (Greene & Kesselheim, 2010; IMS Health Inc., 2011; Kelly, 2007; Mintzes, 2012). This increase can be attributed to the cost-effectiveness of direct-to-consumer advertising. The median return on investment has been estimated to be US$2.20 for every US$1 invested (Kelly, 2007).

In the US and New Zealand where direct-to-consumer advertising of prescription medication is permitted, promotion to the public is most commonly in the form of *product claim* advertisements (henceforth for convenience, the abbreviated form *ad* will be used). Product claim ads contain specific efficacy and safety information for a particular branded drug (Gellad & Lyles,

2007). These ads must contain a major statement that details the major risks and common side effects of the product, and its risks and benefits need to be presented fairly (Gellad & Lyles, 2007). Furthermore, these ads must fulfil the requirement of adequate provision, by referring consumers to alternative sources of information, such as doctors, a website, or a helpline (Gellad & Lyles, 2007).

In contrast, for countries like Australia that prohibit direct-to-consumer advertising of prescription medication, the pharmaceutical companies skirt around regulations by using *disease awareness campaigns* to engage the general public. Any material associated with these campaigns (print ads, radio/television commercials, or websites) cannot make specific references to prescription drugs, so the consumer is often advised to consult their doctor for further information. By raising awareness for a particular disease or condition that their product treats, the pharmaceutical industry can still rely on their very successful push and pull communications strategy without violating any regulations. These campaigns are often run in partnership with health organisations, patient-groups, or charitable organisations. Recent notable examples in Australia are GlaxoSmithKline's "Get your puff back" Asthma campaign that ran during the 2012 London Olympics and Pfizer's 2015 "More than medication" campaign for erectile dysfunction (visit www.morethanmedication.com.au/Health-Conditions/Erectile-dysfunction/).

With the widespread use of new media, particularly social media, it is unsurprising that 100% of the top 10 pharmaceutical companies have a presence on Facebook, Twitter, sponsored blogs and so forth, with 40% having dedicated social media websites that link all their social marketing tools together (B. A. Liang & Mackey, 2011). This creates regulatory problems for countries that prohibit direct-to-consumer advertising of prescription medication because promotional materials designed for the US or New Zealand are freely accessible to anyone via the internet.

1.3 Why Pharmaceutical Promotion is an Issue

1.3.1 Problems with Direct-to-Physician Promotion

Healthcare advocates are concerned that pharmaceutical companies have too much influence over doctors and their prescription decision making process. As discussed in section 1.2, drug companies go to extensive lengths to persuade doctors that their products are superior to their competitors'. In the US alone, the amount spent by pharmaceutical manufacturers on promotional activities was nearly twice the amount spent on research and development (24.4% versus 13.4% of sales revenue; Gagnon & Lexchin, 2008).

Unfortunately, in their attempts to remain competitive in the marketplace, pharmaceutical companies, at times, make claims or statements about their products that are inaccurate and/or misleading. A systematic review on the quality of pharmaceutical advertising in medical journals concluded that less than 67% of pharmaceutical claims were either supported by a meta-analysis, randomised controlled trial, or systematic review (Othman, Vitry, & Roughead, 2009). In addition, about half the references cited were from non-independent sources and were often of poor research quality (Othman et al., 2009). Finally, pharmaceutical companies often reported risks and benefits in relative (e.g. relative risk ratio) as opposed to absolute terms (e.g. absolute risk ratio or numbers need to treat), which the authors argued overemphasised the benefits while understating the risks of a product (Othman et al., 2009). Several studies that were not included in the Othman and colleagues (2009) review have demonstrated that the claims found in pharmaceutical advertising directed at doctors were often either unfounded, not supported by the references cited, or were of poor research quality too (Dumville, Petherick, O'Meara, Raynor, & Cullum, 2009; Greving, Denig, De Zeeuw, & Haaijer-Ruskamp, 2007; Heimans, Van Hylckama Vlieg, & Dekker, 2010; Othman, Vitry, & Roughead, 2010; Santiago, Bucher, & Nordmann, 2008; Shaw & Gray, 2009; Spielmans, Thielges, Dent, & Greenberg, 2008; van Winkelen et al., 2006). Similarly, studies have demonstrated that the industry also misuses graphs or statistics in their promotional material to present a biased account of their product (Cooper, Schriger, Wallace, Mikulich, & Wilkes, 2003; Lexchin, 2010).

1.3.2 Problems with Direct-to-Consumer Promotion

Proponents of direct-to-consumer advertising argue that it improves patient education, reduces under diagnosis or under treatment, and lowers the economic costs on healthcare since early intervention is cheaper than later medical interventions like surgery or hospitalisation (Auton, 2007; Calfee, 2002). However, when Hoek and Maubach (2007) surveyed New Zealanders and investigated whether direct-to-consumer ads increased disadvantaged consumers' health-related knowledge and encouraged those with lower knowledge to consult their doctor. They found that participants who reported greater knowledge of health-related issues found the ads easier to understand and were more likely to seek further information than participants who reported less knowledge of health-related issues. Furthermore, the less knowledgeable were more likely to report difficulty in identifying if the ad had advertised a prescription medication and were more likely to trust the content of the ad. This suggests that direct-to-consumer ads reinforce existing knowledge rather than educate or provide new knowledge. More worryingly, their results suggests that direct-to-consumer ads may not help enhance awareness among groups with lower health knowledge – consumers who are the most likely to benefit from increased knowledge are also those who find direct-to-consumer ads most difficult to understand and the

least likely to seek further information. This is contrary to the argument put forth by proponents of direct-to-consumer ads – that these ads raise awareness and benefit the most vulnerable.

Furthermore, critics are sceptical of the quality and accuracy of information provided and argue that direct-to-consumer advertising does more harm than good (Coney, 2002; D. V. Hall, 2008; Lexchin & Mintzes, 2002; Mansfield, Mintzes, Richards, & Toop, 2004; Mintzes, 2012). For example, in April 2009, the US Food and Drug Administration issued warning letters to 14 manufacturers who sponsored search engine ads for prescription drugs without any obvious connection to a statement of risks (Greene & Kesselheim, 2010). Similarly, a content analysis of unbranded disease awareness print advertising published in Australia found that the information provided in these ads centred around treatment and prevalence, suggesting that their primary purpose was to supply information about treatment in order to sell a product (D. V. Hall, Jones, & Iverson, 2009). Furthermore, the ads relied heavily on emotional appeals to persuade instead of using comprehensive information to educate the reader (D. V. Hall et al., 2009).

Outside of Australia, there is a comprehensive body of content-analysis research conducted on direct-to-consumer ads for prescription medication. Bell, Wilkes, and Kravitz (2000) found that whilst some ads were informative, the majority had minimal information – usually only mentioning the condition the drug treats and its symptoms. Information about prevalence, risk factors, treatment information and efficacy, alternative behavioural interventions, or attempts to clarify common misconceptions were often omitted (Bell et al., 2000). This is unsurprising because experimental work on direct-to-consumer ads has demonstrated that less information and detail, particularly, information relating to risks and side-effects, improves message uptake and ad effectiveness (S. C. Jones & Mullan, 2006; Kavadas, Katsanis, & LeBel, 2007). However, experimental work by Davis (2000) demonstrated that consumers rated ads with incomplete risk statements more positively than ads with more complete statements. When there was less information and detail on risks, consumers were more likely to recommend the drug to a friend or purchase the drug for themselves. So, while less information means the ads are more engaging to the consumer, consumers are not being afforded a fair opportunity to weigh the pros and cons, leading to potentially harmful decisions. In addition, Sheehan (2006) found that direct-to-consumer product claim ads were among the most difficult to read. In particular, risk information had lower readability than both the headline and benefits (Sheehan, 2006). So while these ads meet the regulatory requirement of providing risk and benefit information, they arguably do not sufficiently fulfil their obligation for fair balance because a differential still exists in terms of consumers' ability to process and understand risks versus benefits.

The aforementioned problems are not limited to ads. Websites run by pharmaceutical companies tend to be the least compliant of the Health on the Internet Foundation's code of conduct for posting health information on the internet (M. Morgan & Montagne, 2011). For example, a content analysis of websites developed by pharmaceutical companies for their contraceptive

products concluded that the websites preferred to promote the physiological benefits of using the product rather than its contraceptive effectiveness, emphasised convenience, and often stressed their product's relative lower risk compared to its competitors (Ledford, 2009). However, risk information was consistently presented in a smaller font and often less accessible than other information on the website (Ledford, 2009). Likewise, a meta-analysis revealed that industry-funded mental health websites were more biased than other non-industry-funded ones and in general overemphasised biological causal explanations and medication use (Read & Cain, 2013).

Furthermore, direct-to-consumer advertising often employs various techniques such as imagery and transformational messages to persuade the consumer that there is a pill for every ill (Cline & Young, 2004). Direct-to-consumer advertising also helps the industry engage in the medicalisation of normal physical and emotional experiences (Arney & Rafalovich, 2007) and the perpetuation of existing stereotypes (e.g. framing depression as a female condition and cardiovascular disease as a male problem; Grow, Park, & Han, 2006). Likewise, there is a concern that disease awareness campaigns help the pharmaceutical companies broaden their target population through re-defining what is *healthy* and what is *abnormal* (D. V. Hall & Jones, 2007; Jutel, 2010; Moncrieff, 2009; R. N. Moynihan et al., 2013; Woloshin & Schwartz, 2006). Many researchers call this redefinition process "disease mongering" (R. Moynihan, Doran, & Henry, 2008). The history of Sarafem is an example of the creation of new diagnostic categories to expand into potential markets. Eli Lilly's patent on Prozac (fluoxetine) expired in 2011. To protect its market share, it re-branded Prozac as Sarefem and lobbied extensively for premenstrual dysphoric disorder to be recognised as a medical condition and obtained approval for Sarefem to be use as a treatment for premenstrual dsyphoric disorder by the US Food and Drug Administration (Ebeling, 2011). Similarly, the branding and marketing surrounding Bayer Healthcare Pharmaceuticals' birth control pill, YAZ, promoted the drug as a treatment for premenstrual dysphoric disorder and acne, even though its primary indication is for contraception (E. S. Watkins, 2012).

Lastly, direct-to-consumer advertising commonly employ the use of screening tools that promote self-diagnosis (for instance, you can visit http://www.coulditbeadhd.ca/ to screen for adult attention deficit and hyperactivity disorder or www.isitlowt.com to screen for low testosterone). Ebeling (2011) argues that these screening tools or symptom check-lists position patients as active participants in the construction of the branded drugs and in the branding of highly contested disease states. The aim is for patients to recognise the disease for its symptoms and become brand advocates for the drugs that treat the disease (Ebeling, 2011). Furthermore, through this self-diagnosis, consumers are empowered to demand both a diagnosis and a particular treatment option from their doctors (Ebeling, 2011).

1.3.3 Irresponsible Use of the Push and Pull Strategy

A final reason why pharmaceutical promotion is problematic is the irresponsible use of the pull strategy to create unnecessary demand, which places further strain on our primary healthcare providers. For example, Novartis who manufacture Lamisil, a treatment for onychomycosis (fungal infection of the nail), which is usually benign, ran a disease awareness campaign for the condition several years ago in Australia. It featured an unattractive spokes-character that encouraged individuals to consult their doctor and was rolled out concurrently with a Lamisil campaign directed at general practitioners. However, whilst the direct-to-physician ads encouraged doctors to check for onychomycosis in diabetics to avoid serious complications, the direct-to-consumer ads appeared to be directed to all consumers and played on women's insecurities about personal hygiene and appearances (D. V. Hall & Jones, 2007). A similar campaign was run in the Netherlands and it resulted in an increase in onychomycosis-related consultations and Lamisil prescriptions, while prescriptions for its competitors decreased (t'Jong, Stricker, & Sturkenboom, 2004). Novartis was criticised by the Dutch Society of General Practitioners for placing unnecessary strain on doctors by shining a spotlight onto an unimportant health condition, thereby reducing the time available for more important conditions (t'Jong et al., 2004).

1.4 The Impact of Promotion

Considering the pharmaceutical industry's expenditure on promotional activities, one can assume that there is a substantial return of investment that make such outlays worthwhile. Several studies from the marketing and management literature provide evidence to support this assumption (Cavusgil & Calantone, 2011; Pedan & Wu, 2011; Windmeijer, de Laat, Douven, & Mot, 2006). For example, Hurwitz and Caves (1988) demonstrated early on that physician-directed promotion performs a persuasive role by increasing the market share for a branded drug. More recently, Pedan and Wu (2011) found that detailing, free meals, and free samples to doctors affect brand share positively. However, the degree of success was brand-specific (Pedan & Wu, 2011). Similarly, Windmeijer and colleagues (2006) demonstrated that direct-to-consumer promotional expenditures shift the demand curve for the product outwards, supporting the notion that a sizeable proportion of promotion efforts is about establishing market share. Furthermore, their predictive model suggests that in the long run if all companies increase total promotion outlays by 1% then total pharmaceutical consumption would increase by about 0.2% (Windmeijer et al., 2006). While there is evidence to suggest that promotional activities serve as marketing tools and do affect market share, what is the impact of promotion on healthcare professionals and consumers?

1.4.1 Healthcare Professionals

Given the evidence that suggests pharmaceutical promotion is untrustworthy (discussed earlier in section 1.3.1), healthcare professionals and medical students alike should be wary and sceptical of promotional material. However, surveys have consistently found that while doctors and students acknowledge that information from pharmaceutical companies is often biased, they still regard promotional material as educational and beneficial (Austad et al., 2013; Austad, Avorn, & Kesselheim, 2011; Barfett et al., 2004; Carmondy & Mansfield, 2010; Fischer et al., 2009; Lieb et al., 2013; McKinney et al., 1990; Steinman, Shlipak, & McPhee, 2001; Wazana, 2000; Zipkin & Steinman, 2005). For example, US students and residents still regard industry-sponsored grand rounds as helpful and educational even though the vast majority admitted that such rounds were biased in favour of the company's products (Austad et al., 2013). Similar sentiments were observed in German medical students with regards to industry-sponsored lectures and seminars (Lieb et al., 2013).

Furthermore, in a systematic review of medical students' exposure and attitudes toward the pharmaceutical industry, more frequent contact was associated with more favourable attitudes towards interaction with the industry (Austad et al., 2011). For example, 65% of clinical students believed accepting gifts was appropriate, while only 28% of pre-clinical students believed it was appropriate, even though both groups had the same level of knowledge with regards to the industry's promotional spending and drug development (Fitz et al., 2007). In other words, as students advance to clinical training and consequently have more contact with the industry, they become more accepting of interactions with the industry.

More worrisome is the overconfidence doctors and students have with regard to handling the persuasive attempts of the pharmaceutical industry. In particular, there is a self-bias towards believing that one is less vulnerable than peers to the persuasive influence of pharmaceutical promotion. This is a general and pervasive tendency known as the bias blind spot (Pronin, Lin, & Ross, 2002). For example, medical students and/or residents have consistently reported greater agreement when asked if gifts would influence their colleagues prescribing practices compared to when they were asked whether they were personally influenced by gifts (Austad et al., 2013; Lieb et al., 2013; Sierles et al., 2005; Zipkin & Steinman, 2005). This self-bias has been observed among doctors (M. A. Morgan, Dana, Loewenstein, Zinberg, & Schulkin, 2006; Steinman et al., 2001) as well as nurse practitioners (Crigger, Barnes, Junko, Rahal, & Sheek, 2009).

The detailing of sales representatives and the provision of drug samples to doctors are probably the two most effective ways to influence prescribing behaviour. Detailing has been shown to have a positive and significant impact on the number of prescriptions written (Manchanda & Chintagunta, 2004; Mizik & Jacobson, 2004). Likewise, access to free samples influences

doctors' drug choices (Adair & Holmgren, 2005; Hurley, Stafford, & Lane, 2014; Mizik & Jacobson, 2004; Pinckney et al., 2011). For example, in a randomised trial, residents who were given access to drug samples were less likely to choose unadvertised drugs than residents who did not have access to the samples and less likely to choose over-the-counter drugs (Adair & Holmgren, 2005).

The pharmaceutical industry has asserted that the dissemination of medical information to doctors through detailing is beneficial. However, in a systematic review by Spurling and colleagues (2010) which looked at 58 studies that assessed the impact of direct exposure to pharmaceutical promotion (sales representative visits, advertising in journals or clinical software, mailed information, attendance at pharmaceutical presentations/meetings, or sponsored clinical trials) on either the quality, cost, or the frequency of prescribing, several key findings emerged. Firstly, with regards to the impact of pharmaceutical promotion on the quality of prescribing, all but one of the included studies reported either a decrease in prescribing quality or no association (Spurling et al., 2010). Similarly, all but one of the studies that assessed the impact of pharmaceutical promotion on the cost of prescribing either found an increase in costs or no association (Spurling et al., 2010). Lastly, pharmaceutical promotion was found to either increase the frequency of prescribing or no association was found (Spurling et al., 2010). However, a limitation of these findings is that the majority of the studies reviewed have relied on either cross-sectional study designs (41%) or time-series analyses (41%), with only two studies using randomised controlled trials (3.4%; Spurling et al., 2010). Such designs are descriptive and can only provide a snapshot of the association between pharmaceutical promotion and prescribing behaviour for a given time. In order to make causal inferences about the detriment or benefit of pharmaceutical promotion, more research utilising experimental designs is needed.

1.4.2 Consumers

Despite the issues related to direct-to-consumer advertising (discussed earlier in section 1.3.2), consumers – like healthcare professionals – still regard pharmaceutical advertising favourably. In a survey of US women who had regular exposure to direct-to-consumer advertising, a majority reported that it provides more valuable information and is more believable than regular advertising (Mehta & Purvis, 2003). Only a third of the women agreed that pharmaceutical ads downplay the risks associated with prescription medication (Mehta & Purvis, 2003).

Similarly, in a study that investigated the effect of source credibility (whether it was government or industry sponsored) on health-related attitudes and behaviours, participants rated government and industry sponsored health information websites equally credible (Kim, 2011). An industry sponsor was perceived to be as effective as a government sponsor at influencing health-related

attitudes and behavioural intentions (Kim, 2011). More worryingly, participants with more personal relevance to the medical condition discussed in the website rated the sponsor as more credible than participants with less personal relevance to the condition, regardless of whether the sponsor was a government agency or a corporate company (Kim, 2011). This suggests that the majority of consumers trust and value direct-to-consumer advertising, especially when the material is personally relevant.

Unsurprisingly, in a study that explored the relationship between the level of scepticism towards pharmaceutical advertising and prescription drug information seeking behaviour, the level of scepticism was, on average, found to be neutral among consumers, while a person's level of education significantly predicted greater scepticism (Delorme, Jisu, & Reid, 2009). In addition, whilst scepticism was negatively related to perceived usefulness of advertising as a source of information, it was neither associated with the actual use of information from advertising/interpersonal sources nor related to the perceived importance of prescription drug information (Delorme et al., 2009). This suggests that consumers are confident in their ability to assess direct-to-consumer advertising, regardless of how sceptical they are.

Furthermore, as the pharmaceutical industry increases its use of direct-to-consumer advertising, society is also increasing its reliance on the internet and media for health information. In a survey conducted in New South Wales, Australia, the top three sources of information about a medical condition were the respondents' doctor (81.3%), the internet (42.2%), and the media (14%) respectively, while the most cited source of further information was the internet (87.4%), books (11.2%), and their doctor (8.3%) respectively (Hogue, Doran, & Henry, 2012). Furthermore, 68.8% of respondents reported hearing, seeing, or reading about a medical condition in the media in the past year, with 38.4% seeking further information after hearing about a condition in the media (Hogue et al., 2012).

This increase in accessibility to health information has had a significant impact on consumers' perception of disease. For example, Park and Grow (2008) have shown that the familiarity with direct-to-consumer advertising of antidepressants was found to be positively associated with one's perceived lifetime risk of depression and its prevalence in society. More importantly, participants over-estimated prevalence by almost 4 fold (Park & Grow, 2008). This suggests that constant exposure to direct-to-consumer advertising may result in inflated beliefs about prevalence.

Similarly, the unbridled access to health information has led to changes in patient behaviour during doctor consultations. Patients from a country where direct-to-consumer advertising is permitted (US) reported more exposure to drug advertising and requested more advertised drugs than patients from a country where it is not permitted (Canada; Mintzes et al., 2003). In both settings, patients who had higher exposure to advertising requested more advertised drugs (Mintzes et al., 2003). Direct-to-consumer advertising has influenced patients' expectations too. Lewin

(2013) found that patients who were prompted to see a doctor by direct-to-consumer advertising were more likely to be satisfied with the consultation if they received a prescription rather than no prescription, regardless of whether the prescription was for the advertised drug the patient saw. However, patients were more likely to be satisfied if they received the advertised drug rather than some other drug (Lewin, 2013). Interestingly, patient satisfaction was not contingent on diagnosis, but rather, on the receipt of a prescription (Lewin, 2013). This suggests that the end goal of consumers who are prompted by advertising to consult a doctor is ultimately a prescription – preferably of the drug they saw advertised.

Doctors are probably aware of this shift and several studies have demonstrated that patients' requests can influence doctors' prescribing decisions. For example, Mintzes and colleagues (2003) found that patients who requested an advertised drug were nearly 17 times more likely to receive at least one new prescription than compared to patients who did not request a drug (Mintzes et al., 2003). They found that this increase arose from doctors prescribing requested drugs despite feeling ambivalent about whether those drugs were the best option. Similarly, 19.8% of sciatica patients requesting oxycodone would receive a prescription for it, compared with 1% of those making no specific request (McKinlay, Trachtenberg, Marceau, Katz, & Fischer, 2014). Fifty-three percent of knee osteoarthritis patients requesting Celebrex would receive it, compared with 24% of patients making no request (McKinlay et al., 2014). But perhaps the best evidence so far of the influence of patient requests on prescribing was a randomised trial conducted by Kravitz and colleagues (2005). They trained actors to present themselves in a way that would either be consistent with someone suffering from major depression or adjustment disorder, and measured whether prescribing rates were associated with patients' request for antidepressants (Kravitz et al., 2005). When major depression was depicted, rates of antidepressant prescribing were 53%, 76%, and 31% for making brand-specific, general, and no requests, respectively. In adjustment disorder, antidepressant prescribing rates were 55%, 39%, and 10%, respectively (Kravitz et al., 2005). So even though each of the trained actors presented identical medical histories and symptoms, the nature of their requests influenced the outcome of their consultation.

1.5 Interventions: Countering the Impact of Promotion

1.5.1 Healthcare Professionals

The typical approach taken to combat the influence of pharmaceutical promotion among healthcare professionals is either the implementation of policy and regulations (systemic) or the use of educational interventions (individualistic).

Several studies have evaluated the impact of the systemic approach, with encouraging success. For example, students from medical schools with more restrictive policies with regards to interactions with industry are more likely to support banning student-industry and doctor-sales representative interactions (Kao et al., 2011). Apart from shifting attitudes, policy regulation can influence behaviour too. For example, an implementation of a policy to reduce access to pharmaceutical sales representatives in an Australian general practice, resulted in approximately five hours of additional consultation time for patients per month, a reduction in promotional material and drug samples, a decrease in prescriptions per patient, and an increase in the prescription of generic medication (Spurling & Mansfield, 2007). Another study of the effects of policies on behaviour found that conflict of interest polices during training led to less prescribing of heavily promoted drugs (A. J. Epstein, Busch, Busch, Asch, & Barry, 2013). This study was a national analysis of US psychiatrists' and psychiatry residents' prescription of antidepressants. Epstein and colleagues (2013) found that the rates of prescribing for heavily promoted, brand reformulated, and branded antidepressants were all lower for doctors who were exposed to conflict-of-interest policies (because they graduated after 2008) than those who had no exposure to such policies (because they graduated before 2001). Furthermore, the analysis showed that the differences between those cohorts for the prescribing of heavily promoted and brand reformulated drugs were significantly greater for doctors who were graduates of programs with highly restrictive policies compared to doctors who were graduates of programs with moderate or minimally restrictive policies (A. J. Epstein et al., 2013). Similarly, King, Essick, Bearman, and Ross (2013) found that physicians who graduated from schools with an active gift-restriction policy were significantly less likely to prescribe newly marketed drugs in two of the three psychotropic medication classes that were examined in the study. Furthermore, cohorts with longer exposure to the policy or experienced more stringent policies had the lowest prescribing rates (King et al., 2013).

Another approach taken to combat pharmaceutical promotion has been through educational interventions targeted at medical students or doctors undergoing residency training in hospitals (see Carroll, Vreeman, Buddenbaum, & Inui, 2007 or Montague, Fortin, & Rosenbaum, 2008 for reviews). Past educational interventions ranged from a single session workshop/seminar (Agrawal, Saluja, & Kaczorowski, 2004; Anastasio & Little, 1996; Fugh-Berman, Scialli, & Bell, 2010; Hopper, Speece, & Musial, 1997; Palmisano & Edelstein, 1980; Randall, Rosenbaum, Rohrbaugh, & Rosenheck, 2005; Schneider, Arora, Kasza, Van Harrison, & Humphrey, 2006; Vinson, McCandless, & Hosokawa, 1993; Wilkes & Hoffman, 2001; Wofford & Ohl, 2005) to multi-session programs that spanned up to two years (Daniel & Leedham, 1966; Garb, 1960; Kao et al., 2011; Kelcher, Brownoff, & Meadows, 1998; Shaughnessy, Slawson, & Bennett, 1995; Slawson & Shaughnessy, 1999; R. S. Watkins & Kimberly, 2004). In general, these interventions aimed to inform the audience on the debate surrounding pharmaceutical promotion

as well as to raise awareness and educate the audience on common marketing techniques employed by the industry. In addition, these interventions usually included an interactive/activity-based component such as getting the students to critically evaluate promotional material or rehearse interactions with pharmaceutical representatives. Although it has generally been demonstrated that these educational interventions are able to shift attitudes or increase scepticism towards pharmaceutical promotion (Carroll et al., 2007; Montague et al., 2008), their utility and effectiveness should be interpreted with caution due to a number of methodological issues.

First, the effectiveness of these educational interventions has not been rigorously evaluated. The majority of the studies either had non-experimental (Agrawal et al., 2004; Anastasio & Little, 1996; Fugh-Berman et al., 2010; Shaughnessy et al., 1995; Slawson & Shaughnessy, 1999; R. S. Watkins & Kimberly, 2004; Wilkes & Hoffman, 2001; Wofford & Ohl, 2005) or quasi-experimental research designs with non-randomised control groups (Daniel & Leedham, 1966; Hopper et al., 1997; Kao et al., 2011; Randall et al., 2005; Schneider et al., 2006; Vinson et al., 1993) that relied on the comparison of pre- and post- intervention outcome measures to determine effectiveness. Consequently, any changes observed in the outcome measures may have been the result of contamination from confounds/external factors or due to cohort effects. No study has yet applied a randomised controlled research design to evaluate the effectiveness of a pharmaceutical promotion education intervention.

Second, evaluations have only relied on self-reported measures such as: scepticism towards drug promotion (Agrawal et al., 2004; Daniel & Leedham, 1966; Wilkes & Hoffman, 2001), attitudes toward the acceptance of gifts from industry (Fugh-Berman et al., 2010; Hopper et al., 1997; Kao et al., 2011; Randall et al., 2005; Schneider et al., 2006; Shaughnessy et al., 1995; Vinson et al., 1993; Wofford & Ohl, 2005), attitudes toward interaction with pharmaceutical representatives (Agrawal et al., 2004; Fugh-Berman et al., 2010; Hopper et al., 1997; Kao et al., 2011; Randall et al., 2005; Schneider et al., 2006; Shaughnessy et al., 1995; Wilkes & Hoffman, 2001; Wofford & Ohl, 2005), level of confidence in their ability to deal with pharmaceutical promotion (Anastasio & Little, 1996; Slawson & Shaughnessy, 1999; Wilkes & Hoffman, 2001), and/or level of knowledge and awareness of the ethical issues surrounding pharmaceutical promotion and its impact on healthcare (R. S. Watkins & Kimberly, 2004). Self-reported data is vulnerable to distortion. As such, there is a strong need for more objective outcome measures to be applied. There is also a great need for outcome measures that can assess the ability to critically analyse persuasive content or resist persuasion. It would be counter-productive if an intervention increased an individual's perception/confidence in his/her ability to critically analyse promotional material, but did not actually improve that individual's ability.

Third, there is a lack of behavioural outcome measures. It is unknown if shifts in attitudes or an increase in scepticism is sufficient to bring about behavioural changes such as prescribing frequency/quantity; seeking credible, evidence-based, and independent sources of information

to inform their treatment decisions; the avoidance of pharmaceutical material; or less frequent interaction with sales representatives.

Lastly, studies have not conducted scheduled long-term follow-ups. This is especially pertinent to short, single session interventions. There is no evidence yet to demonstrate that the changes observed immediately after a single brief intervention are stable over time.

1.5.2 Consumers

Unfortunately, little research has been done to counter the influence of pharmaceutical advertising on consumers. To my knowledge, only one study has attempted to do so. Wang (2012) used a visual priming paradigm to investigate whether consumers' perceptions of pharmaceutical print advertising is affected by their attention to disclosures on safety and side-effects. The use of a visual cue in the form of a yellow sign placed to the left of the disclosure statements successfully directed consumers' attention to it (92% in primed condition versus 19% in the control; Wang, 2012). In addition, amongst participants that did notice the disclosure, the presence of the visual cue led to more positive attitudes toward responsible advertising practice, greater trust in the ad, but no differences in their perceptions of likeability, attractiveness, and convincingness (Wang, 2012). Given the influence of direct-to-consumer promotion and its potential to be misleading or untrustworthy, coupled with the fact that consumers are generally uncritical of pharmaceutical advertising, it is imperative that more research be conducted to ensure that consumers are not vulnerable to misinformation.

1.6 Summary

The research discussed above highlight the prevalence of pharmaceutical promotion to both healthcare professionals and consumers, the potential negative impact it can have, and the past approaches taken to counter its impact. There is no question that promotional activities are extensive. However, there is less certainty about whether such promotion impacts the provision of healthcare negatively. While there is a body of evidence that suggests promotional activities are more about marketing than education, the lack of strong empirical evidence to support this claim has hampered the fight against promotional activities. Addressing these shortfalls will help persuade healthcare professionals, policy regulators, and consumers to be more wary of pharmaceutical advertising. Similarly, whilst there have been attempts to combat the impact of promotional activities, particularly, amongst healthcare professionals, we need more rigorous evaluations of both systemic and individualistic interventions. Consequently, this thesis adopted the pharmaceutical industry's two-pronged approach by setting two parallel goals: tackling the

lack of empirical research on the impact of promotion on healthcare professionals and the lack of educational interventions for consumers.

1.7 Overview of the New Research

In line with the two-pronged approach, the following four chapters present new studies conducted within the context of direct-to-physician and direct-to-consumer promotional practices in Australia. Chapter 2 describes my investigation into the impact of print advertising on medical students' attitudes toward prescription medication, while Chapters 3, 4, and 5 describe the design and evaluation of an educational intervention designed to improve consumers' knowledge of pharmaceutical promotion practices.

In Chapter 2, I report on my investigation into the causal effects of incidental exposure to prescription drug advertising on medical students' implicit and explicit attitudes towards the advertised drug. Implicit attitudes were measured using an Implicit Association Test (IAT; see section 2.1.3 for a detailed description of the test). During the experiment, participants were asked to read a mock medical journal before completing the IAT and a self-report questionnaire. Participants in the experimental condition were given mock journals that contained prescription drug advertising, while participants in the control condition were given journals without advertising. The results show no differences between conditions for implicit and explicit attitudes. However, the experiment lacked statistical power and hence, these non-significant results are associated with a high false negative rate. Consequently, I cannot infer with confidence that incidental exposure to drug advertising has no influence on implicit or explicit attitudes.

Chapter 3 describes the design and evaluation of an educational intervention designed to improve consumers' knowledge of the advertising practices the pharmaceutical industry engages in. During the intervention, participants learn that the pharmaceutical industry uses disease awareness campaigns to by-pass regulatory restrictions on direct-to-consumer advertising and are encouraged to evaluate health information from the industry more critically. More importantly, to increase motivation and uptake of the educational message, participants were shown that they were susceptible to unreliable health information. The results show that post-intervention, participants paid greater attention to sponsorship information when evaluating a disease awareness ad. Furthermore, the intervention led to an increase in scepticism towards pharmaceutical advertising. However, exploratory analyses revealed an undesirable trend. Participants who were more convinced by the unreliable ad were less likely to be receptive to the intervention.

Chapter 4 details the design and evaluation of the intervention's second iteration. Subtle changes were made to the wording, tone, and presentation of the intervention to reduce the likelihood of negative reactance from participants. Minor changes were made to the ads to control for

unwanted ad and/or disease specific effects that were observed in the previous experiment. The results show that these improvements led to better uptake of the intervention's educational message and consequently, a more efficacious intervention. However, an interesting response pattern emerged. The intervention led to greater trust in government-sponsored health information, rather than more distrust in industry-sponsored health information. I postulated that this response pattern might have been a result of insufficient knowledge about the industry's push and pull advertising strategy and the role disease awareness ads play within this strategy.

The final experiment presented in Chapter 5 evaluated the third iteration of the intervention. In previous iterations, the intervention informed participants on the existence of industry-sponsored disease awareness campaigns and briefly explained why one should be wary of the information presented in such campaigns. Previously, more focus was placed on teaching participants how to quickly evaluate whether an ad is trustworthy. However, in this third iteration, greater focus was placed on explaining why it is important to differentiate industry and non-industry sponsored health information. The results from this final experiment show that the additional information significantly improved the intervention's efficacy. Post-intervention, participants were more motivated to critically evaluate disease awareness ads to differentiate between trustworthy and untrustworthy ads. More importantly, I achieved moderate success with cultivating a healthy level of scepticism among participants. Their receptiveness towards an ad was dependent on whether the ad was industry or non-industry sponsored. They were more inclined to disregard the information when the ad was industry-sponsored.

Chapter 6 concludes by summarising the key findings from my parallel lines of research and discusses the implications of these findings for policy makers and regulators of pharmaceutical promotion, researchers engaged in the debate over the value of pharmaceutical promotion, and healthcare professionals and consumers who are the recipients of such activities.

Chapter 2

The Impact of Incidental Exposure to Print Ads on Medical Students: An IAT Study

2.1 Introduction

Imagine you are flipping through a magazine, directing your attention to articles that pique your interest. The magazine is interspersed with various ads for a range of products and services but you pay little attention to them. Now, you pick up a different magazine, only this time you focus your attention on the ads within it. Suppose, these two magazines have ads that appear in both and others that do not. Could you recognise which ads in the second magazine appeared in the first? Would it surprise you that even though you might not recognise these ads, they still have the ability to influence your choices as a consumer? This phenomena is known as the *mere exposure effect* and studies have consistently shown that paying minimal attention to an ad is sufficient for that ad's product to enter your consideration set (i.e. your list of possible choices that you draw from during your decision-making process; Perfect & Askew, 1994; Shapiro, 1999; Shapiro, MacInnis, & Heckler, 1997).

Now, imagine your doctor flipping through a medical journal peppered with drug advertising by the pharmaceutical industry. Would you rule out the possibility that the advertised drugs have entered your doctor's prescription consideration set? Would doctors be immune to the incidental exposure effect? When asked, doctors generally believe that their prescribing decisions are rational and void of biases or unconscious influences (Carmondy & Mansfield, 2010; Rutledge, Crookes, McKinstry, & Maxwell, 2003; Steinman et al., 2001). The decision to prescribe is complex and influenced by many factors such as the patient's history, the doctor's experience

with the drug and so forth (Buusman, Andersen, Merrild, & Elverdam, 2007; Schommer, Worley, Kjos, Pakhomov, & Schondelmeyer, 2009). But, to discount the influence of advertising would be premature.

This chapter hopes to take a step closer towards settling the debate by first adding to the dearth of research on the causal effects of pharmaceutical promotion on health professionals.

2.1.1 Outline

First, I begin with a review of the research that has investigated the impact of print advertising by the pharmaceutical industry on medical professionals. I will focus particularly on the work of Grande and colleagues (2009). Next, I will describe the Implicit Association Test (IAT) and highlight some of its methodological issues. I then present an experiment that sought to replicate Grande and colleagues' (2009) findings. I conclude with a discussion of the issues that have arisen from this experiment and highlight the challenges for future work in this area.

2.1.2 Previous Research

Research on the impact of pharmaceutical print advertising has been confined to the ability to recognise/recall ads (Ferber & Wales, 1958), opinion towards the ads (Ferber & Wales, 1958), attitudes toward its effectiveness or usefulness (Avorn, Chen, & Hartley, 1982; Spiller & Wymer Jr, 2001), prescription frequency or its influence on the decision to prescribe (Becker, Stolley, Lasagna, McEvilla, & Sloane, 1972; Hemminki, Karttunen, Hovi, & Karro, 2004; M. Jones, Greenfield, & Bradley, 1999; Prosser & Walley, 2003; Spiller & Wymer Jr, 2001; Walton, 1980), whether print advertising promotes quality prescribing (Montgomery, Mansfield, Spurling, & Ward, 2008), and the cost of prescribing (C. Watkins et al., 2003). To my knowledge no published study to date has investigated the effect of exposure to pharmaceutical print advertising on healthcare professionals' perception or attitudes toward the advertised product.

However, a study by Grande and colleagues (2009) did investigate the effect of exposure to small branded gifts on attitudes toward the advertised drug. In fact, to my knowledge, their work is the only study to experimentally test the impact of pharmaceutical promotion. Specifically, they investigated whether exposure to small branded drug advertising paraphernalia (clipboards/notepads labelled with a specific drug name) influenced both implicit and explicit attitudes toward the advertised drug compared to a competitor drug amongst 3^{rd} and 4^{th} year medical students from two US Universities. Participants' implicit attitudes were measured using an IAT (discussed in detail in section 2.1.3) that compared two categories (the advertised drug and its competitor) across a pleasant-unpleasant attribute dimension.

Their key finding was that the incidental exposure (i.e. without conscious awareness) of small branded items to participants produced differences in implicit attitudes (Grande et al., 2009). More interestingly, the direction of the effect (positive or negative) depended on which University the medical student was attending. They found that 4^{th} year medical students from a University with lax policies on pharmaceutical promotion had a stronger association between the positive concept (pleasantness) and the advertised drug compared to 4^{th} year medical students from the same University who were not exposed to the small branded items. Conversely, a reversed effect was observed when the same experiment was conducted with medical students from a University with strict policies. Those who were exposed to the branded items had stronger associations between the negative concept (unpleasantness) and the advertised drug compared to those who were not exposed (Grande et al., 2009). This finding suggests that University policy or an environment or culture that is sceptical or wary of pharmaceutical promotion can possibly mediate the effects of promotional material. This is further supported by their finding that students from the University with strict policies were indeed more sceptical towards pharmaceutical promotion and held less favourable explicit attitudes than students from the University with lax policies (Grande et al., 2009).

In addition, they measured participants' self-reported preference towards the advertised drug over its competitor but found no significant differences between experimental conditions for all levels of comparisons (overall, by Universities, and by year level; Grande et al., 2009). This finding highlights the need to differentiate between explicit and implicit measures of attitudes.

It should also be noted that no significant IAT effects were observed for 3^{rd} year students across both Universities and it was suggested that because 4^{th} year students have a greater level of clinical experience and more exposure to various treatment options, they were more readily primed by exposure to branded items than 3^{rd} year students (Grande et al., 2009). Further research which explicitly sets out to investigate whether clinical experience mediates the effect of pharmaceutical promotion is needed before this explanation can be sufficiently substantiated.

In summary, Grande and colleagues (2009) is the only published study that has demonstrated the causal impact of pharmaceutical advertising on medical professionals. Brief and incidental exposure to branded stationery resulted in differences in implicit but not explicit attitudes towards the advertised drug. In order to convince policy makers and medical professionals, their findings needs to be replicated and extended to other advertising mediums.

2.1.3 The Implicit Association Test (IAT)

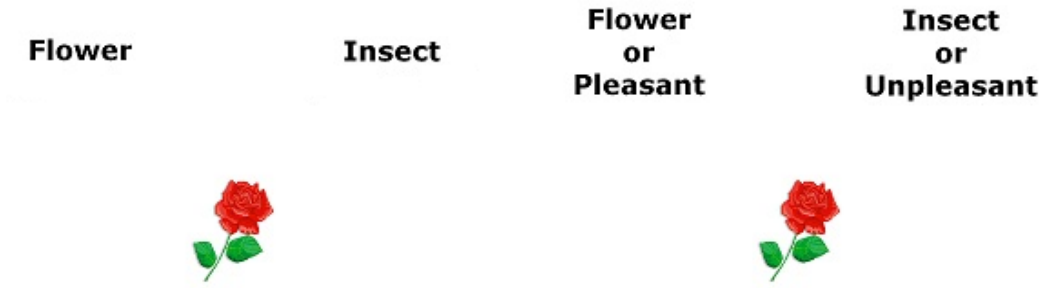
What is an IAT and How does it Work?

The IAT is a test devised by Greenwald, McGhee, and Schwartz (1998) that measures the differential association two target categories (e.g. flowers vs. insects) have across an attribute dimension (e.g. pleasant-unpleasant). A standard IAT requires participants to engage in sorting tasks, whereby pre-determined stimulus exemplars are presented one at a time at the centre of the screen and participants are asked to assigned these exemplars as quickly and accurately as possible to their appropriate categories. These sorting tasks can either occur with just two categories or with all four by pairing them up. Hence, during sorting, there is always at least two competing categories displayed on opposing sides of the screen. Assignment is achieved by hitting the left-response key when the exemplar belongs to the category displayed on the top-left side of the screen and hitting the right-response key when it belongs to the category displayed on the right.

So, for example, in an IAT that measures the differential association between flowers and insects across a pleasant-unpleasant attribute dimension, the test would consist of four categories: *flower*, *insect*, *pleasant*, and *unpleasant*. Each category would have a number of pre-defined exemplars. For instance, an appropriate exemplar for *flower* would be a picture of a rose. Likewise, the word *rotten* would be appropriate for *unpleasant*. Initially, only two categories are displayed at a time (either the flower-insect or pleasant-unpleasant pairings). One category label will be at the top-left position of the screen (e.g. flower) while the other category label will be at the top-right position (e.g. insect; see Figure 2.1a). An exemplar belonging to one of the categories will be presented in the middle of the screen and participants are instructed to hit the appropriate response key (left or right) to categorise the exemplar. For example, if a picture of a rose appeared on the screen, participants would need to hit the left-response key. Likewise, if a picture of a bee appeared, participants would have to hit the right-response key. This task is repeated for the pleasant-unpleasant pairing.

For sorting tasks with all categories present, they will be paired across each other such that the following possible pairs are presented: flower and pleasant on the left with insect and unpleasant on the right, or flower and unpleasant on the left with insect and pleasant on the right. A single exemplar belonging to one of the four categories is presented in the middle of the screen and participants are asked to hit the appropriate response key (see Figure 2.1b).

The IAT is based on the logic that the sorting task should be easier (i.e. faster response times as well as fewer errors committed) when categories that share a response key are strongly associated with each other (i.e. *compatible*) compared to when they are weakly associated (i.e. *incompatible*). So, for instance, in a flower-insect IAT, if a participant responded faster and



(a) Two categories *(b)* Four categories

Figure 2.1. An example of the display configurations for a typical IAT.

more accurately while *flower* was paired with *pleasant* compared to when *insect* was paired with *pleasant*, it would suggest that the participant associates pleasantness more strongly with flowers than with insects.

The IAT has been widely used across different fields with good predictive validity (Greenwald, Poehlman, Uhlmann, & Banaji, 2009). Specifically, within the context of consumer psychology, the IAT has been shown to be a valid measure of implicit brand attitudes, preferences, and relationships, and it improved the prediction of behaviour above and beyond explicit measures (Brunel, Tietje, & Greenwald, 2004; Greenwald et al., 2009; Maison, Greenwald, & Bruin, 2004). These studies used typical consumer brands such as sportswear apparel, yoghurt brands, fast-food restaurants, and soft drinks to cross-validate the implicit and explicit measures.

Methodological Issues

The IAT is not without flaws. Perhaps the most widely known and robust threat to the validity of the IAT is the *block order effect*. IAT effects are typically stronger when the compatible block precedes the incompatible block (Greenwald et al., 1998; Messner & Vosgerau, 2010; Nosek, Greenwald, & Banaji, 2007). Messner and Vosgerau (2010) have argued that block order effects are exacerbated by *cognitive inertia*: the difficulty associated with switching from one categorisation rule in one block to an opposite rule in the next block. For example, in a flower-insect IAT, participants learn to associate *flower* with *pleasant* when it is a compatible block. However, in the subsequent incompatible block, they must respond in the opposite direction and associate *flower* with *unpleasant*. Switching between these categorisation rules is cognitively demanding and consequently, slower responses are observed in the second block. As such, block order effects emerge from the combination of cognitive inertia (slower responses in the second block) and IAT effects (faster responses in the compatible block). Hence, when the compatible block

is presented first, the IAT effect is inflated because cognitive inertia in the second incompatible block leads to even slower responses, and hence, larger differences in response times between the two blocks. Conversely, if the incompatible block is presented first, IAT effects are deflated because cognitive inertia leads to slower responses in the subsequent compatible block.

A range of solutions have been proposed to counter block order effects. Nosek, Greenwald, and Banaji (2005) demonstrated that block order effects can be reduced by using more practice trials to allow participants to get accustomed to the new categorisation rule for each block. Others have suggested the elimination of block structure (Teige-Mocigemba, Klauer, & Rothermund, 2008) or randomly switching compatibility-incompatibility between trials within each block (Rothermund, Teige-Mocigemba, Gast, & Wentura, 2009) to prevent the employment of recoding strategies by participants. Back, Schmukle, and Egloff (2005) advise the use of a control IAT to measure task-switching ability, which can be used as a baseline for comparison. However, the most commonly adopted strategy is the counterbalancing of block order between subjects such that half of the participants start with a compatible block while the remaining half start with an incompatible block (Brunel et al., 2004). Unfortunately, this approach can only eliminate block order effects at the aggregate level but not at the individual level. In addition, it assumes that cognitive inertia effects are the same regardless of whether the participant is switching from compatible-to-incompatible or the reverse, which may not be the case. Instead, Messner and Vosgerau (2010) have advised that the counterbalancing be applied within subjects to allow for the elimination of order effects at the individual level. They demonstrated that counterbalancing had to be applied at least 4 times before order effects were eliminated (Messner & Vosgerau, 2010).

Another common shortfall of the IAT is its sensitivity to the choice of target labels for categories and stimuli for the exemplars (Lane, Banaji, Nosek, & Greenwald, 2007; Nosek et al., 2007). IAT effects have been shown to change just by manipulating the type of stimuli used (Bluemke & Friese, 2006; Govan & Williams, 2004). IATs are also influenced by salience asymmetry between categories (Rothermund & Wentura, 2004) and word familiarity (Ottaway, Hayden, & Oakes, 2001). Consequently, exemplars should clearly belong to only one category and categorisation should only be by its intended nominal feature rather than because of dimensional or distinctiveness confounds (see Lane et al., 2007 for a detailed discussion).

2.1.4 Aims

The primary aim of this experiment was to replicate Grande and colleagues' (2009) findings using a different promotional medium: print advertising. Print advertising was chosen because the industry spends an estimated US$500 million on journal advertising and represents the fourth highest promotional expenditure on doctors after pharmaceutical representative detailing, drug

samples, and the sponsorship of meetings/seminars (Gagnon & Lexchin, 2008). Furthermore, this experiment provided an opportunity to improve on the rigour of Grande and colleagues' (2009) methodology.

Firstly, Grande and colleagues (2009) did not counterbalance the branded drug used for priming. Participants were always exposed to promotional items for Lipitor (atorvastatin), a blockbuster drug that was among the most widely promoted and prescribed drugs at that time. The competing target drug was Zocor (simvastatin), a generic drug that is considered to be nearly equally effective. Even though a control group was used for comparison, without counterbalancing the priming procedure, it is not possible to determine if IAT effects were inflated or deflated by extraneous factors associated with the two drugs. As such, in this experiment, priming was counterbalanced between subjects and furthermore, target drugs that were identical except for their brand names were used instead.

Secondly, it is unclear if Grande and colleagues (2009) applied any measures to reduce block order effects. Based on the description of their methodology, it is likely that a conventional IAT with the compatible block presented first was used in their study.[1] This experiment applied the counterbalancing within subjects approach advocated by Messner and Vosgerau (2010).

Furthermore, it is likely that Grande and colleagues (2009) used the standard exemplar set for the pleasant-unpleasant attribute dimension (see Greenwald et al., 1998). In this experiment, the stimuli was tailored to fit the context. So rather than assess the targets across a generic pleasant-unpleasant dimension, I instead chose to use a positive-negative dimension, with context-appropriate stimuli (e.g. *efficacious* as an exemplar for *positive* and *noxious* for *negative*).

Lastly, whilst Grande and colleagues (2009) measured individual characteristics such as level of scepticism towards pharmaceutical advertising and attitudes toward promotion. No study to date has explored whether an individual's information processing style affects their susceptibility to pharmaceutical promotion. According to the *cognitive-experiential self-theory* (CEST; S. Epstein, Pacini, Denes-Raj, & Heier, 1996), individuals process information via two parallel yet interactive systems: a rational and an experiential system. CEST proposes that the rational system is employed primarily at the conscious level and is purposeful, analytic, and relatively affect free (S. Epstein et al., 1996). The experiential system is assumed to be preconscious, automatic, and associated with affect (S. Epstein et al., 1996). Under conditions of low involvement, such as the incidental ad exposure paradigm used in this experiment, it is likely that the experiential system would take precedence, particularly when the ads use imagery and branding rather than rely on information and content to persuade. Consequently, under such conditions, individuals who have a predisposition towards an experiential processing style may be more susceptible to

[1] Attempts were made to gather more information on their experiment design. Unfortunately, the corresponding author did not respond to my inquires.

priming through incidental ad exposure. Hence, in this experiment, participants' information processing styles were measured to provide a richer profile of their individual characteristics and how it impacted their susceptibility to implicit influences.

2.2 Experiment

2.2.1 Overview

Participants were randomly assigned to one of two groups (*control* or *primed*). The experiment had three consecutive phases: a reading phase, an IAT test phase, and a self-report measurement phase. During the reading phase, control group participants were not exposed to print ads (i.e. not primed), while primed group participants were exposed to print ads for a pharmaceutical drug (i.e. primed). Primed group participants were primed by ads of one product: Avapro or Karvea. Priming was counterbalanced, such that half of the group was shown a variety of Avapro ads while the other half was shown a variety of Karvea ads.

2.2.2 Method

Ethics Statement

This study was performed in accordance with the guidelines of the Declaration of Helsinki. Ethical approval was obtained on the 21^{st} of December 2011 from the Human Research Ethics Committee, The University of Adelaide (ref#: H-282-2011). Informed consent was obtained from participants immediately after the aims of the experiment, role of participants, and methods of the research were explained. They were asked sign a consent form to indicate consent. These forms were stored in a locked cabinet that was only accessible to the researchers.

Sampling Procedure, Selection Criteria, & Power Analysis

Convenience sampling was applied with recruitment primarily through the School of Medicine intra-net, flyers and advertisements, and approaching students on campus. Participants had to be senior medical students (4^{th} year onwards) to be eligible. *A priori* power analysis indicated that a minimum sample size of 128 participants would be needed for this experiment to have a power of .80.

Participants

Participants were 29 (male = 11, female = 18) medical students enrolled with The University of Adelaide, Australia. They were reimbursed with AUD$10 for their time.[2] The majority were in their 4^{th} year of study ($n_{4^{th}} = 20$, $n_{5^{th}} = 5$, and $n_{6^{th}} = 4$). Their age ranged from 19 to 28 years ($M = 22.71$, $SD = 1.72$).

Materials

Priming stimuli Avapro and Karvea were chosen as an ideal pair of pharmaceutical products because they are the exact same drug (irbesartan) marketed under different trade names in Australia. As such, from a pharmacological perspective, Avapro and Karvea are identical and only differ on branding.

Priming was achieved by giving primed group participants a mock journal article to read – henceforth referred to as the *priming stimulus*. As priming was counterbalanced, the priming stimulus either contained only Avapro or only Karvea ads. Each priming stimulus consisted of several coloured print ads embedded within a journal article. These were arranged as such: a full-page ad placed facing the leading page of the article, a half-page ad on the third page, a second full-page ad facing the penultimate page of the article, and two small reminder ads (only displays the trade name) placed either at the top or bottom of a page (see Appendix A for a detailed layout). For each priming stimulus, the same number, size, layout of ads, and journal article was used. The article's content was unrelated to Avapro, Karvea, or pharmaceutical promotion.[3]

Control participants were not primed and hence, were shown the same journal article without any ads (a blank box with the phrase "space reserved for advertisement" was in place of each ad).

Implicit Association Test (IAT) The IAT assessed the strength of association of Avapro and Karvea across a positive-negative attribute dimension. Both drugs had the following stimuli as exemplars: a picture of its trade name in its specific design, font type, and colour; and three pictures of its box packaging – one for each of the different dosages (75mg, 150mg, and 300mg) that the drugs are available in (see Appendix A for images). Exemplars used to represent the *positive* dimension were: effective, strong, healing, good, efficacious, alleviate, healthy, and safe. *Negative* exemplars were: useless, weak, harmful, bad, detrimental, side-effect, adverse, and noxious.

[2] Some participants politely declined payment.

[3] The article was a published article (J. C. Hall, 2006) on the readability of articles in surgical journals. Permission was obtained from the author to reproduce his work in the mock journals.

The IAT consisted of 16 blocks (11 Practice & 5 Main). The inter-trial interval (i.e. the time between a response and the presentation of the next stimulus) was 250ms. Several counterbalancing procedures (both between– and within– subjects) were undertaken for the IAT. Firstly, as advocated by Messner and Vosgerau (2010), the compatibility-incompatibility order effect was reduced by counterbalancing within-subjects. This was achieved by applying task-switching three times, so participants either had a main block sequence of *CICIC* or *ICICI*. 'C' denotes a compatible block (primed drug paired with positive) while 'I' denotes an incompatible block (primed drug paired with negative). As control group participants were not primed, block sequence was determined arbitrarily. Control group participants whose IAT had Avapro and positive categories paired together first were assigned CICIC, while those who had Karvea paired with positive first were assigned ICICI.

In addition, the assignment of which category labels to be first paired with the left response key was counterbalanced between participants, resulting in four possible IAT configurations: positive and Avapro assigned to the left response key first, positive and Karvea assigned to the left response key first, negative and Avapro assigned to the left response key first, and negative and Karvea assigned to the left response key first. See Table 2.1 for more details.

Explicit attitude towards the drug A self-report measure consisting of eight items covering five dimensions: superiority, preference, efficacy, safety, and convenience. Each item was rated on a 5-point scale (1 = *Avapro strongly preferred*, 5 = *Karvea strongly preferred*). For more details see Appendix B.

Explicit attitude towards pharmaceutical promotion A 23-item questionnaire adapted from items used in several studies (Barfett et al., 2004; Daniel & Leedham, 1966; McKinney et al., 1990; Sierles et al., 2005; Wilkes & Hoffman, 2001). It covers attitudes toward: pharmaceutical promotion in general (8 items); industry involvement in medical education (7 items); gifts (3 items); and pharmaceutical print advertising (5 items). Each item was rated on a 5-point Likert scale (1 = *strongly agree*, 5 = *strongly disagree*). The sequential order of the items was randomised. Higher scores indicate a more negative attitude towards pharmaceutical promotion. For a complete list of items see Appendix B.

SKEP scale (Obermiller & Spangenberg, 1998) A nine item published scale originally developed to measure consumer scepticism towards advertising. The scale was modified to be specific to pharmaceutical advertising (e.g. "advertising is generally truthful" was re-worded as "pharmaceutical advertising is generally truthful"). Items were rated on a 5-point Likert scale (1 = *strongly agree*, 5 = *strongly disagree*). Higher scores indicate greater levels of scepticism towards pharmaceutical advertising. For a complete list of items see Appendix B.

Table 2.1
An Example of One of Four Possible Configurations for the Implicit Association Test (IAT) used in the Study

Block	Block type	No. of trials[a]	Category assigned to left-key response	Category assigned to right-key response	Compatibility
B1	Practice	16	Positive	Negative	–
B2	Practice	24	Primed drug	Non-primed drug	–
B3	Practice	24	Positive & Primed drug	Negative & Non-primed drug	Compatible
B4	Main	48	Positive & Primed drug	Negative & Non-primed drug	Compatible
B5	Practice	24	Non-primed drug	Primed drug	–
B6	Practice	24	Non-primed drug & Positive	Primed drug & Negative	Incompatible
B7	Main	48	Non-primed drug & Positive	Primed drug & Negative	Incompatible
B8	Practice	24	Primed drug	Non-primed drug	–
B9	Practice	24	Positive & Primed drug	Negative & Non-primed drug	Compatible
B10	Main	48	Positive & Primed drug	Negative & Non-primed drug	Compatible
B11	Practice	24	Non-primed drug	Primed drug	–
B12	Practice	24	Non-primed drug & Positive	Primed drug & Negative	Incompatible
B13	Main	48	Non-primed drug & Positive	Primed drug & Negative	Incompatible
B14	Practice	24	Primed drug	Non-primed drug	–
B15	Practice	24	Positive & Primed drug	Negative & Non-primed drug	Compatible
B16	Main	48	Positive & Primed drug	Negative & Non-primed drug	Compatible

Note. A traditional IAT has 7 blocks with a single compatible-incompatible (CI) main block combination. My IAT had 16 blocks because block compatibility order was counterbalanced within-subjects to eliminated task-switching effects. This table illustrates an IAT configuration with a CICIC block sequence that starts with the primed drug and positive categories assigned to the left-hand response key. The other three combinations used in this study were: CICIC with primed and positive starting on the right, ICICI with primed and positive starting on the left, and ICICI with primed and positive starting on the right.

[a]A trial is defined as the period between the onset of a single stimulus to the categorisation of that stimulus.

Rational-Experiential Inventory – revised (Pacini & Epstein, 1999) A 40-item measure developed to measure an individual's information processing style. The REI-40 comprises of four sub-scales: rational ability (e.g. "I usually have clear, explainable reasons for my decisions"), rational engagement (e.g. "I enjoy thinking in abstract terms"), *experiential ability* (e.g. "I trust my initial feelings about people"), and experiential engagement (e.g. "Intuition can be a very useful way to solve problems"). Each sub-scale has 10 items. Participants were asked to rate their degree of agreement to items on a 5-point scale (1 = *definitely not true of myself*, 5 = *definitely true of myself*). Participants' rational ability score and rational engagement score were summed to form a total rationality score. Likewise, their experiential ability score and experiential engagement score were summed to form a total experientiality score. For a complete list of items see Appendix B.

Manipulation check Several questions pertaining to the journal article, its content, and the ads were asked at the end of the experiment to ascertain the level of attention paid by participants during the reading task and determine if priming was successful in the primed condition (see Appendix B for more details).

Procedure

In line with the study's cover story, all participants were briefed that they were participating in an experiment that sought to understand how information from medical journals is disseminated and processed under varying conditions. Next, control group participants were handed an ad-free mock journal and instructed to read it. Similarly, primed group participants were given the same instructions, but their mock journal either contained print ads for Avapro or Karvea. 10 minutes of reading time was allocated for each participant.

Upon completion of the reading task, participants were asked to complete the IAT on a computer. They were instructed to assign the presented exemplar to the appropriate category as quickly and accurately as possible by hitting the appropriate response key (e = left; i = right). After participants completed the IAT, demographic information such as their age, gender, and their current year level were obtained (see Appendix B). In addition, participants were asked to complete the following: the explicit attitude towards drug measure, the attitudes toward pharmaceutical promotion questionnaire, the SKEP scale, and the Rational-Experiential Inventory. All questionnaires were answered electronically using the same computer that was used for the IAT.

Lastly, participants were debriefed about the true investigative aims of the experiment and instructed not to expose the cover story to others until the conclusion of data collection (see Appendix B).

2.2.3 Results

Descriptives and internal consistency reliability for all measures are presented in Table 2.2. There were no individual differences between groups on information processing style, scepticism towards pharmaceutical advertising, or explicit attitudes toward pharmaceutical promotion (see Table 2.3). There were no group differences on drug familiarity or frequency of exposure to pharmaceutical advertising, $p = .16$ and $p = .72$, respectively.

Unfortunately, despite a tremendous effort over the course of a year at two Universities, the recruitment of senior medical students was largely unsuccessful. Consequently, due to the small sample size, the interpretation of inferential statistics had to be made with great caution. The small sample also meant that there was insufficient statistical power to explore whether participants' processing style influenced their susceptibility to implicit influences.

Table 2.2
Decriptives for each group and internal consistency reliability for all measures

Measure	Control (n = 15)				Primed (n = 14)[a]				Potential		Cronbach's α
	M	*SD*	Min	Max	*M*	*SD*	Min	Max	Min	Max	
IAT 1	0.02	0.36	−0.46	0.73	0.05	0.45	−0.86	0.67	–	–	–
IAT 2	0.03	0.54	−0.77	1.05	0.04	0.35	−0.49	0.48	–	–	–
IAT 3	0.06	0.38	−0.43	0.89	−0.03	0.36	−0.6	0.4	–	–	–
IAT 4	0.04	0.44	−0.77	1.04	−0.02	0.44	−0.71	0.58	–	–	–
Explicit attitude towards drug	23.73	0.88	21	25	23.77	1.24	21	26	0	40	.63
Explicit attitude towards pharmaceutical promotion	77.27	9.32	60	94	76.38	11.93	58	103	0	115	.84
SKEP scale	34.07	4.74	27	42	33.31	5.45	23	42	0	45	.78
REI-r rationality sub-scale	7.38	0.64	6.2	8.3	7.42	0.53	6.4	8.1	0	10	.63
REI-r experientiality sub-scale	5.99	0.94	4.5	7.8	6.45	0.82	4.8	7.4	0	10	.88

Note. Counter-balancing block compatibility within-subjects allows for the computation of four IAT scores. IAT 1 represents the score after the standard IAT (1^{st} 7 blocks). IAT 4 represents the final score after counterbalancing block compatibility. IAT 2 & 3 are the intermediary scores during the counterbalancing process. A positive IAT score represents a stronger positive association with the primed drug than with the non-primed drug. A low score on the explicit attitude towards drug measure indicates a preference for Avapro, while a high score indicates a preference for Karvea. A high score on the explicit attitude measure indicates greater negative attitudes toward pharmaceutical promotion. The SKEP measures scepticism towards pharmaceutical advertising. Higher scores indicate greater scepticism. Rationality & Experientiality are sub-scales of the REI-r. Higher scores indicate a tendency towards a rational/intuitive information processing style.
[a]There is missing data for all the self-report measures for a single participant in the primed group. This was due to a technical problem that occurred during the experiment. Hence, actual n was 13 for those measures.

Manipulation Check: Was priming successful?

Two participants from the primed condition failed the manipulation check questions, suggesting that they did not pay sufficient attention to the ads embedded in the journal article. However, excluding these participants from analysis did not change the results. Hence, the full sample was used.

Group Differences in Explicit Attitude towards the Drug

Responses to the measure was not normally distributed, D'Agostino's $K^2 = 11.19$, $p = .004$. Hence, the non-parametric Wilcoxon rank sum test was applied. There was no statistically significant difference in ranks for the explicit attitude towards Avapro/Karvea between the control and primed conditions, $W = 94$, $p = .87$.

Group Differences in IAT Score

The improved *D* algorithm was used to compute the IAT scores (see Greenwald, Nosek, & Banaji, 2003). Counter-balancing block compatibility within-subjects allowed for the computation of four IAT scores (IAT 1 to 4) for each participant. IAT 1 is the averaged difference between the first practice and main block set (see B3 & B4 of Table 2.1) and the second practice and main bloc set (B6 & B7). As such, IAT 1 would correspond to the score obtained from a traditional IAT. IAT 2 is the averaged difference between second block set (B6 & B7) and the third (B9 &

Table 2.3
Individual differences between groups on the REI-r, SKEP Scale, & explicit attitude towards pharmaceutical promotion

Measure	Control		Primed		*t* (df)	*p*-value
	M	*SD*	*M*	*SD*		
Rationality	7.38	0.64	7.42	0.53	−0.16 (25.93)	.87
Experientiality	5.99	0.94	6.45	0.82	−1.36 (25.99)	.18
SKEP Scale	34.07	4.74	33.31	5.45	0.39 (24.04)	.70
Explicit attitude towards pharmaceutical promotion	77.27	9.32	76.38	11.93	0.22 (22.63)	.83

Note. Rationality & Experientiality are sub-scales of the REI-r. Higher scores indicate a tendency towards a rational/intuitive information processing style. The SKEP measures scepticism towards pharmaceutical advertising. Higher scores indicate greater scepticism. A high score on the explicit attitude measure indicates greater negative attitudes toward pharmaceutical promotion.

B10). IAT 3 is the averaged difference between the third (B9 & B10) and fourth (B12 & B13). Finally, IAT 4 is the averaged difference between the fourth (B12 & B13) and fifth (B15 & B16).

Since IAT 2 and 3 are intermediary scores that are products of the counterbalancing process, they were not part of the main analysis. While IAT 4 is the primary outcome measure, parallel analysis was done with IAT 1 to observe if counterbalancing had any effects and to facilitate comparison with Grande and colleagues' (2009) results.

Both IAT 1 and IAT 4 scores were normally distributed, D'Agostino's $K^2 = 0.69$, $p = .71$ and $K^2 = 1.27$, $p = .53$, respectively. The homogeneity of variance assumption was met for both scores too, $F(3, 25) = 2.34$, $p = .10$ and $F(3, 25) = 0.32$, $p = .81$, respectively.

A 2 × 2 (group × block sequence) Type II ANOVA revealed that there was no interaction between group and block sequence for IAT 1, $F(1, 25) = 2.27$, $p = .14$, partial $\eta^2 = .08$, CI_{95} η^2 [0, .3]. The main effect for group was non-significant, $F(1, 25) = 0.12$, $p = .73$, partial $\eta^2 < .001$, CI_{95} η^2 [0, .15]. The main effect for block sequence was significant, $F(1, 25) = 5.74$, $p = .02$, partial $\eta^2 = .19$, CI_{95} η^2 [3.44×10^{-4}, .41]. See Figure 2.2.

Similarly, a 2 × 2 (group × block sequence) Type II ANOVA revealed that there was no interaction between group and block sequence for IAT 4, $F(1, 25) = 0.02$, $p = .89$, partial $\eta^2 < .001$, CI_{95} η^2 = [0, .10]. The main effect for group was non-significant, $F(1, 25) = 0.06$, $p = .80$, partial $\eta^2 < .001$, CI_{95} η^2 = [0, .13]. The main effect for block sequence was significant, $F(1, 25) = 10.01$, $p = .004$, partial $\eta^2 = .29$, CI_{95} η^2 = [.03, .49]. See Figure 2.3.

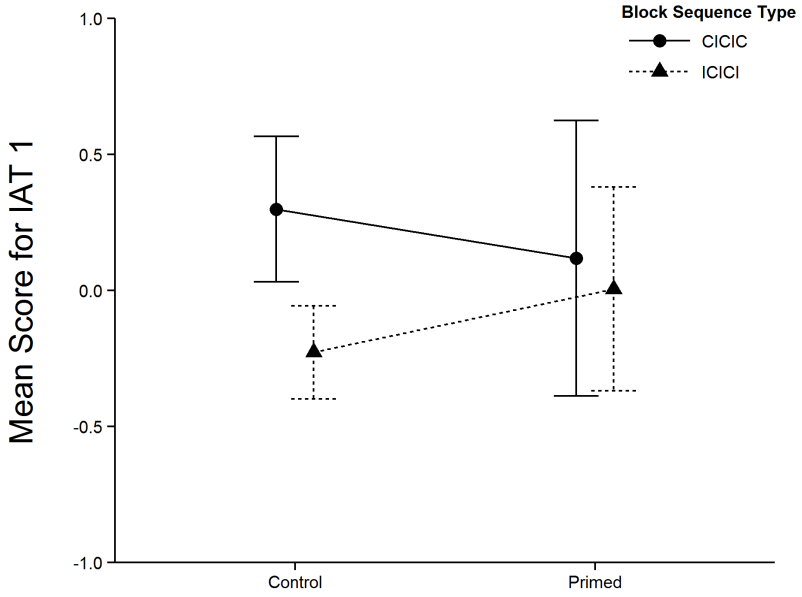


Figure 2.2. An interaction plot of mean scores for IAT 1 across groups. Error bars represent 95% confidence intervals and points are offset horizontally to avoid over-plotting.

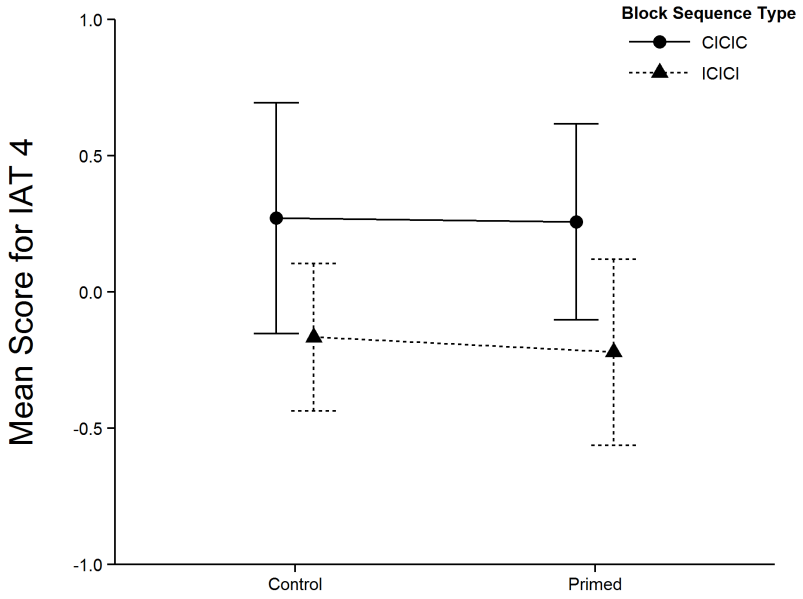


Figure 2.3. An interaction plot of mean scores for IAT 4 across groups. Error bars represent 95% confidence intervals and points are offset horizontally to avoid over-plotting.

Hence, priming participants with print advertising did not result in more favourable IAT effects for the advertised drug either after the standard IAT or after counterbalancing for block order effects.

Impact of Block Sequence on IAT Scores

The main effect for block sequence in IAT 4 was unexpected. Switching between compatible and incompatible blocks 3 times did not eliminate cognitive inertia in participants. The ICICI block sequence consistently resulted in slower response times than the CICIC block sequence irrespective of experimental condition (see Figure 2.4).

2.3 Discussion

Unfortunately, the inability to recruit sufficient participants severely impacted this experiment. It was extremely under-powered and given its small sample, is unlikely to be a reliable representation of the target population. It is unsurprising that no statistically significant group differences were detected. However, the persistence of a block sequence effect even after counterbalancing within subjects is worrying. If task-switching 3 times is not enough to eliminate cognitive inertia among participants during an IAT, it may be more practical to apply a different method to control block order effects. Perhaps the block-free IAT variants devised by Teige-Mocigemba and colleagues (2008) or Rothermund and colleagues (2009) are better alternatives.

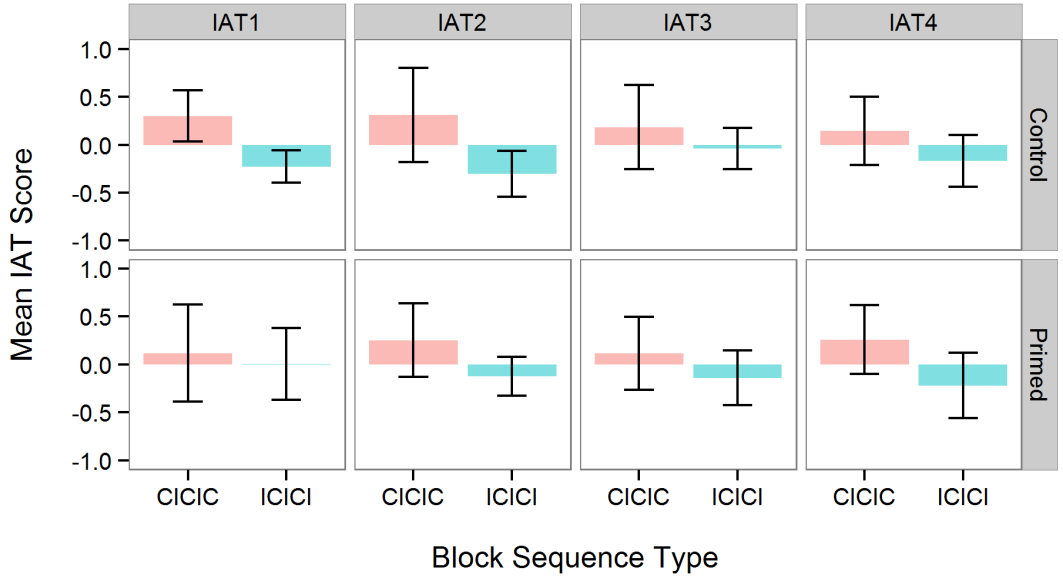


Figure 2.4. A bar plot of mean scores for IAT 1 to 4 across block sequence and group. Positive IAT scores indicate an effect in favour of the primed drug, while negative IAT scores indicate an effect in favour of the non-primed drug. Error bars represent 95% confidence intervals.

Despite my failure to replicate Grande and colleagues' (2009) results, this experiment has raised questions about the validity and reliability of the IAT as a tool to measure the causal influences of pharmaceutical advertising. While my findings warrant further investigation into block order effects and whether it can be effectively controlled for, such an investigation is beyond the scope of my thesis and hence, was not pursued during my candidature. However, it is certainly worth revisiting in the future.

After careful consideration and consultation with my supervisors, it was agreed that given the limited time frame of my candidature, I could not afford any further delays brought on by recruitment difficulties. Consequently, I focused my time on my other target population – consumers. The following chapter describes the first of three experiments that evaluated the efficacy of a brief educational intervention that improves consumer knowledge of pharmaceutical promotion practices.

Chapter 3

Cultivating the Critical Assessment of Disease Awareness Advertisements: Part I

3.1 Introduction

In light of the recruitment issues associated with medical students and professionals, I shifted focus onto my other target population: consumers. This chapter presents the first of three iterations of an intervention developed to educate consumers about pharmaceutical industry-sponsored health information. As detailed in Chapter 1, the pharmaceutical industry has a poor track record of providing balanced and accurate health information and has engaged in questionable consumer-directed promotional activities. Furthermore, technology has provided unbridled access to health information. Hence, it is imperative that consumers be wary of misleading or inaccurate information and be taught how to differentiate reliable and unreliable sources of information. At the same time, it is important that consumers do not become too cynical and disregard disease awareness campaigns that are of merit. The goal is to abolish the naivete surrounding industry-sponsored health information and cultivate healthy sceptics: individuals who neither simply accept nor disregard information provided in a disease awareness ad, but instead, make an informed evaluation of the ad by considering who was responsible for disseminating that information and whether it is reliable and credible.

3.1.1 Outline

I begin with a review of the research on disease awareness ads conducted in Australia to illustrate why an intervention to educate the Australian public on the difference between industry and non-industry sponsored disease awareness campaigns is a necessity. Next, I present new research that utilises knowledge about the psychology of persuasion to develop and evaluate a brief but effective educational intervention that improves the critical analysis of disease awareness ads. The results of Experiment 1 are encouraging. The intervention improved sponsor identification accuracy and increased scepticism towards pharmaceutical advertising, but was less successful at cultivating healthy sceptics. I conclude with a discussion of the issues that have arisen from Experiment 1 that formed the basis for Experiment 2.

3.1.2 Previous Research

Understandably, the majority of studies on direct-to-consumer advertising (discussed earlier in Sections 1.3.2 & 1.4.2) has occurred in countries that permit such practices and thus pertain to the promotion of prescription medication. Given that direct-to-consumer advertising of specific products or treatments is prohibited in Australia, these studies are informative in so far as they contribute to the on-going debate on whether direct-to-consumer advertising should be allowed in Australia. More research is needed within the Australian context to understand the impact of industry-sponsored disease awareness campaigns. Are these campaigns similar to pharmaceutical product advertising? Is it a threat or an asset to the quality of healthcare in Australia? Some recent research, pioneered by Hall and colleagues, has begun to answer some of these questions.

In a study that compared Australian consumers' perceptions of disease awareness print ads with New Zealanders' perceptions of product print ads for Alzheimer's and weight-loss, consumers that viewed the Australian ad for Alzheimer's were more likely to rate it as valuable compared to consumers who viewed the other ads (D. V. Hall & Jones, 2008). Australian consumers were most likely to perceive the ads intent as for educational or informative purposes, while New Zealand consumers were mostly likely to perceive the product ads as an attempt to promote or sell (D. V. Hall & Jones, 2008). Consumers agreed that all the ads, but in particular the Australian ads, did not contain adequate information (D. V. Hall & Jones, 2008). It is worrying that participants regarded disease awareness ads as most valuable and perceived their intent as educational, but yet rated these ads as the least informative. This suggests that without an overt indication to sell or promote a product, consumers may not be alerted to the pharmaceutical company's persuasive intent. Similarly, in a survey on Australians' perceptions toward disease awareness ads, the majority of respondents (80%) agreed that such ads help raise awareness of medical conditions and treatment options but were ambivalent (52%) about whether the ads help consumers to make better decisions about their health (D. V. Hall, Jones, & Hoek, 2011).

Interestingly, 72% acknowledged that these ads raise awareness of disease in order to sell more medical products or treatments (D. V. Hall, Jones, & Hoek, 2011).

In a subsequent study by D. V. Hall, Jones, and Iverson (2011), which investigated the effects of manipulating the source and degree of detail in disease awareness ads on women's behavioural intentions, the amount of information available in the ad significantly influenced participants' intention to ask for a prescription or referral from their doctor. Participants who read the low-detail ad more likely to seek a prescription or referral than participants who read a high-detail ad (D. V. Hall, Jones, & Iverson, 2011). Presumably, consumers who viewed the high-detail ad had sufficient information to decide whether it was necessary to consult a doctor. In addition, participants who were more likely to ask for a prescription or referral were older and less educated (D. V. Hall, Jones, & Iverson, 2011). Most importantly, sponsorship: whether it was a pharmaceutical company, non-profit organisation, or co-sponsored, did not affect participants' reported intentions to seek a prescription or referral from their doctor (D. V. Hall, Jones, & Iverson, 2011). This mirrors research by Kim (2011) in the US which explored the effects of sponsorship, website interactivity, and consumer involvement on perceptions of credibility. A website that was industry-sponsored was perceived to be as effective at influencing health-related attitudes and behavioural intentions as one which was government-sponsored (Kim, 2011). Furthermore, sponsor credibility was the same for government and industry-sponsored websites (Kim, 2011). Whilst Kim (2011) included a sponsor manipulation check, D. V. Hall, Jones, and Iverson (2011) did not report any. Hence, it is impossible to infer why sponsorship did not matter. Were D. V. Hall, Jones, and Iverson (2011)'s participants like their US counterparts who did not differentiate across sponsorship types despite knowing that information or did they just not pay attention to the sponsorship information when viewing a disease awareness ad?

3.1.3 Aims

The aims of this experiment were to investigate whether people pay any attention to sponsor information and if an educational intervention would improve their ability to differentiate between industry-sponsored and non-industry-sponsored disease awareness ads and more importantly, whether it would result in them becoming healthy sceptics.

I expected that participants who underwent the intervention would become more critical consumers of health information and hold less favourable attitudes toward pharmaceutical advertising than those who did not. Furthermore, these participants would be more motivated to regard sponsorship information as salient and use it to make informed evaluative decisions about the ads they view. Consequently, it was hypothesised that the intervention would result in better sponsor identification accuracy, less favourable attitudes toward industry-sponsored ads, more

scepticism towards pharmaceutical advertising, and less perceived prevalence, severity, and susceptibility to medical conditions depicted in industry-sponsored ads. Furthermore, it was also hypothesised that participants who underwent the intervention would be less likely to report health-related behavioural intentions (such as consulting a doctor about the condition or asking for a prescription) as a result of seeing an industry-sponsored ad than participants who did not.

3.2 Experiment 1

3.2.1 Overview

Forewarning and McGuire's (1964) inoculation theory have been the traditional approaches to instilling resistance to persuasion. Forewarning of message content as well as persuasive intent have both been shown to build resistance (Wood & Quinn, 2003). However, forewarning is of limited utility within the context of disease awareness ads. Simply warning individuals prior to exposure that the ad may contain biased health information or that its intent is to promote rather than educate is insufficient. Individuals need to be equipped with the ability to differentiate between reliable and unreliable sources of health information. McGuire's (1964) inoculation theory was inspired by biological immunity. McGuire postulated that an individual could build up a resistance towards an attitudinal attack by being inoculated with weaker doses of that attack. However, inoculation is an attitudinal treatment. Its goal is to make a particular attitude or belief held by an individual resistant to change. In contrast, my goal is to motivate individuals to critically evaluate disease awareness ads, rather than bolster resistance for a particular attitude or belief.

Consequently, I designed an intervention that would both motivate individuals to critically evaluate disease awareness ads and equip them with the ability to determine when an ad is trustworthy. A series of novel experiments conducted by Sagarin, Cialdini, Rice, and Serna (2002) illustrated how an individual's perception of invulnerability to persuasive appeals can influence the effectiveness of an intervention to build resistance towards persuasion. They demonstrated that training participants to discriminate between legitimate authority appeals (e.g. an elite athlete endorsing sporting equipment) and illegitimate authority appeals (e.g. an elite athlete endorsing a fashion label), resulted in those participants rating legitimate ads as less manipulative and more persuasive than participants who were not trained (see Experiment 2 in Sagarin et al., 2002). However, training did not result in any difference in the rating of illegitimate ads on manipulativeness or persuasiveness (Sagarin et al., 2002). They suggested that participants who were trained may have held a false sense of belief that they were impervious to the persuasive appeals of an illegitimate ad. As a result, even though they were able to identify an ad as illegitimate, they were unmotivated to resist its appeals. In their third experiment, they re-affirmed their

suspicions by demonstrating that when participants were only asked to consider whether they had been fooled by an illegitimate ad during training, their previous findings were replicated (Sagarin et al., 2002). However, in another condition, participants' vulnerability to persuasion was demonstrated by bringing their attention to the fact that they had previously rated an illegitimate ad as convincing during training (Sagarin et al., 2002). The realisation that they fell victim to an illegitimate ad during training resulted in them rating legitimate ads as more persuasive and less manipulative, and illegitimate ads as less persuasive and more manipulative than participants in the other conditions (Sagarin et al., 2002). Hence, to ensure that my participants were sufficiently motivated, I adapted and incorporated Sagarin and colleagues' counter persuasion approach of dispelling an individual's *illusion of unique invulnerability* into my intervention.

3.2.2 Method

Ethics Statement

This study was performed in accordance with the guidelines of the Declaration of Helsinki. Ethical approval was obtained on the 6^{th} of September 2012 from the Human Research Ethics Subcommittee of the School of Psychology, The University of Adelaide (ref#:12/62). Informed consent was obtained from participants immediately after the aims of the experiment, role of participants, and methods of the research were explained. They were asked to click upon a button to indicate consent. This response was recorded in a data file stored on the personal drive of a computer that is only accessible to the researchers. This form of obtaining consent was approved by the School of Psychology Human Research Ethics Subcommittee.

Randomisation & Study Design

The experiment was conducted on-line using Qualtrics (2013 Copyright ©). Once demographic information was obtained, the randomisation block tool in Qualtrics randomly allocated participants to one of two groups: *control* or *intervention*. Intervention group participants were administered the educational intervention before proceeding to the outcome measurement phase. Control group participants, however, proceeded straight to the outcome measurement phase.

During the outcome measurement phase, participants were shown two disease awareness ads (one government-sponsored and the other industry-sponsored) separately. The presentation order of the ads was counter-balanced across participants. After viewing each ad, participants were asked to answer a set of questions. The same set of questions was used for each ad. Lastly, participants completed a questionnaire designed to verify the validity of their responses and

were debriefed. Control group participants received a slightly more detailed debrief that included educational information that was provided to intervention group participants during the intervention.

Sampling Procedure, Exclusion Criteria, & Power Analysis

Convenience sampling was applied with recruitment primarily through the School of Psychology paid participant mailing list. Participants had to understand English and had to be residing in Australia to be eligible for Experiment 1. *A priori* power analysis indicated that a minimum sample size of 122 participants would be needed for this experiment to have a power of .80.

A total of 158 responses were recorded. However, this number includes individuals who decided not to participate after reading the on-line information sheet, individuals who did not meet the eligibility requirements, re-attempts by individuals who had already participated once, or participants who quit before random assignment (i.e. only demographic information was obtained). In addition, to safeguard the integrity of Experiment 1, an exclusion criteria designed to identify potentially invalid responses, such as those obtained from an individual who clicked through the experiment and gave random answers, was defined *a priori* (see Figure 3.1 for the criteria). Furthermore, there were four known cases of participants re-participating in the experiment because their previous attempt was incomplete. These re-attempts were only deemed invalid and excluded (one case) if the initial failed attempt could have influenced participants' responses (e.g. the participant was exposed to the educational intervention in their initial failed attempt and was re-assigned to the control group on their subsequent attempt).

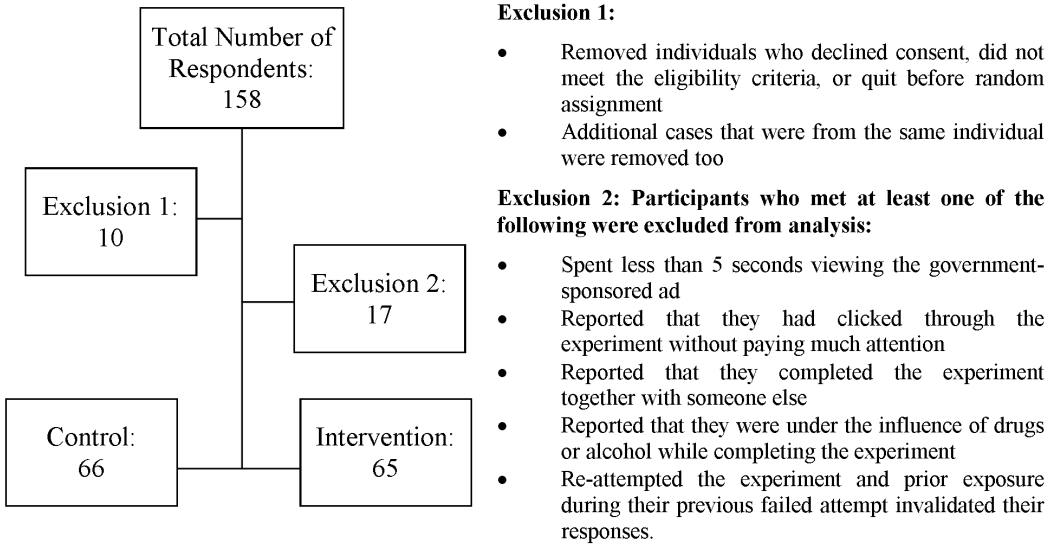


Figure 3.1. Flowchart of the exclusion process applied to participants.

Consequently, data from a final sample size of 131 participants, of which 5 (3.82%) were incomplete, was used for analysis (see Figure 3.1). Fisher's Exact test found no significant differences in the proportion of incomplete responses between the two experimental groups, $p = .21$.

Participants

Participants were Australian residents, aged 18 to 58 years ($M = 26.03$, $SD = 7.59$), who volunteered in exchange for either course credit for a 1^{st} year undergraduate psychology course or a reimbursement of AUD$15. More demographic information is reported in Table 3.1. There was an over-representation of females for a sample drawn from the South Australian population, χ^2 (1) = 5.82, $p = .02$. This over-representation was consistent across the two experimental groups, χ^2 (1) = 0.42, $p = .52$. Likewise, the two experimental groups did not differ on income, education, or reason for participation.

Table 3.1
Demographics of Participants in Experiment 1

Characteristic	*n*	%	Characteristic	*n*	%
Gender			Participant Type		
Male	51	38.93	Course Credit	21	16.03
Female	80	61.07	Paid	110	83.97
Annual Income[a]			Level of Education[b]		
Less than AUD$20,000	75	57.25	High School	40	30.53
AUD$20,000 to $34,999	31	23.66	Vocational Training	9	6.87
AUD$35,000 to $49,999	5	3.82	Undergraduate	57	43.51
AUD$50,000 to $74,999	14	10.69	Post-graduate	25	19.08
AUD$75,000 to $99,999	3	2.29			
AUD$100,000 to $149,999	3	2.29			

[a]Income bracket options of *$150,000 to $199,999* and *$200,000 or more* were available but had no responses, so these levels were dropped.
[b]The option of *primary school* was available but had no responses, so it was dropped.

Materials

Disease awareness advertisements. A total of 3 sets of ads were used in Experiment 1. Each set consisted of a pair of ads (one for males, one for females) for a particular medical condition. One set consisted of real full page coloured ads endorsed by the Australian government to promote safe sex and reduce the spread of Chlamydia (see Appendix C). This set represented ads from an independent source. The other two sets were full page coloured custom-made ads designed to mirror real ads developed by pharmaceutical companies (see Appendix C). These sets represented ads from non-independent sources. The conditions depicted in the industry-sponsored ads were Multiple Sclerosis and Social Anxiety Disorder. These three medical conditions were chosen because they are applicable and relevant to both genders and appropriate for the expected age demographic.

Educational intervention. The intervention comprised of a simple exercise designed to dispel an individual's illusion of unique invulnerability. This approach was inspired by a series of novel experiments conducted by Sagarin and colleagues (2002). Essentially, they illustrated that people generally regard themselves as uniquely invulnerable to persuasive appeals and that this bias can negatively affect the effectiveness of interventions that build resistance towards persuasive appeals. Sagarin and colleagues (2002) resolved this problem by incorporating an exercise to dispel participants' illusions of unique invulnerability into their intervention (see Experiments 2 and 3 of their paper for more details). Consequently, a similar exercise was adopted for Experiment 1, which demonstrated to intervention group participants that they do not consider the source when evaluating health information, potentially leaving them vulnerable to unwarranted persuasive messages from the pharmaceutical industry.

First, participants were shown the mock industry-sponsored disease awareness ad for Multiple Sclerosis. Before viewing, the ad was described to participants as "an example of a typical print advertisement designed to help raise awareness for a particular medical condition". After viewing the ad, participants were asked to rate on a 7-point scale (1 = *not at all convincing*, 2 = *somewhat convincing*, 3 = *fairly convincing*, 4 = *convincing*, 5 = *quite convincing*, 6 = *very convincing*, 7 = *extremely convincing*) how convincing they found the ad to be. Furthermore, participants were asked to list the two most convincing aspects of the ad.

Next, on a new page, the exercise ended with participants given the following brief:

> Take a look below at your answer to the question "How convincing did you find the advertisement to be?"
>
> Your answer was: ⟨the answer was re-printed here as participants were not allowed to backtrack through the experiment⟩

> Did you find the ad to be even "Somewhat convincing"? If so, then you got fooled.
>
> Disease awareness advertisements like this fool most people. But if we want to protect ourselves from being manipulated, we need to know what makes a disease awareness advertisement reliable or unreliable.
>
> For a disease awareness advertisement to be considered reliable, the information presented has to be from independent sources. Many disease awareness advertisements, such as the advertisement you just viewed, are created or sponsored by pharmaceutical companies.
>
> These "disease awareness campaigns" are often disguised as health education initiatives, when in truth they are a means for pharmaceutical companies to dictate which health conditions should dominate in the mass media.
>
> These ads are also a means for pharmaceutical companies to circumvent current legislation which prohibits them from advertising prescription drugs directly to consumers in Australia.
>
> Instead of promoting their drugs, the pharmaceutical companies turn to promoting the conditions that their drugs treat.
>
> Now, take a look below at your answers to the question "Which two aspects of the ad were most important to you when making a decision on its convincingness?"
>
> Reason 1: ⟨answer re-printed⟩
>
> Reason 2: ⟨answer re-printed⟩
>
> Did you ask yourself whether you should be accepting the information presented as factual, reliable, and unbiased?
>
> Did you think you should seek information from a less biased source before reaching any conclusions about the claims made in the advertisement?
>
> Did you notice that the information you found convincing was from a biased source?
>
> If you didn't, then you let yourself be vulnerable to the advertisers that are trying to manipulate you.

Demographic information and miscellaneous questions. Participants' age, gender, annual income, level of education, and whether the participant was participating for course credit or paid were obtained. In addition the following questions were asked to obtain useful information for each ad:

- How easy was it to make sense of the information? (1 = *very difficult*, 5 = *very Easy*)
- Do you or someone you know well suffer or suffered from ⟨insert medical condition⟩? (Yes/No)

Sponsor identification accuracy. The primary outcome measure was participants' ability to correctly identify the organisation responsible for sponsoring each ad. Participants were asked the following set of questions:

- Did you notice what type of organisation was responsible for commissioning the advertisement?
- If yes, who was responsible for disseminating the ad?
  - Government
  - Non-profit organisation
  - Pharmaceutical company

A 'no' response to the first question or a wrong answer to the follow-up was coded as an incorrect response.

Scepticism towards pharmaceutical advertising. A nine item published scale originally developed to measure consumer scepticism towards advertising (Obermiller & Spangenberg, 1998; Cronbach's α = .91). The scale was modified to be specific to pharmaceutical advertising (e.g. "advertising is generally truthful" was re-worded as "pharmaceutical advertising is generally truthful"). Items were rated on a 5-point Likert scale (1 = *strongly agree*, 5 = *strongly disagree*). Higher scores indicate greater levels of scepticism towards pharmaceutical advertising (min = 0, max = 45). This scale was previously used in the IAT study (see appendix B for full list of items).

Attitudes toward the disease awareness advertisement. Two questions taken from Hall and Jones (2008) assessed participants' attitudes toward each ad. The first question, "How valuable did you find this advertisement?" was rated on a 5-point Likert type scale (1 = *not valuable at all*, 5 = *extremely valuable*). The second question, "What do you think is the main purpose of this advertisement?" had the following response options:

- Sell a product or treatment
- Provide information about treatment
- Encourage talking to your doctor
- Provide information about medical condition
- Encourage asking for a prescription

Participants could only choose one of those five options.

Behavioural intentions. Participants' behavioural intentions were assessed with the following set of questions taken from D. V. Hall, Jones, and Iverson (2011):

As a result of seeing this advertisement would you...? (Yes/No)

- Talk to your doctor about the condition
- Ask your doctor about treatments or tests
- Look for information as directed by the advertisement
- Look for information from other sources
- Ask your doctor for a prescription or referral
- Do nothing

Perceived prevalence. A six item measure adapted from Park and Grow (2008). Participants were asked to indicate in percentages their gut-level estimates of the probability of the following situations occurring in Australia:

1. In a typical year, what percentage of Australian adults will suffer from ⟨insert medical condition⟩?
2. In a typical year, what percentage of Australian households will have one or two members who suffer from ⟨insert medical condition⟩?
3. In a typical year, what percentage of people with ⟨insert medical condition's broader disease type⟩ will be categorised as ⟨insert medical condition⟩ patients?
4. In a typical year, what percentage of male adults will suffer from ⟨medical condition⟩ in Australia?
5. In a typical year, what percentage of female adults will suffer from ⟨medical condition⟩ in Australia?
6. In a typical year, what percentage of Australians will have one or two family members, relatives, or close friends who suffer from ⟨insert medical condition⟩?

The responses on the six items exhibited high internal consistency for both industry-sponsored (Cronbach's α = .93) and government-sponsored ads (Cronbach's α = .89). As such, the responses were averaged to form a perceived prevalence of condition composite measure. Higher scores indicate a greater perceived prevalence of the condition (min = 0, max = 100).

Perceived severity of the condition. Participants were asked to rate three items on a 6-point scale (0 = *not at all*, 5 = *very much so*). The three items were:

1. How distressing would it be to suffer from ⟨insert medical condition⟩?
2. How seriously affected would your quality of life be if you were afflicted with ⟨insert medical condition⟩?
3. How would suffering from ⟨insert medical condition⟩ adversely affect your ability to engage in day-to-day activities?

The ratings across the three items exhibited high internal consistency for both the industry ad (Cronbach's α = .90) and the government ad (Cronbach's α = .76). As such, ratings of the three items were averaged to form a perceived severity of condition composite measure. Higher scores indicate higher perceived severity (min = 0, max = 5).

Perceived susceptibility. A question adapted from Park and Grow (2008). Participants were asked to indicate the likelihood in percentages that they would suffer from the medical condition discussed in the ad at some point in their lifetime. Higher scores indicate a greater perceived susceptibility to the medical condition (min = 0, max = 100).

Validity checks. Two forms of checks were designed into the experiment to protect its integrity. First, important phases of the experiment were time stamped. This helped quantify the time participants spent looking at the respective ads and for intervention group participants, the time spent on the educational intervention. Second, a self-report validity check questionnaire was included at the end of the experiment. Participants indicated their agreement (yes/no) to the following list of statements:

- I was under the influence of alcohol or other substances
- I was on the phone or otherwise engaged during the study
- I completed the questionnaire together with someone else
- My answers are not valid, I clicked through the answers without paying much attention to the questions
- I visited other websites (e.g., Facebook) during the study
- I had a chat with other people during the study
- I did not complete the study in one session

- I was disturbed during the study

Data from these two checks determined the participant exclusion criteria reported earlier in Figure 3.1.

Statistical Analysis

Analyses[1] were performed using R (Schaarschmidt, 2012) along with several add-on packages[2]. A Welch independent samples *t*-test was applied for the scepticism measure while 2×2 mixed between-within subjects Analysis of Variance (ANOVA) was applied for the remaining continuous outcome measures. In cases where assumptions of ANOVA were violated, the non-parametric ANOVA-Type Statistic (ATS) was applied instead (for an introduction to ATS see Brunner & Puri, 2001; Erceg-Hurn & Mirosevich, 2008).

Logistic generalised estimating equations (GEEs), using an independence working correlation structure, were used to explore the association between the various categorical outcome variables versus group (control or intervention) and sponsor-type (government or industry). A GEE approach was chosen so as to account for dependence due to repeated measures within each participant (for an introduction to GEE models see Hanley, Negassa, Edwardes, & Forrester, 2003; K.-Y. Liang & Zeger, 1986). Initially, the interaction term combining group and sponsor-type was included in each model. However, when the interaction term was not statistically significant at $\alpha = .05$, the interaction term was removed from the model. This allowed for the accurate computation of odds ratios for main effects. In cases where quasi-complete separation occurred because of the presence of a zero-count cell and the GEE model did not converge, Fisher's Exact/Chi-square Test of Conditional Independence were applied instead.

3.2.3 Expected Pattern of Results

To aid the interpretation of results, it is useful to consider how a healthy sceptic would respond to the array of outcome measures used in Experiment 1.

Identification Accuracy & Scepticism

I expected that undergoing the intervention would improve sponsor identification accuracy, regardless of whether the ad was industry or government sponsored. Accordingly, I predicted that

[1] The analysis was conducted on the full dataset too for each experiment. See Appendix D for a summary of the results. There were minimal differences in results across the different datasets.

[2] R packages: BSagri (Schaarschmidt, 2012), car (Fox & Weisberg, 2011), ez (Lawrence, 2013), fBasics (Wuertz & core team members, 2013), geepack (Højsgaard, Halekoh, & Yan, 2006), ggplot2 (Wickham, 2009), lsr (Navarro, 2014), MBESS (Kelley & Lai, 2012), nparLD (Noguchi, Gel, Brunner, & Konietschke, 2012), orddom (Rogmann, 2013), psych (Revelle, 2013), and reshape2 (Wickham, 2007).

there would be a main effect for group, with better sponsor identification accuracy among the intervention group. In addition, I expected that participants would become more sceptical of pharmaceutical advertising after the intervention. Hence, I predicted that scores on the SKEP scale would be higher in the intervention group.

Perceived Value & Purpose of Ad

I expect healthy sceptics to evaluate trustworthy ads differently from untrustworthy ads. Hence, I predicted a group × sponsor-type interaction, with the intervention group perceiving an ad as a less valuable source of information than the control group, only when the ad was industry-sponsored. Similarly, I predicted that the intervention group would be more likely than the control group to choose the *sell a product or treatment* or *encourage asking for a prescription* options as their perceived main purpose of an ad, only when the ad was industry-sponsored.

Behavioural Intentions

I expect healthy sceptics to disregard calls to consult a doctor when they deem an ad to be untrustworthy. Hence, I predicted an interaction effect with the intervention group less likely than the control group to report the intention to talk to their doctor about the condition only when the ad was industry-sponsored. Similarly, I predicted the same response pattern for the other two related items: *ask your doctor about treatments or tests* and *ask your doctor for a prescription or referral*. In addition, I expect healthy sceptics to be wary of any information provided by untrustworthy ads. Hence, I predicted an interaction effect with the intervention group being less likely than the control group to report an intention to *look for information as directed by the ad* only when the ad was industry-sponsored. Moreover, I expect healthy sceptics to be particularly motivated to *look for information from other sources* after viewing an untrustworthy ad. Hence, I predicted an interaction effect whereby the intervention group would be more likely than the control group to seek other sources of information only when the ad was industry-sponsored. Lastly, because of their distrust towards industry-sponsored ads, I predicted an interaction effect. The intervention group was expected to be more likely than the control group to report the intention to *do nothing* only after viewing an industry-sponsored ad.

Perceived Prevalence, Severity, & Susceptibility

I expected that participants' perceptions of the medical conditions depicted in the ads would be influenced by their evaluations of its trustworthiness. Hence, I predicted interaction effects whereby the intervention group would rate the medical condition was less prevalent and severe,

and perceive themselves to be less susceptible to the condition than the control group, only when the ad was industry-sponsored.

3.2.4 Results & Discussion

3.2.4.1 Ancillary Analyses

3.2.4.1.1 Participants' reasons behind their assessment of advertisement convincingness. Participants' reasons behind the degree to which they were convinced by the ad were examined and broadly classified into several recurrent themes (see Table 3.2). Interestingly, the provision of a reference was among the most frequently cited reasons. Participants were quick to assume that the information presented was trustworthy simply because it was referenced, even though the citation was of contentious credibility (a website).

3.2.4.1.2 Intervention and manipulation fidelity.

Were there group differences in the ability to understand the advertisements and prior experience with the medical conditions? Participants' responses were organised by group and sponsor-type and presented in Table 3.3. There were neither significant differences between groups in their ease of understanding the information presented in the ads, Wald $\chi^2(3, 252) = 0.27$, $p = .60$, nor their prior experience with the medical conditions, Wald $\chi^2(3, 252) = 0.01$, $p = .94$. However, there was a main effect for sponsor-type with participants having more experience with Social Anxiety Disorder than Chlamydia, Wald $\chi^2(3, 252) = 25.53$, $p < .001$.

Were the advertisements at least "somewhat convincing"? The intervention exercise was designed to dispel an individual's illusion of unique invulnerability by demonstrating to the individual that he/she had been persuaded by an untrustworthy ad. This was achieved by highlighting to the participant during the intervention exercise that he/she had at the very least indicated that the ad was *somewhat convincing*. All except two participants (who indicated that they were unconvinced due to the design of the ad, not the source), indicated that they were at least somewhat convinced by the ad.

Did the intervention work as intended? The time spent viewing important pages of the intervention was recorded. Four participants (6.15% of the intervention group) were identified as individuals who clicked through the intervention without paying attention. More importantly, there appeared to be an unexpected association between the primary outcome measure, the ability to correctly identify the sponsor of the ad, and the ad's level of convincingness. Among the

Table 3.2
Thematic Analysis of Participants' Reasons for Ad Convincingness

Theme	Frequency
Ad Design	
Overall quality of ad (e.g. "professional design")	4
Layout/structure of ad (e.g. "the type font used")	12
Ad's headline (e.g. "the slogan")	8
Imagery used in ad (e.g. "the emotive image")	14
Ad's Content	
The information provided (e.g. "the facts presented")	23
The symptoms provided (e.g. "the list of symptoms")	21
The provision of statistics or prevalence (e.g. "number of Australians affected every year")	17
The provision of further information and resources (e.g. "details to further follow up")	4
Ad's Influence on Participants	
Personal relevance (e.g. "it affects young adults between the ages of twenty and forty in which I fall")	8
An appeal towards emotions (e.g. "serious tone of the ad")	2
An appeal towards logic (e.g. "reasoning behind ad")	4
Trustworthiness of Ad	
Provision of references to back up claims (e.g. "cited credible references")	9
Reliability of the organisation responsible for the ad (e.g. "the authority dispensing the information")	6

four most common convincingness ratings chosen, participants' who responded *somewhat convincing* performed distinctly better while the other three had similar performances (see Figure 3.2a).

Two possible reasons could explain why participants who were convinced the least had the best performance post-intervention. First, the wording used to highlight participants' vulnerability may have been easy to misinterpret:

> Take a look below at your answer to the question "How convincing did you find the advertisement to be?"

Table 3.3
Experiment 1's Participants' Ability to Understand the Ads and Prior Experience with the Medical Conditions across Group and Sponsor-type

Measure	Government		Industry	
	Control	Intervention	Control	Intervention
Ad Understandability				
Very Difficult	0	0	0	2
Difficult	0	4	1	5
Neither Difficult Nor Easy	4	3	6	17
Easy	33	34	40	32
Very Easy	28	21	18	7
Experience with Medical Condition				
Yes	10	11	31	28
No	55	51	34	35

Your answer was: ⟨answer was re-printed here⟩

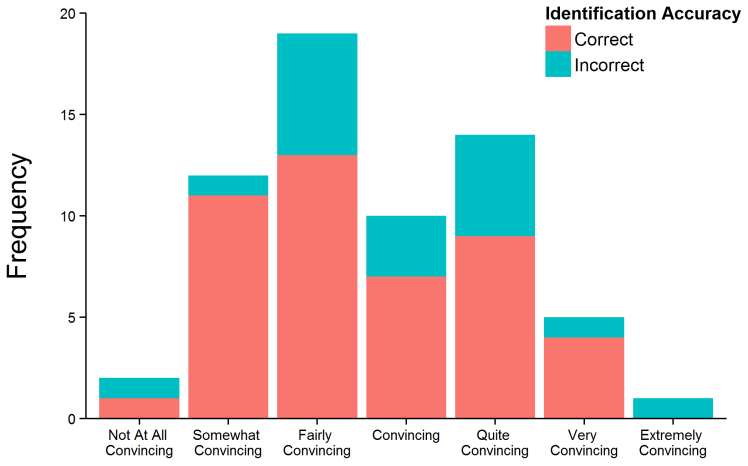
Did you find the ad to be even 'Somewhat convincing'? If so, then you got fooled.

Participants might have skimmed past the *to be even* part of "Did you find the ad to be even 'Somewhat convincing'?" Consequently, participants who did not respond *somewhat convincing* may have paid less attention to the intervention.

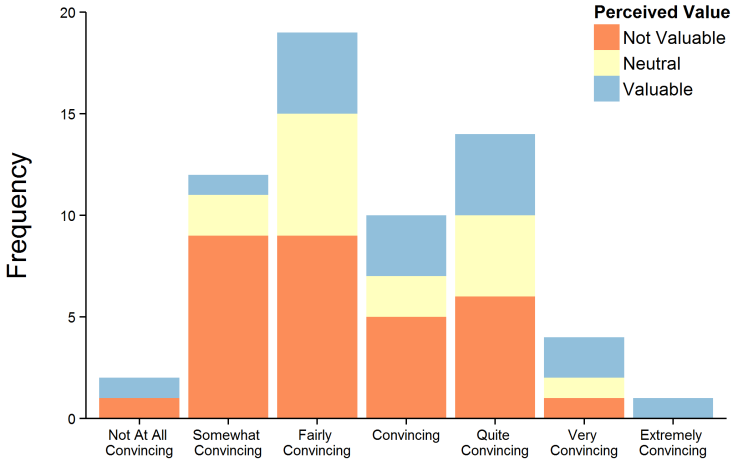
Second, participants who were more convinced might have had a negative reaction to the intervention. This may have resulted in participants disregarding the intervention's educational message. To investigate this further, two additional outcome measures: *value of the ad* and *main purpose of the ad* were compared against ad convincingness.

To simplify and avoid clutter, responses to the original five options in the measure were collapsed to three: *valuable*, *neutral*, and *not valuable*. The proportion of *not valuable* responses for the intervention's industry-sponsored ad decreases as convincingness increases (see Figure 3.2b).

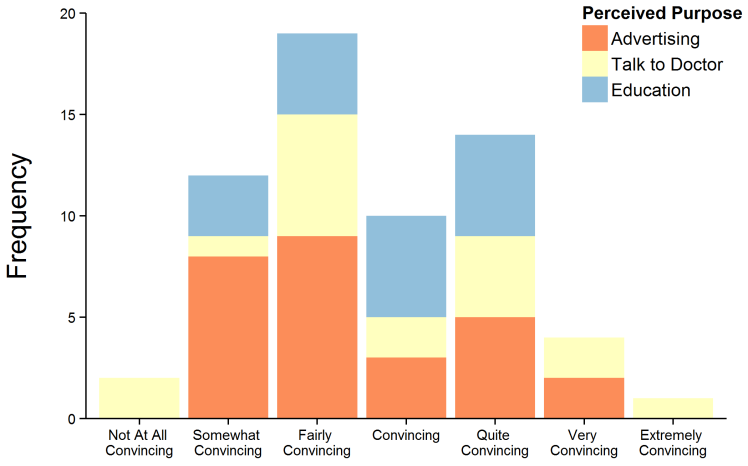
The pattern is similar for the *main purpose of the ad* measure (see Figure 3.2c). Again, the original levels were collapsed for clarity. *Sell a product or treatment* and *encourage asking for a prescription* were re-classified as *advertising*. *Provide information about treatment* and *provide information about medical condition* were re-classified as *education*. *Encourage talking to your doctor* was an ambiguous option and consequently not re-classified.



(a) Identification accuracy across convincingness ratings



(b) Perceived value of the ad across convincingness ratings



(c) Perceived main purpose of the ad across convincingness ratings

Figure 3.2. The intervention group's response pattern for identification accuracy (a), perceived value (b), and purpose of the ad (c) across convincingness ratings.

The downward trend illustrated by these three outcome measures suggests that participants who were more convinced by the industry-sponsored ad shown during the intervention may have directed the negative experience of being informed that they were duped towards the intervention rather than the ad sponsor. Consequently, the effectiveness of the intervention for these individuals was diminished.

3.2.4.2 Main Analyses

Table 3.4 presents the *p*-values for the interaction term for each logistic GEE model. In all cases except one, the interaction term was not statistically significant at the .05 level of significance. Consequently, as explained in section 3.2.2, the interaction term was dropped for these models.

3.2.4.2.1 Did the intervention improve participants' ability to identify the sponsor? The educational intervention improved the ability to identify the sponsor regardless of sponsor-type (see Figure 3.3). Intervention group participants had 2.96 times the odds of correctly identifying the ad sponsor, $CI_{95}OR$ [1.65, 5.33], Wald $\chi^2(3, 252) = 13.13$, $p < .001$, than the odds for control group participants. Interestingly, when asked if they noticed the organisation responsible for disseminating the ad, the majority of the control group responded *yes* (80% for government-sponsored, 67.7% for industry-sponsored). But, their poor performance, particularly with the

Table 3.4
Interaction p-values for each Logistic GEE model in Experiment 1

Outcome Variable	Interaction *p*-value[a]
Ad Sponsor ID Accuracy	.95
Value of the Ad	.10
Purpose of the Ad	Model did not converge
Behavioural Intentions	
Talk to your doctor about the condition	.87
Ask your doctor about treatments or tests	.75
Look for information as directed by the ad	.03
Look for information from other sources	.75
Ask your doctor for a prescription or a referral	.86
Do nothing	.76

[a] All interactions are group × sponsor-type.

industry-sponsored ad, suggests that they are not paying sufficient attention to sponsorship information. However, a simple educational intervention can motivate individuals to pay more attention to sponsorship information and significantly improve their identification accuracy.

In addition, there was better accuracy across both groups for the government-sponsored ad. Participants had 3.63 times the odds of correctly identifying the sponsor, $CI_{95}OR$ [1.96, 6.72], Wald $\chi^2(3, 252) = 16.85$, $p < .001$, when the ad was government-sponsored compared to when it was industry-sponsored. This might have been a result of the choice of ads used. The government-sponsored ad was an actual ad that was promoted in Australia while the industry-sponsored ad was a mock-up. Hence, there may well have been a familiarity effect in favour of the government-sponsored ad.

3.2.4.2.2 Did the intervention increase scepticism towards pharmaceutical advertising?

The assumption of normality was met, $K^2 = 1.94$, $p = .38$. As shown in Figure 3.4, intervention group participants had statistically significantly greater scepticism towards pharmaceutical advertising ($M = 31.97$, $SD = 6.75$) than control group participants ($M = 28.57$, $SD = 7.10$), $t(123.98) = 2.75$, $p = 0.01$, CI_{95} [0.95, 5.84]. The magnitude of the difference was moderate, $d = 0.49$, $CI_{95}d$ [0.13, 0.83]. The intervention did result in greater scepticism towards pharmaceutical advertising in the intervention group compared to the control group.

3.2.4.2.3 Did the intervention cultivate healthy sceptics?

One of the aims of the intervention was to educate individuals on the importance of critically assessing health information. It is not beneficial to either blindly accept information as fact or completely dismiss it without consideration. As such, it was important that the intervention cultivated healthy scepticism.

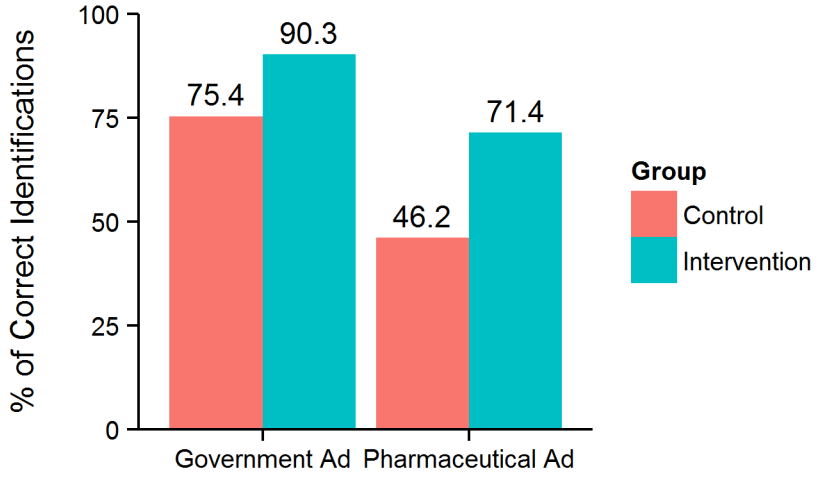


Figure 3.3. Percentage of correct ad sponsor identifications across group and sponsor-type.

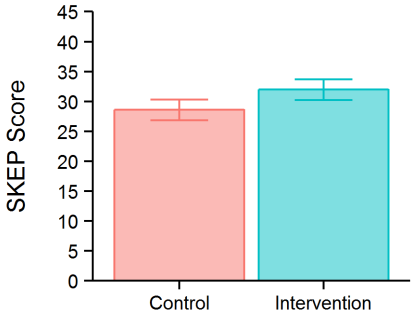
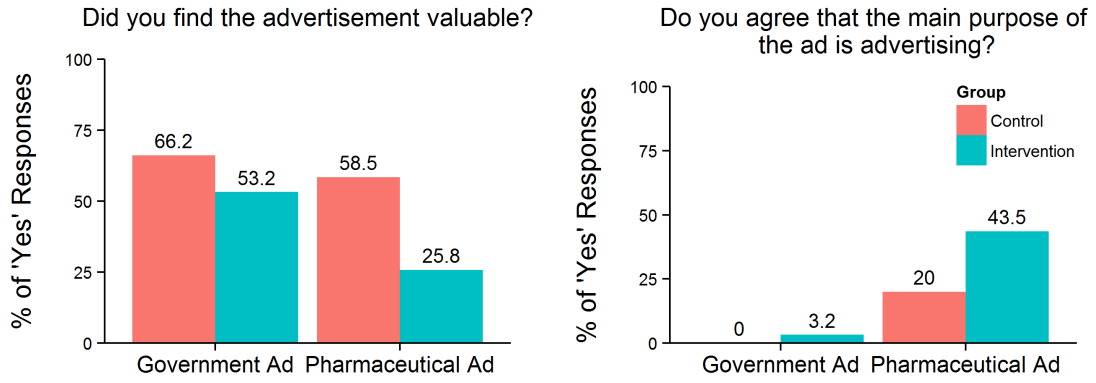


Figure 3.4. Average scepticism towards pharmaceutical advertising across groups. Error bars represent 95% confidence intervals. Maximum possible score is 45.

Attitudes towards disease awareness advertisements. Responses to the perceived value and purpose measures were dichotomised to enable logistic GEE models to be fitted. Participants who originally responded either *extremely valuable* or *valuable* were re-classified as indicating *yes*. All other responses were regarded as a *no*. Similarly, participants who originally responded either *sell product/treatment* or *encourage asking for a prescription* were re-classified as indicating agreement that the main purpose of the ad was advertising. All other responses were regarded as a *no*. See Figure D.1 and Figure D.2 in Appendix D for participants' original responses to these measures.

With respect to participants' perceived value of a disease awareness ad, there was a statistically significant main effect for group, Wald $\chi^2(3, 251) = 12.94$, $p < .001$. Control group participants had 2.61 times the odds, $CI_{95}OR$ [1.55, 4.41], of agreeing that the ad was valuable than the odds for the intervention group participants. The main effect for sponsor-type was statistically significant too, Wald $\chi^2(3, 251) = 8.18$, $p = .004$. Participants had 2.1 times the odds, $CI_{95}OR$ [1.26, 3.49], when it was government-sponsored compared to the odds when it was industry-sponsored. This suggests that the intervention group did not differentiate across sponsor-type, but instead, regarded both disease awareness ads as less valuable post-intervention. However, as shown in Figure 3.5a, there is a trend towards the desired interaction effect of intervention group participants rating the ad as not valuable only when it is industry-sponsored.

Unfortunately, because of the presence of a zero-valued cell (see Figure 3.5b) the model for perceived purpose did not converge. Consequently, Chi-square Test of Conditional Independence and Fisher's Exact Test were applied instead. There was a statistically significant association between whether a participant thought that the main purpose of the ad was advertising and group assignment for the industry-sponsored ad, $\chi^2(1) = 8.16$, $p = .004$), but not for the government-sponsored ad, $p = .24$. The intervention group was only more likely than the control group to agree when the ad was industry-sponsored. Hence, for this measure, the intervention group differentiated across sponsor-type.



(a) Value of Ad

(b) Purpose of Ad

Figure 3.5. Percentage of responses across group and sponsor-type after re-coding for (a) perceived value and (b) purpose.

Behavioural intentions. Figure 3.6 shows the percentage of *yes* responses to each behavioural intention across group and sponsor-type. Six logistic GEE models were constructed for each behavioural intention item (see Table 3.5 for model effects). The only statistically significant group $\times$ sponsor-type interaction observed was for the intention to *look for information as directed by the ad*. When participants viewed the industry-sponsored ad, the odds that a control group participant would look for further information as directed by the ad was 2.28 times the odds for an intervention group participant. Furthermore, intervention group participants had 1.95 times the odds of intending to look for information as directed by the ad for the government-sponsored ad compared to the odds for the industry-sponsored ad. In contrast, there was neither a statistically significant difference in odds for the control group across sponsor-type, nor a difference in the odds for the government-sponsored ad across the two groups. Hence, with regards to this item, intervention group participants responded as healthy sceptics would.

For the remaining five items, there were statistically significant main effects for sponsor-type for only two of the five behavioural intentions. All other effects were non-significant. The government-sponsored ad was more likely to result in participants reporting their intention to *ask their doctor about treatment or tests* and *ask their doctor for a prescription or a referral*, compared to the industry-sponsored ad (OR = 2.11 & 1.78 respectively). This may have been a result of the nature of the medical condition depicted in the government-sponsored ad rather than a sponsor-type effect. Perhaps, participants were more likely to seek treatment or information about treating Chlamydia (a sexually transmitted disease) than Social Anxiety Disorder, because Chlamydia is communicable, arguably more convenient to treat, and has more apparent detrimental effects if left untreated.

In summary, only one of the six measures produced a response pattern from the intervention group that is consistent with healthy sceptics. They were only less likely to look for further

information that was provided by the sponsor than the control group when the ad was industry-sponsored.

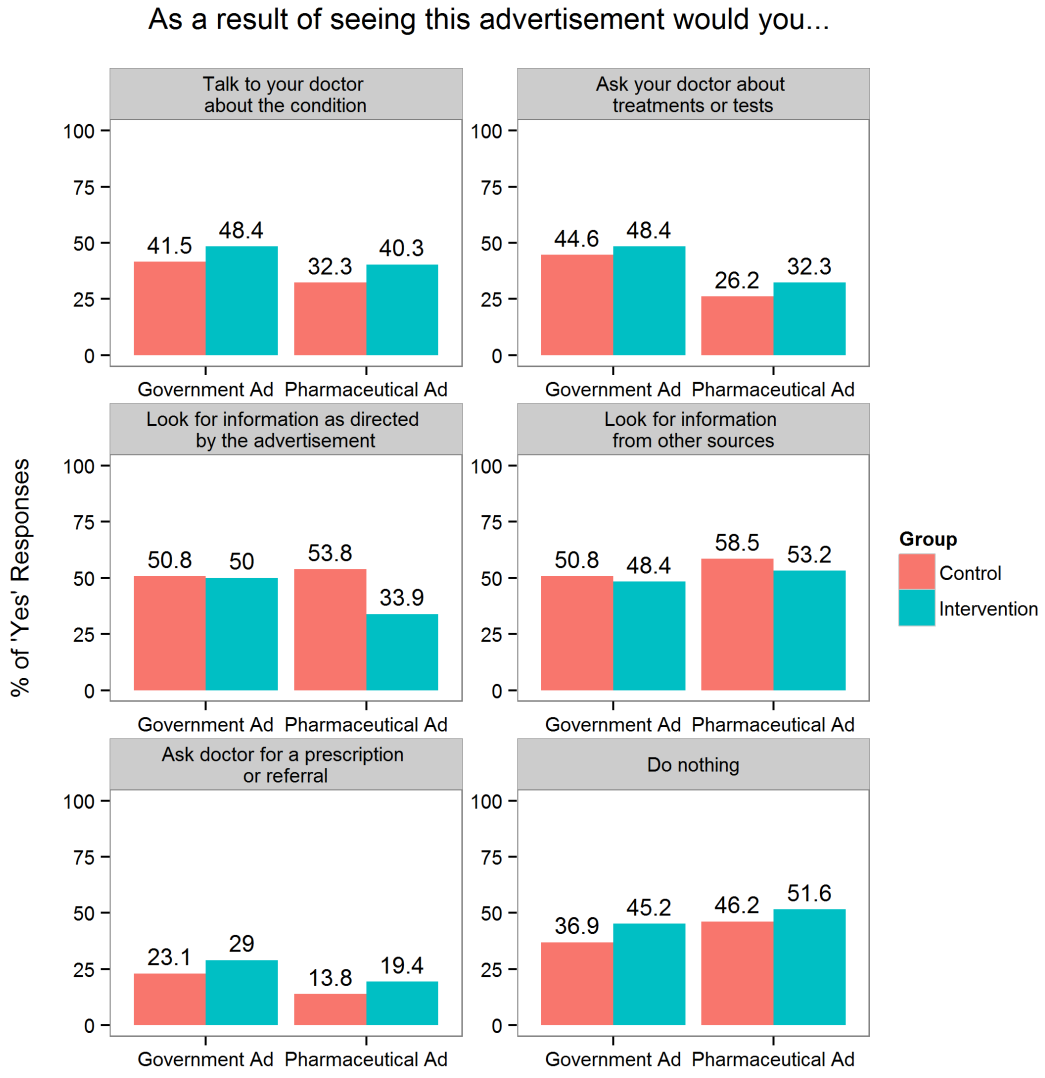


Figure 3.6. Percentage of *yes* responses from participants on their behavioural intentions after viewing each ad across groups.

Table 3.5
Logistic GEE Models on the Effect of Group and Sponsor-type on Responses to each Behavioural Intention.

Behavioural Intention	Effect	*OR*	$CI_{95}OR$	Wald χ^2	*p*-value	Interaction *p*-value
Talk to your doctor about the condition	Intervention vs. Control	1.37	[0.77, 2.42]	1.14	.29	NA
	Government vs. Industry	1.44	[0.94, 2.2]	2.75	.10	
Ask your doctor about treatments or tests	Intervention vs. Control	1.24	[0.69, 2.23]	0.53	.47	NA
	Government vs. Industry	2.11	[1.36, 3.28]	11.14	<.001	
Look for info as directed by the ad	For Control					
	(Industry vs. Government)	1.13	[0.66, 1.94]	0.20	.65	
	For Intervention					
	(Government vs. Industry)	1.95	[1.19, 3.20]	7.02	.01	.03
	For Government					
	(Intervention vs. Control)	1.03	[0.51, 2.07]	0.01	.93	
	For Industry					
	(Control vs. Intervention)	2.28	[1.11, 4.67]	5.06	.02	
Look for info from other sources	Control vs. Intervention	1.17	[0.64, 2.12]	0.25	.61	NA
	Industry vs. Government	1.29	[0.90, 1.85]	1.87	.17	
Ask your doctor for a prescription or referral	Intervention vs. Control	1.42	[0.69, 2.89]	0.92	.34	NA
	Government vs. Industry	1.78	[1.09, 2.90]	5.31	.02	

Note. OR = odds ratio, CI_{95} = 95% confidence interval.

(continued)

Table 3.5 (continued)

Results: Behavioural Intentions

Behavioural Intention	Effect	*OR*	$CI_{95}OR$	Wald χ^2	*p*-value	Interaction *p*-value
Do nothing	Intervention vs. Control	1.32	[0.74, 2.37]	0.88	.35	NA
	Government vs. Industry	1.38	[0.93, 2.04]	2.57	.11	

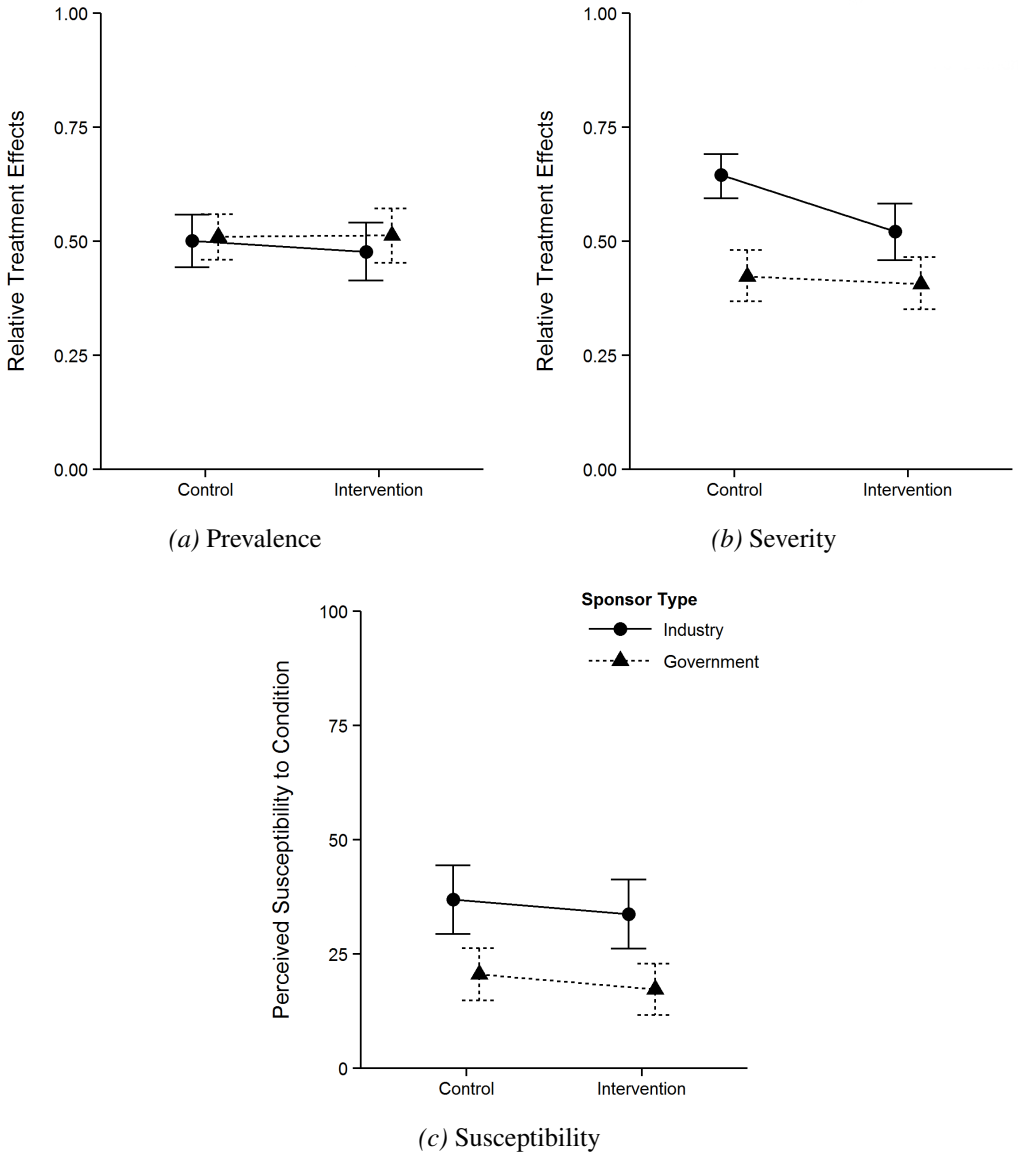
Note. *OR* = odds ratio, CI_{95} = 95% confidence interval.

Perceived prevalence, severity, and susceptibility. Responses to the perceived prevalence measure violated the assumption of normality, $K^2 = 18.95$, $p < .001$. Responses to the severity of condition measure for the industry-sponsored ad violated the assumption of homogeneity of variance, $F(1, 124) = 6.07$, $p = .02$. There was more within-group variability in severity sores for the industry-sponsored ad in the intervention group compared to the control group. Consequently, for these two measures, a non-parametric alternative: the ANOVA-Type Statistic (ATS) was applied.

Figure 3.7 presents the group × sponsor-type interaction plots for the three measures. The interaction was non-significant for perceived prevalence (see Figure 3.7a), ATS(1) = 0.23, $p = .63$. The main effects for group and sponsor-type were both non-significant too, ATS(1) = 0.06, $p = .81$ and ATS(1) = 0.61, $p = .43$, respectively. Undergoing the educational intervention did not result in participants perceiving a condition as less prevalent compared to control group participants, when the ad was industry-sponsored.

The interaction was non-significant for perceived severity too (see Figure 3.7b), ATS(1) = 3.02, $p = .08$. The main effect for group was non-significant too, ATS(1) = 3.51, $p = .06$. However, there was a significant main effect for sponsor-type, ATS(1) = 29.75, $p < .001$. The relative treatment effect (RTE) was higher in the industry-sponsored ad compared to the government-sponsored ad (0.58 vs. 0.41). The RTE quantifies the tendency for participants to have higher perceived severity ratings after viewing the industry-sponsored ad, compared with the ratings of all participants. The RTE can range between 0 and 1 (if the null hypothesis is true, RTE for both ads should be .50). The magnitude of this effect was moderate, probability of superiority (*PS*) = .63, CI_{95} [.55, .72]. The *PS* measures the probability that a randomly sampled score from one population (i.e. severity scores for the industry-sponsored ad) is higher than a randomly sampled score from a second population (i.e. severity scores for the government-sponsored ad). In other words, 63 out of 100 randomly selected participants would have rated the industry-sponsored ad's condition as more severe than the government-sponsored ad.

A 2 × 2 mixed between-within subjects ANOVA revealed that the interaction was non-significant for perceived susceptibility (see Figure 3.7c), $F(1, 124) < .001$, $p = .98$. The main effect for group was non-significant too, $F(1, 124) = 0.84$, $p = .36$, $\eta^2_G = .004$, generalised eta-squared $CI_{95}\eta^2_G$ [.00, .06]. However, the main effect for sponsor-type was significant, $F(1, 124) = 27.06$, $p < .001$. The magnitude of this effect was small, $\eta^2_G = .09$, $CI_{95}\eta^2_G$ [.07, .29]. The intervention group did not perceived themselves as less susceptible to a condition compared to the control group when the ad was industry-sponsored. Instead, participants as a whole regarded themselves as more likely to suffer from Social Anxiety Disorder (industry-sponsored ad) than Chlamydia (government-sponsored ad). This may have been an artefact of a perceived difference in susceptibility to the medical conditions rather than an indication of an effect of sponsor-type on



(a) Prevalence

(b) Severity

(c) Susceptibility

Figure 3.7. Interaction plots for (a) perceived prevalence, (b) severity, and (c) susceptibility across group and sponsor-type. Error bars represent 95% confidence intervals. Points are offset horizontally for clarity.

perceived susceptibility. Participants' greater prior experience with Social Anxiety Disorder may have contributed to this effect too.

In summary, none of the three measures produced a response pattern from the intervention group that is consistent with healthy sceptics. The intervention had no impact on perceived prevalence. However, participants as a whole regarded Social Anxiety Disorder to be more severe and felt more susceptible to the condition than compared to Chlamydia.

3.2.4.3 Summary

Although the intervention appeared to be less effective for participants who were more convinced by the industry-sponsored ad, at the aggregate level, the intervention had encouraging results. It improved sponsor identification accuracy and scepticism towards pharmaceutical advertising. This resulted in the intervention group acting as healthy sceptics by being more likely than the control group to agree that the main purpose of a disease awareness ad was advertising and less likely than control to look for information as directed by the ad, only when it was industry-sponsored. However, this increase in scepticism was not necessarily always healthy. The intervention group was less likely to rate disease awareness ads as valuable, regardless of sponsor. Although not statistically significant, the trend towards only rating industry-sponsored ads less valuable is encouraging.

3.2.4.4 Limitations of the Intervention & Choice of Ads

Post-hoc exploratory analysis of the intervention group's responses to the outcome measures highlighted possible flaws in the intervention. Firstly, participants may have found the intervention exercise too wordy, which may have encouraged skim reading. This might have impacted on participants' understanding or uptake of the educational message.

Furthermore, there was a slight trend that suggested the intervention was less effective the more convinced an individual was by the industry-sponsored ad. The attempt to dispel participants' illusion of unique invulnerability may have been too aggressive and the negative feedback might have caused participants to subsequently disregard the educational message or lose interest in the experiment. Alternatively, the intervention may not have been persuasive enough to effect change in individuals who strongly believe that industry-sponsored ads are beneficial.

Lastly, the choice of disease awareness ads used in this experiment might have affected both the effectiveness of the intervention as well as participants' responses to the outcome measures. A Multiple Sclerosis ad was used for the intervention and it is unclear if a different ad would have resulted in better or poorer acceptance of the educational message. As discussed earlier, the ads used for the outcome measures had differences apart from their sponsorship information. This made it difficult to differentiate between effects that were solely a result of differences in sponsor type and effects that were confounded by ad design or ad content.

Taken together, the intervention certainly had room for improvement. The modest identification accuracy of 71.4% for the industry-sponsored ad among the intervention group is a good example. The task was simple and should have resulted in better accuracy. The following chapter presents a second experiment that was conducted to address these issues.

Chapter 4

Cultivating the Critical Assessment of Disease Awareness Advertisements: Part II

4.1 Introduction

The findings from Experiment 1 highlighted weaknesses in its experimental design and flaws in the educational intervention. Firstly, the difference in design and medical condition for industry and non-industry sponsored ads introduced confounds. Consequently, any sponsor-type effects observed in Experiment 1 could not be solely attributed to sponsorship. Secondly, exploratory analysis of the intervention group revealed an inverse relationship between participants' convincingness ratings of the industry-sponsored ad and their subsequent performance on the outcome measures. The more convinced they were by the industry-sponsored ad, the less likely they were to respond as healthy sceptics. To avoid these problems in Experiment 2, all ads were counter-balanced to control for ad-specific or disease-specific factors and improvements were made to the delivery of the intervention.

The following chapter describes the design and evaluation of the second iteration of my educational intervention. The results of Experiment 2 suggest that the new improvements eliminated the inverse relationship between participants' convincingness ratings of the industry-sponsored ad and their subsequent performance. However, despite counter-balancing ads, sponsor-type effects were observed for several measures. Furthermore, cultivating healthy scepticism remained elusive. I conclude this chapter with a discussion on how to tackle the new challenges that have arisen from Experiment 2.

4.2 Experiment 2

4.2.1 Aims

The aim of Experiment 2 was to replicate the results of Experiment 1 whilst controlling for the ad or disease specific confounds that were inherent in my previous experiment. Secondly, I wanted to evaluate whether the improvements in clarity, wording, and presentation resulted in less negativity from participants and ultimately a more effective intervention.

4.2.2 Method

Ethics Statement

This experiment was performed in accordance with the guidelines of the Declaration of Helsinki. Ethical approval was obtained on the 1^{st} of May 2013 from the Human Research Ethics Subcommittee of the School of Psychology, The University of Adelaide (ref#:13/52). Written informed consent was obtained from participants immediately after the aims of the experiment, role of participants, and methods of the research were explained. They were asked to click upon a button that indicated consent. This response was recorded in a data file stored on the personal drive of a computer that is only accessible to the researchers. This form of obtaining consent was approved by the School of Psychology Human Research Ethics Subcommittee.

Randomisation & Experiment Design

Experiment 2 was conducted on-line using Qualtrics (2013 Copyright ©). But, unlike in Experiment 1, the presentation of all ads used in this experiment was counter-balanced across participants. By rotating the use of these ads in the intervention as well as in the measurement phase, design-specific and disease-specific effects were controlled for. Apart from these alterations, Experiment 2's design and procedure was identical to Experiment 1.

Sampling Procedure, Exclusion Criteria, & Power Analysis

Convenience sampling was applied with recruitment primarily through the School of Psychology's research participation pool. Participants had to understand English, be residing in Australia, and did not participate in Experiment 1 to be eligible for Experiment 2. *A priori* power analysis indicated that a minimum sample size of 122 participants would be needed for this experiment to have a power of .80.

A total of 187 responses were recorded. However, this number includes individuals who decided not to participate after reading the on-line information sheet, re-attempts by individuals who had already participated once, or participants who quit before random assignment (i.e. only demographic information was obtained). As with Experiment 1, to safeguard the integrity of Experiment 2, a near identical exclusion criteria was defined *a priori* and applied (see Figure 4.1). The only change to the criteria was the increase of the minimum viewing threshold from five to ten seconds. This was to accommodate the longer time needed to view the new ads used in Experiment 2. Furthermore, there were 10 known cases of participants re-participating in this experiment because their previous attempt was incomplete. These re-attempts were only deemed invalid and excluded (one case) if the initial failed attempt could have influenced participants' responses (e.g. the participant was exposed to the educational intervention in their initial failed attempt and was re-assigned to the control group on their subsequent attempt).

Consequently, data from a final sample size of 132 participants, of which 13 (9.85%) were incomplete, was used for analysis. Fisher's Exact test found no significant differences in the proportion of incomplete responses between the two experimental groups, $p = .78$.

Participants

Participants were 132 Australian residents who volunteered in exchange for course credit for a 1st year undergraduate psychology course or were unpaid volunteers. Participants' age ranged from 18 to 61 years ($M = 20.40$, $SD = 5.21$). Participants' demographic information are presented in Table 4.1. Like with Experiment 1, there was an over-representation of females compared to the South Australian population, χ^2 (1) = 27.81, $p < .001$. This over-representation

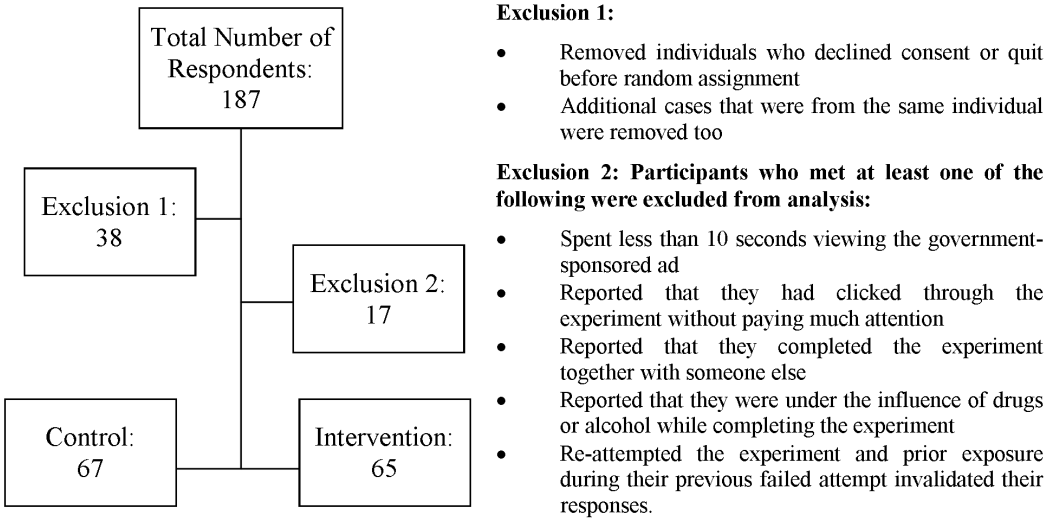


Figure 4.1. Flowchart of the exclusion process applied to participants.

was consistent across the two experimental groups, χ^2 (1) = 0.25, p = .62. Likewise, the two experimental groups did not differ on income, education, or reason for participation.

Table 4.1
Demographics of Participants in Experiment 2

Characteristic	*n*	%	Characteristic	*n*	%
Gender			Participant Type		
Male	35	26.52	Course Credit	115	87.12
Female	97	73.48	Volunteers	17	12.88
Annual Income[a]			Level of Education		
Less than AUD$20,000	112	84.85	Primary School	1	0.76
AUD$20,000 to $34,999	9	6.82	High School	103	78.03
AUD$35,000 to $49,999	5	3.79	Vocational Training	11	8.33
AUD$50,000 to $74,999	5	3.79	Undergraduate	15	11.36
AUD$75,000 to $99,999	1	0.76	Post-graduate	2	1.52

[a]Income bracket options of *$100,000 to $149,999* and *$150,000 or more* were available but had no responses, so these levels were dropped.

Materials

Disease awareness advertisements. Unlike in Experiment 1, where the industry-sponsored ads were mock-ups while the government-sponsored ad was genuine, Experiment 2's ads were all mock-ups. The government-sponsored Chlamydia ad used in Experiment 1 was replaced with a mock-up for Coeliac Disease. As in Experiment 1, gender-specific ads were made for each medical condition. Furthermore, industry and government sponsored variants of each ad were made. Besides the sponsor information and references, these variants were identical to each other (see Appendix C). Hence, a total of 12 ads (3 conditions × 2 gender variants x 2 sponsor variants) were used in Experiment 2.

The variants were counter-balanced between participants. So, participants were randomly assigned to one of six possible ad variant conditions:

1. A government-sponsored Coeliac ad paired with an industry-sponsored Multiple Sclerosis ad
2. A government-sponsored Coeliac ad paired with an industry-sponsored Social Anxiety Disorder ad

3. An industry-sponsored Coeliac ad paired with a government-sponsored Multiple Sclerosis ad
4. An industry-sponsored Coeliac ad paired with a government-sponsored Social Anxiety Disorder ad
5. A government-sponsored Multiple Sclerosis ad paired with an industry-sponsored Social Anxiety Disorder ad
6. An industry-sponsored Multiple Sclerosis ad paired with a government-sponsored Social Anxiety Disorder ad

The presentation order (industry-sponsored or government-sponsored ad first) was also counterbalanced between participants.

Educational intervention. Experiment 2's intervention was re-worded such that the process of dispelling a participant's illusion of unique invulnerability was less confronting. Convincingness ratings were brought to participants' attention in a clearer manner and contingencies were incorporated into the intervention to deal with participants who rated the ad as *not at all convincing*.

The intervention adopted a piece-meal instead of the original body-of-text presentation format, to discourage participants from glossing over the educational information. The piece-meal format also allowed for greater focus on specific aspects of the ad. By identifying to participants particular issues within the ad that make it unreliable, the intervention would be more persuasive and participants would be more receptive to the intervention's educational message.

A full copy of the intervention is available in Appendix E.1.

Demographic information and miscellaneous questions. The same set of questions from Experiment 1 were used (see section 3.2.2).

Sponsor identification accuracy. The two-part question format in Experiment 1 was replaced with a single multiple-choice question:

> What type of organisation was responsible for commissioning the advertisement?
>
> - Not sure
> - Government
> - Non-profit organisation

- Pharmaceutical company
- Other. Please specify:_____

This ensured that every participant had equal opportunity to make a correct identification. In Experiment 1, the *yes/no* screening question, "Did you notice who was responsible for advertising the advertisement?", might have filtered out participants who may have made a correct decision had they been given an opportunity to answer but were denied the chance because they answered *no* to the screening question. To discourage guessing, a *not sure* option was included among the choices.

Scepticism towards pharmaceutical advertising. The same nine item scale used in Experiment 1 (Obermiller & Spangenberg, 1998; Cronbach's α = .86). Items were rated on a 5-point Likert scale (1 = *strongly agree*, 5 = *strongly disagree*). Higher scores indicate greater levels of scepticism towards pharmaceutical advertising (min = 0, max = 45; see Appendix B for the full list of items).

Attitudes toward the disease awareness advertisement. In Experiment 1, responses to both the perceived value and purpose measures had to be re-classified into binary responses in order for the data to fit a logistic GEE model. Hence, in Experiment 2, both these measures were modified to obtain binary yes/no responses:

Did you find the advertisement valuable? (yes/no)

Would you agree that the advertisement's main aims are to... (yes/no)

- Sell a product or treatment
- Provide information about treatment
- Encourage talking to your doctor
- Provide information about medical condition
- Encourage asking for a prescription

Behavioural intentions. The same six item questionnaire from Experiment 1 was used in Experiment 2 (see section 3.2.2).

Perceived prevalence, severity, and susceptibility. No changes were made from the measures used in Experiment 1. The responses on the six prevalence items exhibited high internal consistency for both the industry-sponsored ad (Cronbach's α = .93) and the government-sponsored ad (Cronbach's α = .90). As such, the responses were averaged to form a perceived

prevalence of condition composite measure. Higher scores indicate a greater perceived prevalence of the condition (min = 0, max = 100). Likewise, ratings across the three severity items exhibited high internal consistency for both the industry ad (Cronbach's α = .88) and the government ad (Cronbach's α = .93). As such, the ratings were averaged to form a perceived severity of condition composite measure. Higher scores indicate higher perceived severity (min = 0, max = 5).

Validity checks. Experiment 2 applied the two forms of validity checks used in Experiment 1 (see section 3.2.2).

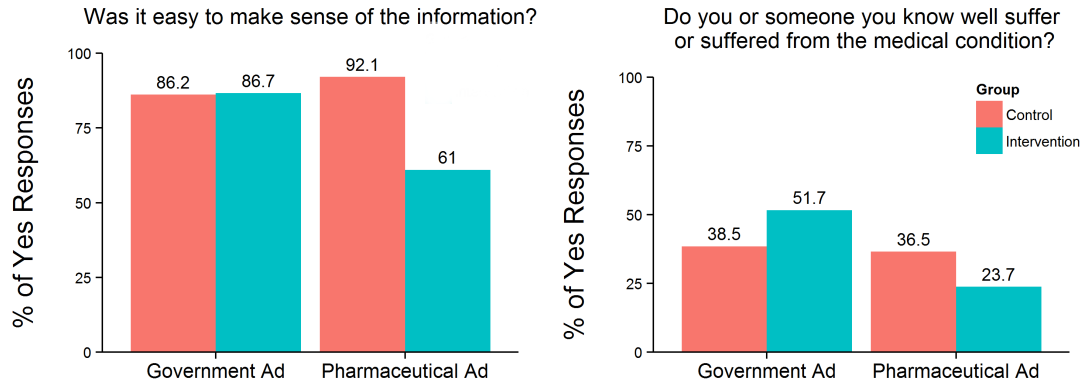
4.2.3 Expected Pattern of Results

As detailed earlier, changes were made to the perceived purpose measure. Participants were asked to indicate whether they perceive each item as a main purpose of the ad. To aid the interpretation of results for this measure, it is useful to consider how a healthy sceptic would respond to these five items. With respect to *sell a product or treatment* and *encourage asking for a prescription*, I predicted a group × sponsor-type interaction effect. The intervention group would be more likely than the control group to indicate *yes* for those two items, only when the ad was industry-sponsored. Considering that all the ads used do not contain information about treatment options or tests, I predicted that there would not be any group differences in responding for the item: *provide information about treatment*. Similarly, since all my ads included a prominent tag-line "consult your doctor today", I expected all participants to be in agreement that a main purpose of an ad was to *encourage talking to your doctor*. Hence, I predicted that there would not be any group differences in agreement. Lastly, I expected that distrust towards industry-sponsored ads would result in an interaction effect for *provide information about medical condition*. I predicted that the intervention group would be less likely than the control group to agree, only when the ad was industry-sponsored. For all other outcome measures, the expected pattern of results remained unchanged from Experiment 1 (see section 3.2.3).

4.2.4 Results & Discussion

4.2.4.1 Ancillary Analysis

4.2.4.1.1 Intervention and manipulation fidelity. As in Experiment 1, the time spent viewing important pages of the intervention was recorded. This time seven participants (10.77% of the intervention group) were identified as individuals who clicked through the intervention without paying attention.



(a) Ease of understanding

(b) Prior experience

Figure 4.2. Percentage of yes responses that the information provided by the ad was easy to understand (a) and participants' prior experience with the medical conditions (b) across group and sponsor-type.

Were there group differences in the ability to understand the advertisements or prior experience with the medical conditions? Figure 4.2 presents the percentage of *yes* responses organised by group and sponsor-type for both measures. As the ads were counter-balanced between participants, any differences associated with its design or medical condition should be eliminated on aggregate. Unexpectedly, there were significant interactions for ease of understanding, Wald $\chi^2(4, 243) = 8.32$, $p = .004$, and prior experience with the medical conditions, Wald $\chi^2(4, 243) = 5.19$, $p = .02$.

The intervention group was more likely to understand the information when the ad was sponsored by the government, $OR = 4.15$, $CI_{95}OR$ [1.82, 9.47], Wald $\chi^2(4, 243) = 11.46$, $p < .001$. Similarly, when the ad was industry-sponsored, the intervention group was less likely than control to agree that the ad's information was easy to understand, $OR = 7.41$, $CI_{95}OR$ [2.59, 21.24], Wald $\chi^2(4, 243) = 13.91$, $p < .001$. Even though the only difference between the industry and government ads was their sponsorship, the intervention group perceived the identical information as less understandable when the ad was industry-sponsored. In addition, the intervention group was more likely to report a prior experience with the medical condition when responding with regards to the government-sponsored ad compared to the industry-sponsored ad, $OR = 3.44$, $CI_{95}OR$ [1.61, 7.33], Wald $\chi^2(4, 243) = 10.2$, $p = .001$. A demand effect is the most probable reason for observing these differences in the intervention group. Consequently, when interpreting the results of the outcome measures, this demand effect has to be taken into account.

Were any participants not at all convinced by the advertisement? A sole participant in Experiment 2 regarded the industry-sponsored ad shown during the intervention as *not at all convincing*. Much like in Experiment 1, this participant's reasons for finding the ad unconvincing were

associated with aspects of its design rather than because it was sponsored by a pharmaceutical company:

> Reason 1: Wasn't eye catching
>
> Reason 2: I don't follow AFL[1]

However, unlike in Experiment 1, Experiment 2 had contingencies in place that would ask participants who were not convinced by the ad to review their reasons and consider whether they found the ad unconvincing because of its ties to industry.

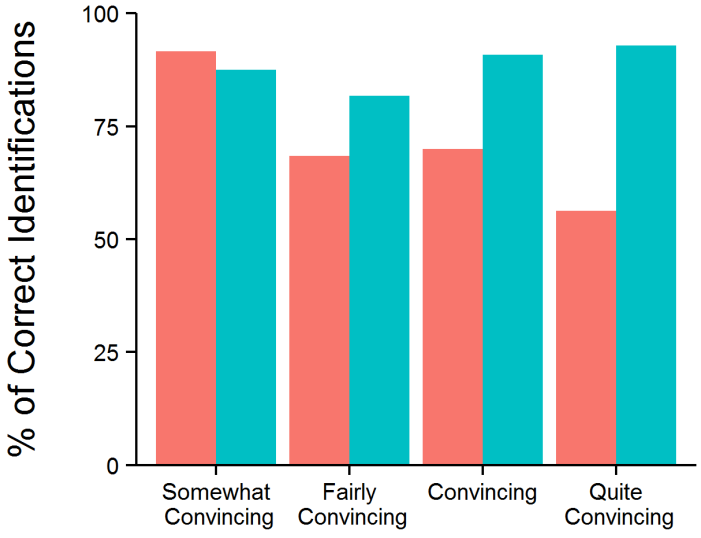
Did the new intervention work better? An interesting pattern emerged in Experiment 1 when participants' convincingness rating of the ad shown to them during the intervention was compared with several outcome measures. As their convincingness rating increased, participants were less likely to respond as expected. This suggests that the act of dispelling their unique invulnerability may have, possibly, resulted in a negative reaction among some individuals. Consequently, these participants might have disregarded the intervention's educational message and thus did not respond as desired. The intervention in Experiment 2 was tweaked to reduce the possibility of this negative reaction occurring again. The following paragraphs investigate whether the tweaks were successful by comparing the response patterns between Experiment 1 and 2 for identification accuracy and perceived value of the ad.

Among the four most commonly chosen convincingness ratings, Experiment 2's participants did not differ in their ability to identify the ad's sponsor (accuracy $\geq 80\%$). This is in contrast to Experiment 1, where there was a marked difference between *somewhat convincing* and the other three options (see Figure 4.3a). Similarly, Experiment 2's participants did not exhibit the downward trend apparent in Experiment 1 for the perceived value of ad measure (see Figure 4.3b). Taken together, this suggests that the tweaks were successful, with no evidence to suggest a negative reaction to the intervention occurred in Experiment 2.

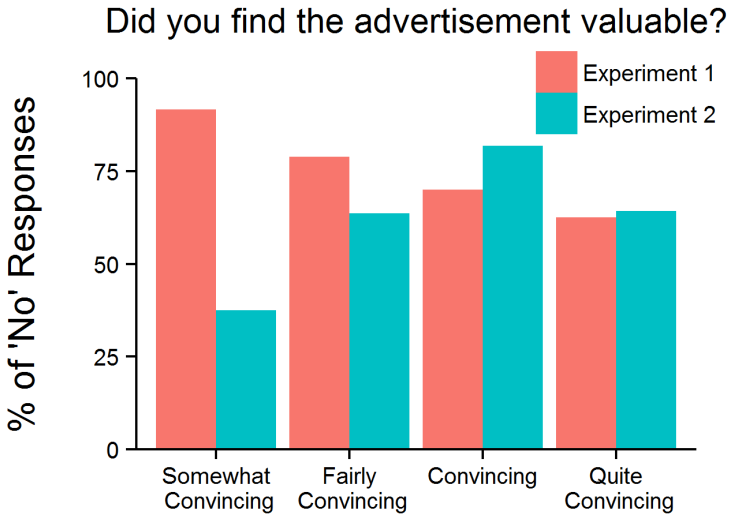
4.2.4.2 Main Analyses

Table 4.2 presents the interaction p-value for each logistic GEE model. Whenever the interaction was non-significant, it was dropped from the model.

[1] AFL is the acronym for the Australian Football League. A professional AFL player is used as a celebrity spokesman in the male Coeliac Disease ads.



(a) Identification accuracy



(b) Perceived value of ad

Figure 4.3. The intervention group's identification accuracy and their perceived value of the ad across convincingness ratings for Experiment 1 & 2.

Table 4.2
Interaction p-values for each Logistic GEE model

Outcome Variable	Interaction p-value[a]
Ad Sponsor ID Accuracy	.01
Value of the Ad	.001
Purpose of the Ad	
Sell a product or treatment	.06
Provide info on treatment	.03
Encourage talking to your doctor	.01
Provide info on condition	.79
Encourage you to ask for a prescription	.01
Behavioural Intentions	
Talk to your doctor about the condition	.04
Ask your doctor about treatments or tests	.03
Look for information as directed by the ad	.002
Look for information from other sources	.69
Ask your doctor for a prescription or a referral	.17
Do nothing	.22

[a]All interactions are group × sponsor-type.

4.2.4.2.1 Participants' ability to identify the sponsor. Contrary to Experiment 1, there was a significant group × sponsor interaction effect, Wald $\chi^2(4, 243) = 7.29$, $p = .01$. When the ad was industry-sponsored, the intervention group had 9.9 times the odds of correctly identifying the ad sponsor, $CI_{95}OR$ [3.89, 25.2], Wald $\chi^2(4, 243) = 23.17$, $p < .001$, compared to the control group (see Figure 4.4).

Interestingly, better performance in the control group for the government-sponsored ad was observed again, even though Experiment 2 controlled for ad-specific or disease-specific differences. The control group had 8.3 times the odds of correctly identifying the ad sponsor when it was government-sponsored, $CI_{95}OR$ [3.19, 21.59], Wald $\chi^2(4, 243) = 18.8$, $p < .001$, compared to when it was industry-sponsored. It was proposed that the use of a real government-sponsored ad in Experiment 1 might have accounted for the improved performance. However, in Experiment 2, the only difference between an industry-sponsored ad and a government-sponsored ad was its sponsor logo and references. The logo sizes and references were matched and occupied the same area and location across all the ads. A government identification bias is an

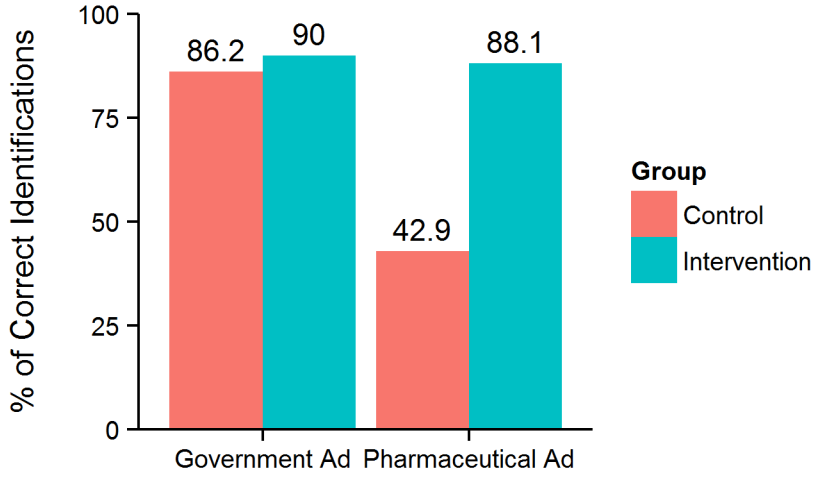


Figure 4.4. Percentage of correct ad sponsor identifications across group and sponsor-type.

unlikely explanation because the proportion of incorrect responses from the control group for the industry-sponsored ad was evenly distributed across *not sure*, *government*, and *non-profit*, $\chi^2(2) = 1.5$, $p = .47$. Instead, it is likely that participants' familiarity with the Australian government insignia made it easier to identify even though its size and location was identical to its pharmaceutical counterpart.

4.2.4.2.2 Participants' scepticism towards pharmaceutical advertising. The assumption of normality was met, $K^2 = 0.82$, $p = .66$. As shown in Figure 4.5, intervention group participants had statistically significantly greater scepticism towards pharmaceutical advertising ($M = 32.07$, $SD = 4.34$) than control group participants ($M = 26.43$, $SD = 5.68$), $t(111.9) = 6.1$, $p < .001$, CI_{95} [3.81, 7.48]. The magnitude of the difference was large, $d = 1.12$, CI_{95} d [0.69, 1.43]. Hence, Experiment 2 replicated Experiment 1's findings, the intervention did result in greater scepticism towards pharmaceutical advertising in the intervention group compared to the control group.

4.2.4.2.3 Did the new intervention cultivate healthy sceptics?

Attitudes towards disease awareness ads. Figure 4.6 shows the percentage of agreement that the ad was valuable across group and sponsor-type, while Table 4.3 presents the results of the logistic GEE model. There was a significant group × sponsor-type interaction in participants' perceived value of the ad. When shown an industry-sponsored ad, the control group was more likely to agree that the ad was valuable compared to the intervention group ($OR = 8.55$). However, when a government-sponsored ad was shown, there was no statistical difference in odds between the two groups. Furthermore, the intervention group was more likely to agree that the

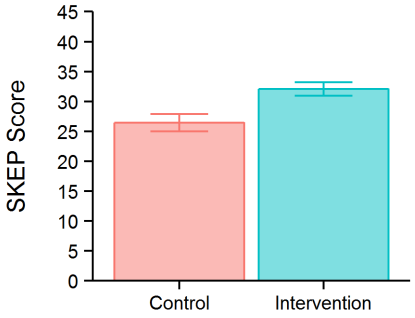


Figure 4.5. Average scepticism towards pharmaceutical advertising across groups. Error bars represent 95% confidence intervals. Maximum possible score is 45.

ad was valuable when it was government-sponsored compared to when it was industry sponsored (OR = 9.05). Hence, the new intervention did result in healthy scepticism among participants: sponsor type influenced the perceived value of an ad among intervention group participants. They were less likely to rate an ad as valuable only when the ad was industry-sponsored. This is in contrast with Experiment 1, which found that intervention group participants regarded the ads as less valuable than the control group for both sponsor types.

With respect to the perceived purpose of ad measure, Experiment 1's intervention group displayed healthy sceptic behaviour by being more likely than the control group to agree that an ad's main purpose was advertising, only when the ad was industry-sponsored. However, in Experiment 2, this measure was analysed differently. Instead of restricting participants to one

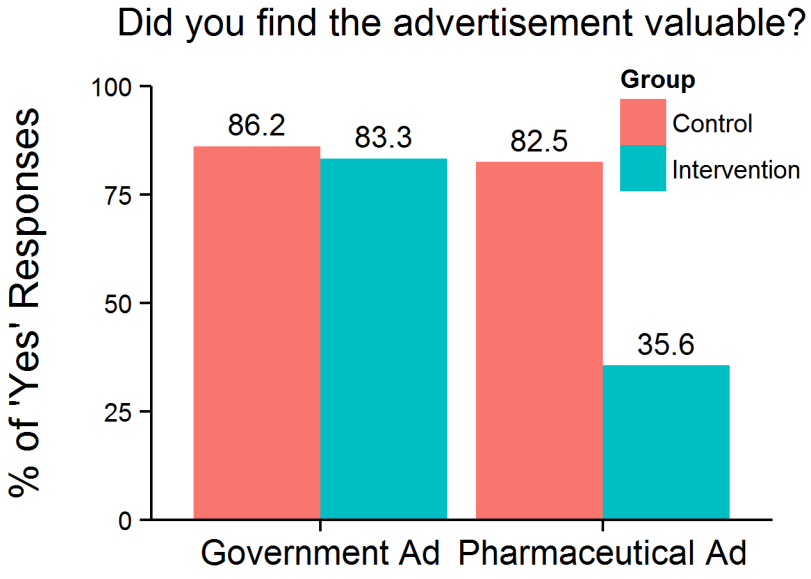


Figure 4.6. Percentage of yes responses that the ad was valuable across group and sponsor-type.

Table 4.3
A Logistic GEE Model on the Effect of Group and Sponsor-type on Responses to the Perceived Value of Ad Measure

Effect	*OR*	$CI_{95}OR$	Wald χ^2	*p*-value	Interaction *p*-value
For Control					
(Government vs. Industry)	1.32	[0.59, 2.92]	0.46	.50	
For Intervention					
(Government vs. Industry)	9.05	[3.90, 20.97]	26.36	< .001	.001
For Government					
(Control vs. Intervention)	1.24	[0.47, 3.31]	0.19	.66	
For Industry					
(Control vs. Intervention)	8.55	[3.69, 19.83]	25.03	< .001	

Note. *OR* = odds ratio, CI_{95} = 95% confidence interval.

choice out of five options, they had to agree or disagree whether each of the five options was a main purpose of the ad.

Figure 4.7 shows the percentage of *yes* responses across group and sponsor-type for each main aim. The results of the five logistic GEE models that were constructed to examine the impact of group assignment and sponsor-type on participants' responses to each item are reported in Table 4.4. Statistically significant interactions were observed for three items: *provide information on treatment*, *encourage talking to your doctor*, and *encourage asking for a prescription*. The intervention group was more likely than the control group to agree that the main purpose of the ad was to encourage asking for a prescription only when the ad was industry-sponsored (*OR* = 6.18).

Interestingly, even though none of the ads used in Experiment 2 provided information about treatment, 40 - 60% of participants agreed that the main purpose of disease awareness ads was to provide information about treatment. This suggests that participants relied more on their perceptions rather than what was presented in the ad when they responded to this item. Furthermore, the intervention group was more likely than the control group to agree that a main purpose of an ad was to provide information about treatment only when it was government-sponsored (*OR* = 2.18). While the intervention did explain that the pharmaceutical industry is prohibited from promoting its treatments or products directly to consumers, perhaps, the intervention group presumed that such restrictions do not apply to government-sponsored ads. Hence, they had higher levels of agreement only when the it was government-sponsored.

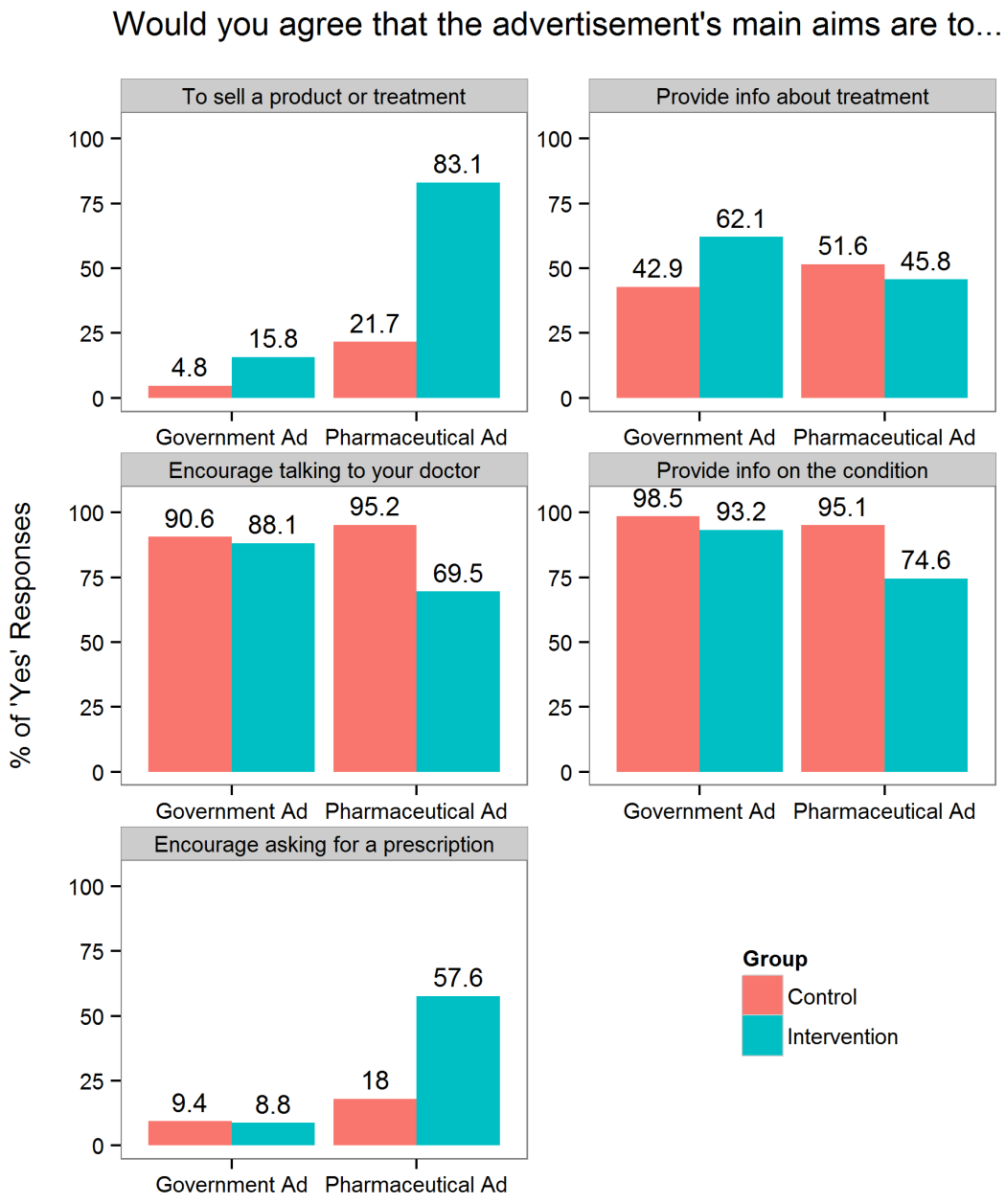


Figure 4.7. Percentage of yes responses to the perceived purpose of ad items across group and sponsor-type.

Similarly, even though all the ads included a message to *consult your doctor today*, the intervention group was less likely than control to agree that a main purpose of the ad was to encourage talking to your doctor only when it was industry-sponsored. This is a little unsettling as the goal of consumer directed promotion is to motivate individuals to consult their doctor. It is plausible that participants are unaware that the call to consult your doctor included in industry-sponsored ads is an integral part of the promotional strategy.

For the remaining two items: *to sell a product or treatment* and *provide information about the condition*, only significant main effects for group and sponsor-type were observed. However, both displayed a trend towards healthy sceptic behaviour.

Table 4.4
Logistic GEE Models on the Effect of Group and Sponsor-type on Responses to the Perceived Purpose of the Ad Measure

Item	Effect	*OR*	CI_{95} *OR*	Wald χ^2	*p*-value	Interaction *p*-value
To sell product or treatment	Intervention vs. Control	12.19	[5.00, 29.68]	30.31	< .001	NA
	Industry vs. Government	17.06	[6.69, 43.52]	35.28	< .001	
Provide info about treatment	For Control					
	(Industry vs. Government)	1.42	[0.83, 2.43]	1.67	.20	
	For Intervention					
	(Government vs. Industry)	1.94	[0.91, 4.16]	2.90	.09	.03
	For Government					
	(Intervention vs. Control)	2.18	[1.05, 4.52]	4.41	.04	
	For Industry					
	(Control vs. Intervention)	1.26	[0.62, 2.58]	0.41	.52	
Encourage talking to your doctor	For Control					
	(Industry vs. Government)	2.03	[0.69, 5.98]	1.67	.20	.01
	For Intervention					
	(Government vs. Industry)	3.26	[1.38, 7.69]	7.29	.01	

Note. *OR* = odds ratio, CI_{95} = 95% confidence interval.

(continued)

Table 4.4 (continued)

Results: Perceived Purpose

Item	Effect	*OR*	CI_{95} *OR*	Wald χ^2	*p*-value	Interaction *p*-value
	For Government					
	(Control vs. Intervention)	1.30	[0.41, 4.12]	0.20	.65	.01
	For Industry					
	(Control vs. Intervention)	8.63	[2.39, 31.23]	10.80	.001	
Provide info on the condition	Control vs. Intervention	6.07	[1.96, 18.78]	9.80	.002	NA
	Government vs. Industry	4.38	[1.62, 11.86]	8.46	.004	
Encourage asking for a prescription	For Control					
	(Industry vs. Government)	2.13	[0.85, 5.30]	2.62	.11	
	For Intervention					
	(Industry vs. Government)	14.14	[5.43, 36.87]	29.37	< .001	.01
	For Government					
	(Control vs. Intervention)	1.08	[0.31, 3.73]	0.01	.91	
	For Industry					
	(Intervention vs. Control)	6.18	[2.69, 14.21]	18.40	< .001	

Note. *OR* = odds ratio, CI_{95} = 95% confidence interval.

Behavioural intentions. Figure 4.8 shows the percentage of *yes* responses to each behavioural intention across group and sponsor-type. The results of the six logistic GEE models are reported in Table 4.5. Three items: *talk to your doctor about the condition*, *ask your doctor about treatments or tests*, and *look for information as directed by the ad*, had a significant group × sponsor-type interaction effect. In Experiment 1, look for information as directed by the ad was the only behavioural intention measure that demonstrated healthy scepticism from the intervention group. However, even though more items reached statistical significance, none demonstrated healthy scepticism amongst the intervention group. Instead of observing increased scepticism towards industry-sponsored ads, the intervention group displayed an increase in trust towards government-sponsored ads. This pattern of responding was observed in Sagarin and colleagues' (2002) asserted vulnerability condition. Participants in this condition underwent the same educational intervention as those in the demonstrated vulnerability condition. The only difference between the two conditions was: in the asserted vulnerability condition, participants did not take part in an exercise that demonstrated their vulnerability to manipulative advertising. So why was this pattern of responding apparent in these three behavioural intention items when the intervention incorporated an exercise to dispel the illusion of unique invulnerability?

It is possible that the intervention did not effectively dispel the illusion of invulnerability. But that cannot explain why I obtained mixed results across my outcome measures. I propose a more nuanced explanation. The inconsistency may have arisen as the result of the nature of these behavioural intention items. Two of the three items pertain to consultations with a doctor. Understandably, people generally place a lot of trust in their doctors. Hence, I observed increased agreement for these items in the intervention group when the ad was government-sponsored. Furthermore, they may be unaware that doctors too are subject and possibly vulnerable to persuasive pharmaceutical advertising. Consequently, they may not regard consulting with their doctor after viewing an industry-sponsored ad as potentially problematic because they trust that their doctor will provide them with reliable information. As a result, the intervention group did not respond differently to the control group for these items when the ad was industry-sponsored. It is puzzling why the intervention group did not respond any differently to the control group when asked if they would look for information as directed by the ad after viewing an industry-sponsored ad. I expected the intervention group participants to be motivated to avoid any industry-tied sources of information. Perhaps, these participants were truly healthy sceptics. They were willing to research these resources first, rather than dismiss them as unreliable solely because of their association with the pharmaceutical industry.

For the remaining three items, no significant effects were found for *look for information from other sources*. Unfortunately, the intervention group was more likely than the control group to *ask their doctor for a prescription or referral* ($OR = 2.69$). I am unable to provide a reasonable explanation for this observation. Considering that only a minority reported this intention to seek a prescription or referral, the effect could be the result of the handful of intervention group

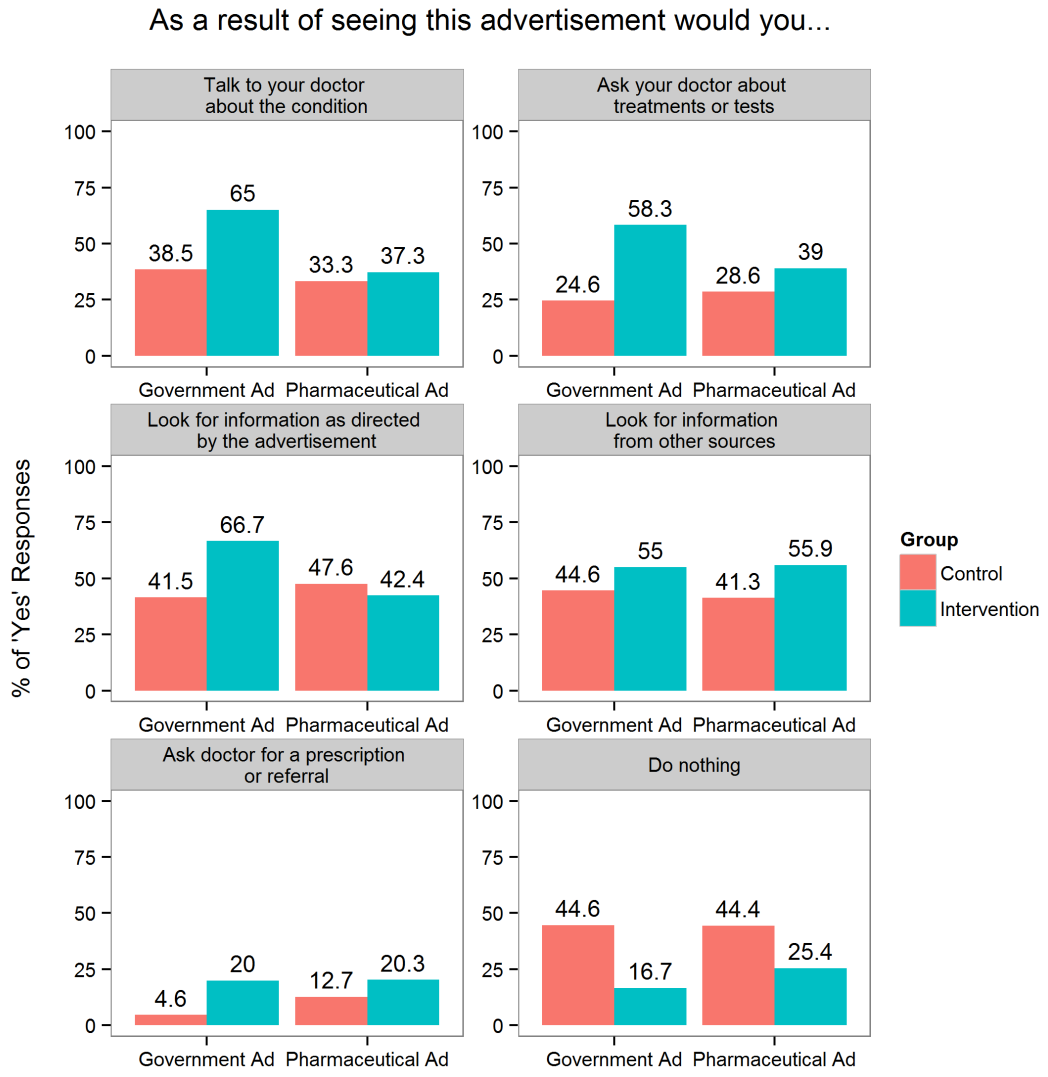


Figure 4.8. Percentage of *yes* responses from participants on their behavioural intentions after viewing each ad across groups.

participants who clicked through the experiment. Lastly, the control group was more likely than the intervention group to do nothing after seeing an ad (OR = 3.03). While the intervention group was less likely to do nothing, it is disappointing that they were not more likely than the control group to seek further information from other sources. Close to half of the individuals in both groups indicated an intention to seek further information from other sources. So, at the very least, even without an intervention many people will seek out information from multiple sources. Perhaps, in future, the intervention should emphasise the importance of seeking out multiple sources so that individuals will be more proactive than they currently are, especially when presented with information from a potentially unreliable source.

Table 4.5
Logistic GEE Models on the Effect of Group and Sponsor-type on Responses to each Behavioural Intention

Behavioural Intention	Effect	*OR*	$CI_{95}OR$	Wald χ^2	*p*-value	Interaction *p*-value
Talk to your doctor about the condition	For Control					
	(Government vs. Industry)	1.25	[0.68, 2.28]	0.53	.47	
	For Intervention					
	(Government vs. Industry)	3.12	[1.71, 5.70]	13.73	< .001	.04
	For Government					
	(Intervention vs. Control)	2.97	[1.43, 6.16]	8.58	.003	
	For Industry					
	(Intervention vs. Control)	1.19	[0.57, 2.50]	0.21	.65	
Ask your doctor about treatments or tests	For Control					
	(Industry vs. Government)	1.22	[0.62, 2.41]	0.35	.56	
	For Intervention					
	(Government vs. Industry)	2.19	[1.24, 3.86]	7.35	.01	.03
	For Government					
	(Intervention vs. Control)	4.29	[2.00, 9.19]	13.99	< .001	
	For Industry					
	(Intervention vs. Control)	1.60	[0.75, 3.40]	1.47	.23	

Note. *OR* = odds ratio, CI_{95} = 95% confidence interval.

(continued)

Table 4.5 (continued)

Results: Behavioural Intentions

Behavioural Intention	Effect	*OR*	CI_{95} *OR*	Wald χ^2	*p*-value	Interaction *p*-value
Look for info as directed by the ad	For Control					
	(Industry vs. Government)	1.28	[0.79, 2.06]	1.02	.31	
	For Intervention					
	(Government vs. Industry)	2.72	[1.43, 5.18]	9.25	.002	.002
	For Government					
	(Intervention vs. Control)	2.81	[1.36, 5.84]	7.74	.01	
	For Industry					
	(Control vs. Intervention)	1.24	[0.60, 2.53]	0.34	.56	
Look for info from other sources	Intervention vs. Control	1.65	[0.94, 2.92]	3.01	.08	NA
	Government vs. Industry	1.05	[0.69, 1.61]	0.06	.81	
Ask your doctor for a prescription or referral	Intervention vs. Control	2.69	[1.21, 6.00]	5.89	.02	NA
	Industry vs. Government	1.45	[0.77, 2.73]	1.31	.25	
Do nothing	Control vs. Intervention	3.03	[1.55, 5.91]	10.55	.001	NA
	Industry vs. Government	1.22	[0.82, 1.83]	0.94	.33	

Note. *OR* = odds ratio, CI_{95} = 95% confidence interval.

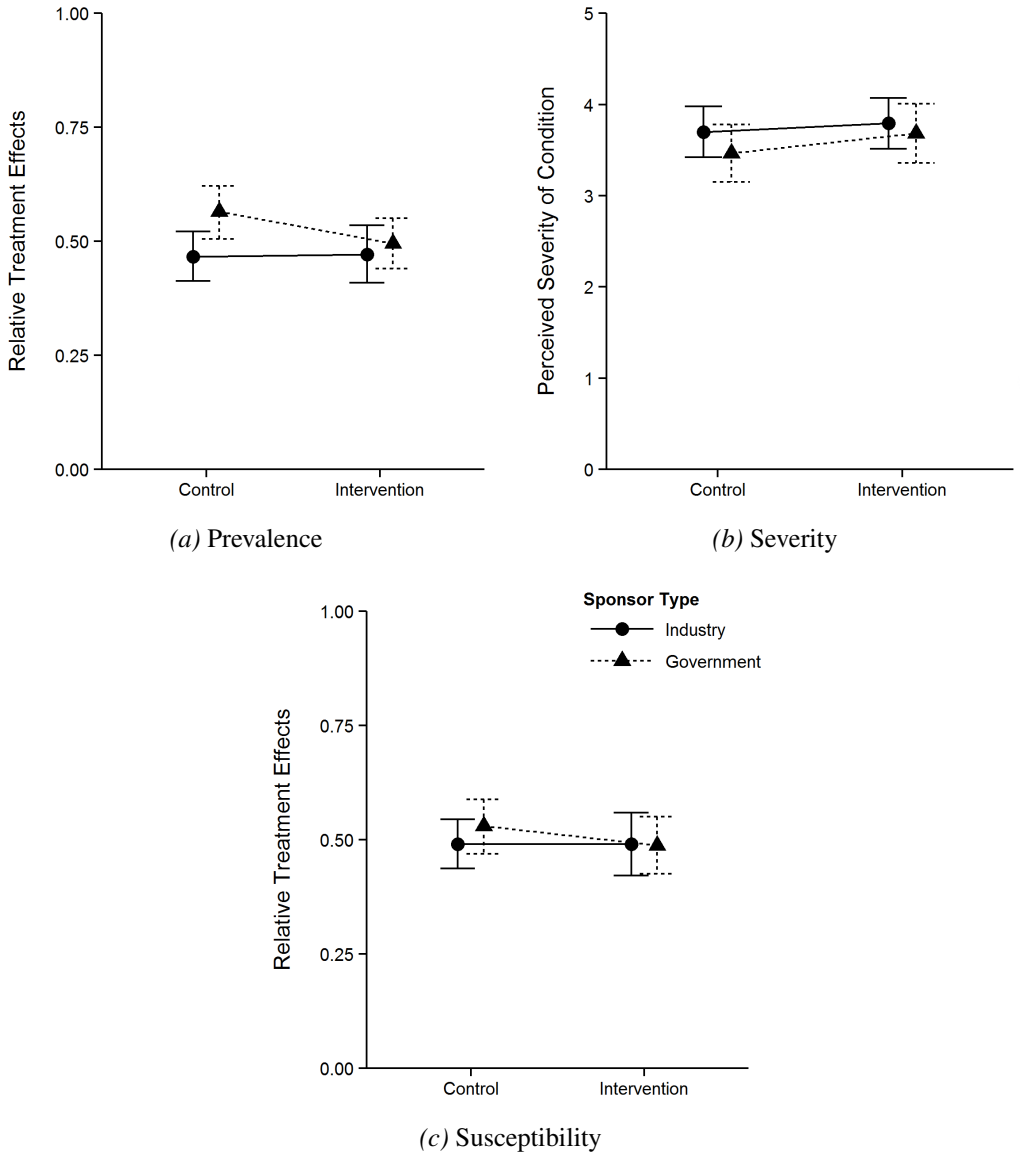
Perceived prevalence, severity, and susceptibility. Responses to the prevalence and susceptibility measures for the government-sponsored ad violated the assumption of homogeneity of variance, $F(1, 117) = 8.93$, $p = .003$ and $F(1, 117) = 4.41$, $p = .04$, respectively. There was more within-group variability in prevalence and susceptibility scores for the government-sponsored ad in the control group compared to the intervention group. Responses to the perceived susceptibility measure violated the assumption of normality too, $K^2 = 7.96$, $p = .02$. Consequently, for these two measures, a non-parametric alternative: the ANOVA-Type Statistic (ATS) was applied.

As in Experiment 1, undergoing the new intervention did not result in participants perceiving a condition as less prevalent when the ad was industry-sponsored. The absence of an effect may be in part due to the large variability in participants' estimates of disease prevalence across both groups and sponsor-type (0.8 – 73.5%, with *SD*s of approximately 16%). This suggests that participants were not particularly precise at estimating prevalence. This is consistent with Park and Grow's (2008) study which used an identical measure. The large variability of estimates from participants might have masked any potential effects from the intervention.

The interaction was non-significant for perceived prevalence, ATS(1) = 2.2, $p = .14$. The main effect for group was non-significant too, ATS(1) = 0.49, $p = .48$. However, the main effect for sponsor-type was statistically significant, ATS(1) = 5.88, $p = .02$. Despite counter-balancing the medical conditions across sponsor-type, the relative treatment effect (RTE) for the government-sponsored ad was significantly higher than the RTE for the industry-sponsored ad (see Figure 4.9a). There was a higher tendency for participants to have higher prevalence scores for the government-sponsored ad compared to all other prevalence scores. However, the observed difference was small, probability of superiority (*PS*) = .55.

A 2 × 2 mixed between-within subjects ANOVA revealed that the group × sponsor-type interaction for perceived severity was non-significant too (see Figure 4.9b), $F(1, 117) = 0.16$, $p = .69$, $\eta^2_G = .001$, CI_{95} [.00, .04]. The main effect for group and sponsor-type were non-significant too, $F(1, 117) = 1.21$, $p = .27$, $\eta^2_G = .005$, CI_{95} [.00, .07] and $F(1, 117) = 1.2$, $p = .28$, $\eta^2_G = .01$, CI_{95} [.00, .07], respectively. Hence, like in Experiment 1, undergoing the new intervention did not result in participants perceiving the condition as less severe compared to control group participants when the ad was industry-sponsored.

Like Experiment 1, intervention group participants did not perceive themselves as less susceptible compared to control group participants when the ad was industry-sponsored (see Figure 4.9c). The group × sponsor-type interaction was non-significant, ATS(1) = 0.38, $p = .54$. The main effects for group and sponsor-type were non-significant too, ATS(1) = 0.26, $p = .61$ and ATS(1) = 0.31, $p = .58$, respectively.



(a) Prevalence

(b) Severity

(c) Susceptibility

Figure 4.9. Interaction plots for perceived prevalence, severity, and susceptibility across group and sponsor-type. Error bars represent 95% confidence intervals. Points are offset horizontally for clarity.

4.2.4.3 Summary

Despite counter-balancing the medical conditions, a main effect of sponsor-type was still observed for sponsor identification accuracy, perceived main purpose of ad is to sell a product or treatment, perceived main purpose of ad is to provide information about the condition, and perceived prevalence of the condition. Interestingly, apart from sponsor identification accuracy, none of these measures had main effects for sponsor-type in Experiment 1. Conversely, the main effects for sponsor-type observed in Experiment 1 were eliminated in Experiment 2. It is unclear why, but at least there are less occurrences of this effect in Experiment 2. In addition, the

manipulation check questions revealed that the intervention group's responses may be partially influenced by demand or expectancy effects.

The new intervention succeeded in eliminating the inverse relationship between its effectiveness and participants' convincingness ratings observed in Experiment 1. Experiment 2 replicated Experiment 1's findings by improving sponsor identification accuracy and scepticism towards pharmaceutical advertising. There were improvements in my effort to cultivate health scepticism. The new intervention led to the intervention group rating the ad as less valuable only when it was industry-sponsored. Likewise, they were more likely to agree that an ad's main purpose was to encourage asking for a prescription, only when the ad was industry-sponsored. However, an interesting pattern arose that was not observed in Experiment 1. Three of the behavioural intentions items documented greater trust in government-sponsored ads rather than more distrust in industry-sponsored ads. While having greater trust in reliable sources of health information is beneficial, my main concern is the lack of distrust in unreliable sources. As discussed earlier, I postulated that this observation may have arose because participants are unaware that the goal of consumer-directed promotion is to encourage consultations with their doctors, who are heavily advertised to as well. To address this issue the following chapter describes a third iteration of the intervention that was developed and evaluated.

Chapter 5

Cultivating the Critical Assessment of Disease Awareness Advertisements: Part III

5.1 Introduction

Experiment 2 successfully replicated results from Experiment 1 without compromising the effective delivery and uptake of the intervention. However, an interesting pattern emerged from participants' responses across sponsor-type. The intervention group responded differently after viewing a government-sponsored ad, rather than after an industry-sponsored ad. In order words, whilst the intervention boosted trust in disease awareness ads from a reliable and independent source, it did not result in individuals becoming more critical of disease awareness ads from non-independent sources. In my opinion, the potential costs from being susceptible to unreliable health information outweighs the benefit from being more receptive to reliable ones. Consequently, the aim of the third iteration was to rectify this issue.

I proposed that the lack of distrust in unreliable sources may have been the result of a lack of awareness that the goal of consumer-directed promotion is to encourage consultations with health professionals, who themselves are heavily advertised to by the pharmaceutical industry. As such, changes were made to the intervention in Experiment 3 to include more information about the pharmaceutical industry's promotional practices.

5.2 Experiment 3

5.2.1 Aims

Results from Experiment 2 suggested that consumers are unaware of the extent of pharmaceutical advertising directed at their healthcare professionals and the influence such advertising can have on doctors. As such, more detailed information about promotional practices was included in the intervention. The aim of Experiment 3 was to evaluate whether the new intervention was better at cultivating healthy sceptics than its predecessors in Experiments 1 and 2.

5.2.2 Method

Ethics Statement

This experiment was performed in accordance with the guidelines of the Declaration of Helsinki. Ethical approval was obtained on the 12^{th} of May 2014 from the Human Research Ethics Subcommittee of the School of Psychology, University of Adelaide (ref#:14/52). Written informed consent was obtained from participants immediately after the aims of the experiment, role of participants, and methods of the research were explained. They were asked to click upon a button that indicated consent. This response was recorded in a data file stored on the personal drive of a computer that is only accessible to the researchers. This form of obtaining consent was approved by the School of Psychology Human Research Ethics Subcommittee.

Randomisation & Experiment Design

Experiment 3 was conducted on-line using Qualtrics (2013 Copyright ©) and its design and procedure was identical to Experiment 2 except that the intervention was administered to the control group at the end of experiment (i.e. a wait-list control group). Unlike Experiments 1 and 2, there would have been substantial differences in experiment duration across groups for Experiment 3 because of the greater detail incorporated into its intervention. Hence, this change was made primarily to ensure equity between all participants, both in terms of experiment duration and educational benefits from the intervention.

Sampling Procedure, Exclusion Criteria, & Power Analysis

Like in Experiment 2, convenience sampling was applied with recruitment primarily through the School of Psychology's research participation pool. Participants had to understand English, be

residing in Australia, and did not participate in previous iterations to be eligible for Experiment 3. Based on my previous two experiments, *a priori* power analysis indicated that a minimum sample size of 140 participants would be needed for adequate power.

A total of 255 responses were recorded. However, this number includes individuals who decided not to participate after reading the on-line information sheet, re-attempts by individuals who had already participated once, or participants who quit before random assignment (i.e. only demographic information was obtained). To safeguard the integrity of Experiment 3, the exclusion criteria from Experiment 2 was applied. There were 12 known cases of participants re-participating in Experiment 3. As with previous experiments, these re-attempts were only deemed invalid and excluded (four cases) if the initial failed attempt could have influenced participants' responses (e.g. the participant was exposed to the educational intervention in their initial failed attempt and was re-assigned to the control group on their subsequent attempt).

Consequently, data from a final sample size of 196 participants, of which 25 (12.76%) were incomplete, was used for analysis (see Figure 5.1). Unlike in Experiment 1 and 2, there was a significant difference in the proportion of incomplete responses between the two groups, $\chi^2(1) = 9.37$, $p = .002$. Nineteen participants failed to complete the experiment in the intervention group compared to six in the control group (20.43 vs. 5.83%).

Participants

Participants were 196 Australian residents who volunteered in exchange for course credit for a 1st year undergraduate psychology course or were unpaid volunteers. Participants' age ranged

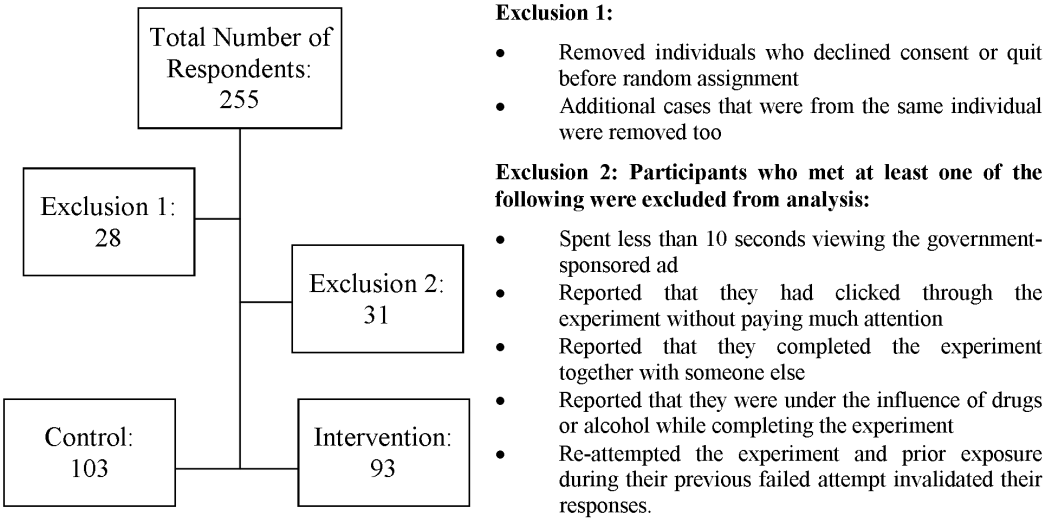


Figure 5.1. Flowchart of the exclusion process applied to participants.

from 17 to 44 years (M = 20.62, SD = 4.41). Participants' demographic information are presented in Table 5.1. Once again, there was an over-representation of females compared to the South Australian population, $\chi^2(1) = 12.71$, $p < .001$. This over-representation was consistent across the two experimental groups, $\chi^2(1) = 0.24$, $p = .62$. Likewise, the two experimental groups did not differ on income, education, or reason for participation.

Table 5.1
Demographics of Participants in Experiment 3

Characteristic	*n*	%	Characteristic	*n*	%
Gender			Participant Type		
Male	72	36.73	Course Credit	186	94.90
Female	124	63.27	Volunteers	10	5.10
Annual Income[a]			Level of Education		
Less than AUD$20,000	167	85.20	Primary School	2	1.02
AUD$20,000 to $34,999	15	7.65	High School	159	81.12
AUD$35,000 to $49,999	6	3.06	Vocational Training	16	8.16
AUD$50,000 to $74,999	4	2.04	Undergraduate	18	9.18
AUD$75,000 to $99,999	3	1.53	Post-graduate	1	0.51
AUD$100,000 or more	1	0.51			

[a]Income bracket options of *$100,000 to $149,999* had zero responses while *$150,000 or more* had one response, so these levels were collapsed together.

Materials

Disease awareness advertisements. Experiment 3 shared the same set of ads and counterbalancing procedure used in Experiment 2 (see Appendix C).

Educational intervention. To address the interesting pattern that was observed in Experiment 2, where responses to three of the behavioural intentions items implied a greater trust in government-sponsored ads rather than more distrust in industry-sponsored ads, more emphasis was placed on explaining to participants why it is important to check for sponsorship information. In line with my ethos of healthy scepticism, all arguments were backed by evidence and fully referenced to encourage participants to evaluate them critically. Furthermore, the intervention explained that doctors too were vulnerable and exposed to pharmaceutical advertising. A full copy of the intervention is available in Appendix E.2.

For the first time, feedback on the intervention was obtained from participants. The following questions were asked at the end of the experiment:

1. Please rate the effectiveness of the intervention (4-point scale, 1 = *very ineffective*, 4 = *very effective*)
2. Was the intervention's message persuasive? (Yes/No)
3. Which option best describes your feelings towards the intervention's strategy of highlighting your responses to the unreliable help-seeking ad?
    - Positive. Even though my pride may have been hurt, knowing that I had been a victim of an unreliable ad made me pay more attention to the education message.
    - Negative. The strategy was manipulative and offensive. Hence, I did not pay much attention to the educational message.
    - Neutral. I don't think my attention to the educational message would have been different if the strategy was not used.
4. How could we improve the intervention? (optional open-ended question)

Demographic information and miscellaneous questions. The same set of questions from Experiment 1 and 2 were used (see section 3.2.2).

Sponsor identification accuracy. The same multiple-choice question used in Experiment 2 (see section 4.2.2).

Scepticism towards pharmaceutical advertising. A nine item published scale originally developed to measure consumer scepticism towards advertising (Obermiller & Spangenberg, 1998; Cronbach's α = .88). Items were rated on a 5-point Likert scale (1 = *strongly agree*, 5 = *strongly disagree*). Higher scores indicate greater levels of scepticism towards pharmaceutical advertising (min = 0, max = 45; see Appendix B for the full list of items).

Attitudes toward the disease awareness advertisement. The same set of perceived value and purpose measures used in Experiment 2 (see section 4.2.2).

Behavioural intentions. The same six item questionnaire from Experiment 1 and 2 (see section 3.2.2).

Perceived prevalence, severity, and susceptibility. No changes were made from the measures used in Experiment 1 and 2. The responses on the six prevalence items exhibited high internal consistency for both the industry-sponsored ad and the government-sponsored ad (Cronbach's α = .94 for both). As such, the responses were averaged to form a perceived prevalence of condition composite measure. Higher scores indicate a greater perceived prevalence of the condition (min = 0, max = 100). Likewise, the ratings across the three severity items exhibited high internal consistency for both the industry ad (Cronbach's α = .90) and the government ad (Cronbach's α = .92). As such, ratings of the three items were averaged to form a perceived severity of condition composite measure. Higher scores indicate higher perceived severity (min = 0, max = 5).

Validity checks. Experiment 3 applied the two forms of validity checks used in Experiment 1 and 2 (see section 3.2.2).

5.2.3 Results & Discussion

5.2.3.1 Ancillary Analysis

5.2.3.1.1 Intervention and manipulation fidelity. Like Experiments 1 and 2, the time spent viewing important pages of the intervention was recorded. This time 12 participants (12.9% of the intervention group) were identified as individuals who clicked through the intervention without paying attention.

Were there group differences in the ability to understand the advertisements or prior experience with the medical conditions? Participants' responses were organised by group and sponsor-type and presented in Table 5.2. In contrast to Experiment 2, no interaction effects were observed for ease of understanding and prior experience. The main effect for group was non-significant for both ease of understanding and prior experience, Wald $\chi^2(3, 351) = 0.19$, $p = .67$ and Wald $\chi^2(3, 351) = 0.34$, $p = .56$, respectively. This suggests that the latest iteration of the intervention is not as prone to eliciting demand or expectancy effects amongst the intervention group as its predecessor. Furthermore, there was no significant main effect for sponsor-type for both ease of understanding and prior experience, Wald $\chi^2(3, 351) = 0.35$, $p = .56$ and Wald $\chi^2(3, 351) = 1.87$, $p = .17$, respectively. Hence, counter-balancing was successful in controlling for ad or disease specific effects.

Were any participants not at all convinced by the advertisement? Seven intervention group participants in Experiment 3 regarded the industry-sponsored ad shown during the intervention

Table 5.2
Experiment 3's Participants' Ability to Understand the Ads and Prior Experience with the Medical Conditions across Group and Sponsor-type

Measure	Government		Industry	
	Control	Intervention	Control	Intervention
Ad Understandability				
Very Difficult	1	1	0	1
Difficult	3	2	3	4
Neither Difficult Nor Easy	14	10	16	18
Easy	40	44	46	44
Very Easy	41	19	36	11
Experience with Medical Condition				
Yes	38	27	46	33
No	61	49	55	45

as *not at all convincing*. Unlike in Experiment 1 and 2, their reasons for finding the ad unconvincing were not exclusively associated with aspects of its design. Instead, they were rather sceptical (see Table 5.3).

5.2.3.1.2 Participants' feedback on the intervention. Participants' responses to the feedback questions are presented in Table 5.4. A majority of participants (72.96%) felt that the strategy of dispelling one's illusion of unique invulnerability had a positive effect and agreed that even though their pride may have been hurt, knowing that they had been a victim of an unreliable ad made them pay more attention to the education message. A small minority (4.4%) agreed that the strategy was manipulative and offensive and, thus, did not pay much attention to the educational message. The rest chose the *neutral* option and indicated that they did not think their attention to the educational message would have been different if the strategy was not used. Similarly, a majority of participants agreed that the intervention was effective and persuasive (85.5% and 89.3% respectively). Lastly, 23 participants responded to the optional open-ended question, "How could we improve the intervention?" The most common issue raised was that the intervention was too lengthy and provided too much information. A few respondents thought the tone of the intervention was paternalistic and condescending (see Table D.4 in Appendix D for a complete list of written feedback provided by the participants).

Table 5.3
Participants' reasons for being unconvinced by the industry-sponsored ad shown during the intervention

ID	Ad Shown[a]	Reason 1	Reason 2
6	MS (M)	I found the symptoms to be very broad felt like there was a drag net just being dropped and picking up as many people as possible	Twenty three thousand is not that big of a number don't try and make it sound like it is
21	Coeliac (M)	footballers connection to the sickness	relevance
29	Coeliac (M)	i don't know who that guy is	i don't usually trust ads because they don't have a creditable source
39	MS (M)	The design appeal and how much effort went into making the ad etc.	No compelling or emotionally touching reason to be convinced
101	Coeliac (F)	Sick and tired are two very general symptoms which could be associated with a lot of things	how can they give a percentage of people that do not know they have the disease
140	MS (F)	symptoms are general	they say its common but never heard of it
143	MS (M)	Pharmaceutical Company	Vague symptoms used as scare tactics

[a]M/F denotes male and female versions of ad.

Table 5.4
Participants' attitude towards the intervention and their ratings of its effectiveness and persuasiveness

Measure	Control (n = 85)	Intervention (n = 74)	Total (N = 159)
Attitude towards Intervention's Strategy			
Positive	62	54	116
Neutral	21	15	36
Negative	2	5	7
Effectiveness			
Very Ineffective	3	5	8
Fairly Ineffective	8	7	15
Fairly Effective	41	48	89
Very Effective	33	14	47
Persuasiveness			
Yes	78	64	142
No	7	10	17

Note. The control group could choose whether to receive the intervention after completing the experiment. Hence, their responses were included. The total number of respondents is less than the sample size because of missing data from participants who did not complete the feedback questions.

5.2.3.2 Main Analyses

Table 5.5 presents the interaction *p*-value for each logistic GEE model. Whenever the interaction was non-significant, it was dropped from the model.

5.2.3.2.1 Participants' ability to identify the sponsor. The educational intervention improved the ability to identify the sponsor regardless of sponsor-type (see Figure 5.2). Intervention group participants had 4.41 times the odds of correctly identifying the ad sponsor, $CI_{95}OR$ [2.48, 7.84], Wald $\chi^2(3, 351) = 25.52$, $p < .001$, than the odds for control group participants.

As with Experiments 1 and 2, there was better identification accuracy when the ad was sponsored by the government. Participants had 3.34 times the odds of correctly identifying the sponsor, $CI_{95}OR$ [2.03, 5.48], Wald $\chi^2(3, 351) = 22.75$, $p < .001$, when the ad was government-sponsored compared to when it was industry-sponsored.

Table 5.5
Interaction p-values for each Logistic GEE model

Outcome Variable	Interaction *p*-value[a]
Ad Sponsor ID Accuracy	.26
Value of the Ad	< .001
Purpose of the Ad	
Sell a product or treatment	.01
Provide info on treatment	.01
Encourage talking to your doctor	.63
Provide info on condition	.06
Encourage you to ask for a prescription/referral	.14
Behavioural Intentions	
Talk to your doctor about the condition	.02
Ask your doctor about treatments or tests	.06
Look for information as directed by the ad	< .001
Look for information from other sources	.87
Ask your doctor for a prescription or a referral	.82
Do nothing	.46

[a] All interactions are group × sponsor-type.

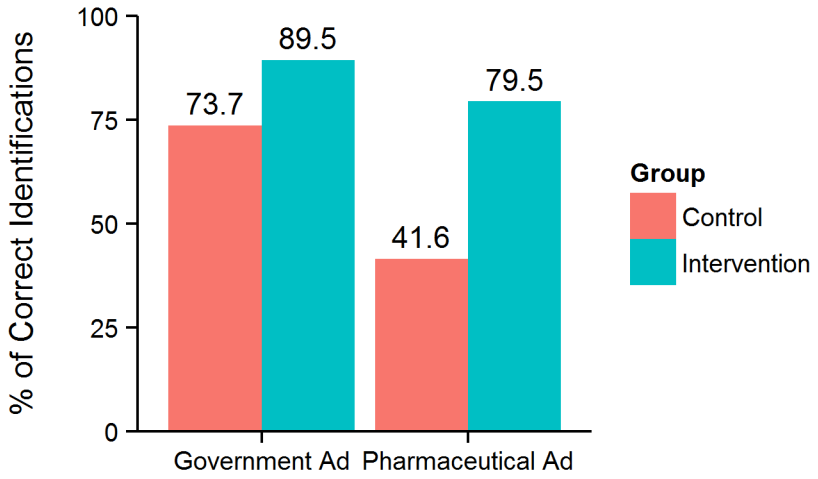


Figure 5.2. Percentage of correct ad sponsor identifications across group and sponsor-type.

5.2.3.2.2 Participants' scepticism towards pharmaceutical advertising. The assumption of normality was met, $K^2 = 2.83$, $p = .24$. As shown in Figure 5.3, intervention group participants had statistically significantly greater scepticism towards pharmaceutical advertising ($M = 33.57$, $SD = 5.72$) than control group participants ($M = 28.95$, $SD = 6.25$), $t(165.21) = 5.05$, $p < .001$, CI_{95} [2.82, 6.43]. The magnitude of the difference was large, $d = 0.77$, CI_{95} d [0.43, 1.01]. Hence, Experiment 3 replicated the findings from Experiment 1 and 2. The latest iteration of the intervention resulted in greater scepticism towards pharmaceutical advertising in the intervention group compared to the control group.

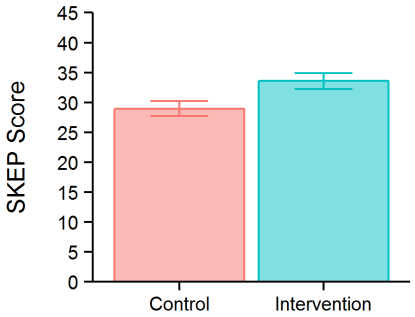


Figure 5.3. Average scepticism across groups. Error bars represent 95% confidence intervals. Maximum possible score is 45.

5.2.3.2.3 Was the latest intervention better at cultivating healthy sceptics?

Attitudes towards disease awareness ads. Figure 5.4 shows the percentage of agreement that the ad was valuable across group and sponsor-type, while Table 5.6 presents the results of the logistic GEE model. There was a significant group × sponsor-type interaction in participants' perceived value of the ad. When shown an industry-sponsored ad, the control group was more likely to agree that the ad was valuable compared to the intervention group (OR = 8.82). However, when a government-sponsored ad was shown, there was no statistical difference in odds between the two groups. Furthermore, the intervention group was more likely to agree that the ad was valuable when it was government-sponsored compared to when it was industry sponsored (OR = 10.06). Hence, in line with Experiment 2, the latest intervention did result in healthy scepticism among participants: sponsor type influenced the perceived value of an ad among intervention group participants. They were less likely to rate an ad as valuable only when the ad was industry-sponsored.

For participants' perceived purpose of the ad, Figure 5.5 shows the percentage of *yes* responses across group and sponsor-type for each main aim, while the results of the five logistic GEE models for each item are reported in Table 5.7. Statistically significant interactions were observed for two items: *to sell a product or treatment* and *provide information on treatment*. The healthy sceptic trend observed in Experiment 2 for the *to sell a product or treatment* item was replicated and reached statistical significance in Experiment 3. Intervention group participants were only

Table 5.6
A Logistic GEE Model on the Effect of Group and Sponsor-type on Responses to the Perceived Value of Ad Measure

Effect	OR	$CI_{95}OR$	Wald χ^2	p-value	Interaction p-value
For Control					
(Government vs. Industry)	1.22	[0.64, 2.32]	0.38	.54	
For Intervention					
(Government vs. Industry)	10.06	[4.86, 20.86]	38.58	< .001	< .001
For Government					
(Control vs. Intervention)	1.07	[0.52, 2.21]	0.03	.85	
For Industry					
(Control vs. Intervention)	8.82	[4.47, 17.4]	39.35	< .001	

Note. OR = odds ratio, CI_{95} = 95% confidence interval.

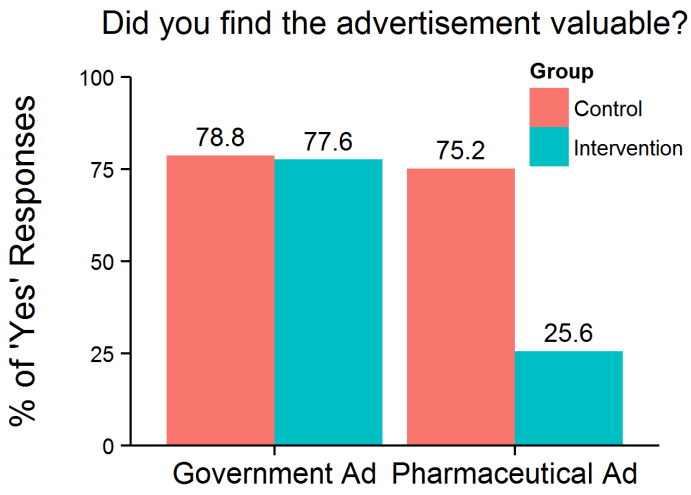


Figure 5.4. Percentage of yes responses that the ad was valuable across group and sponsor-type.

more likely to agree that a main aim of the disease awareness ad was to sell a product or treatment when the ad was industry-sponsored (OR = 11.79). Once again, 40 - 60% of participants agreed that the main purpose of disease awareness ads was to provide information about treatment even though none of the ads used provided information about treatment. This reinforces the suggestion made in Chapter 4 that participants relied more on their perceptions rather than what was presented in the ad when they responded to this item. Interestingly in Experiment 2, the interaction effect was a result of the intervention group being more likely to agree than the control group that a main aim of the ad is to provide information about treatment only when it was government-sponsored. However, for Experiment 3, the interaction resulted from the control group being more likely than the intervention group to agree when it was industry-sponsored (OR = 2). Similarly, there was a trend towards the control group being more likely than the intervention group to agree that a main purpose of an ad is to *provide information on a condition* when it was industry-sponsored, but the interaction effect did not reach statistical significance in Experiment 2 or 3. Taken together, this suggests that the more detailed intervention provided in Experiment 3 managed to persuade participants that the main purpose of industry-sponsored ads is not to disseminate information.

In Experiment 2, the intervention group was less likely than control to agree that a main purpose of the ad was to encourage talking to your doctor only when it was industry-sponsored. Given that the goal of consumer-directed promotion is to motivate individuals to consult their doctor, the latest intervention explained that the call to consult your doctor included in industry-sponsored ads is an integral part of the promotional strategy. Consequently, in Experiment 3, the expected result of no significant differences across group and/or sponsor-type was observed. Finally, whilst the desired interaction effect of the intervention group only being more likely than the control group to agree that a main purpose is to encourage asking for a prescription

when the ad was industry-sponsored was observed in Experiment 2, no interaction was found in Experiment 3. Instead, there were significant main effects for group and sponsor-type. Firstly, the intervention group was more likely than the control group to agree that a main purpose of the ads were to encourage asking for a prescription (*OR* = 3.58). Secondly, participants, as a whole, were more likely to agree when the ad was industry-sponsored (*OR* = 4.26).

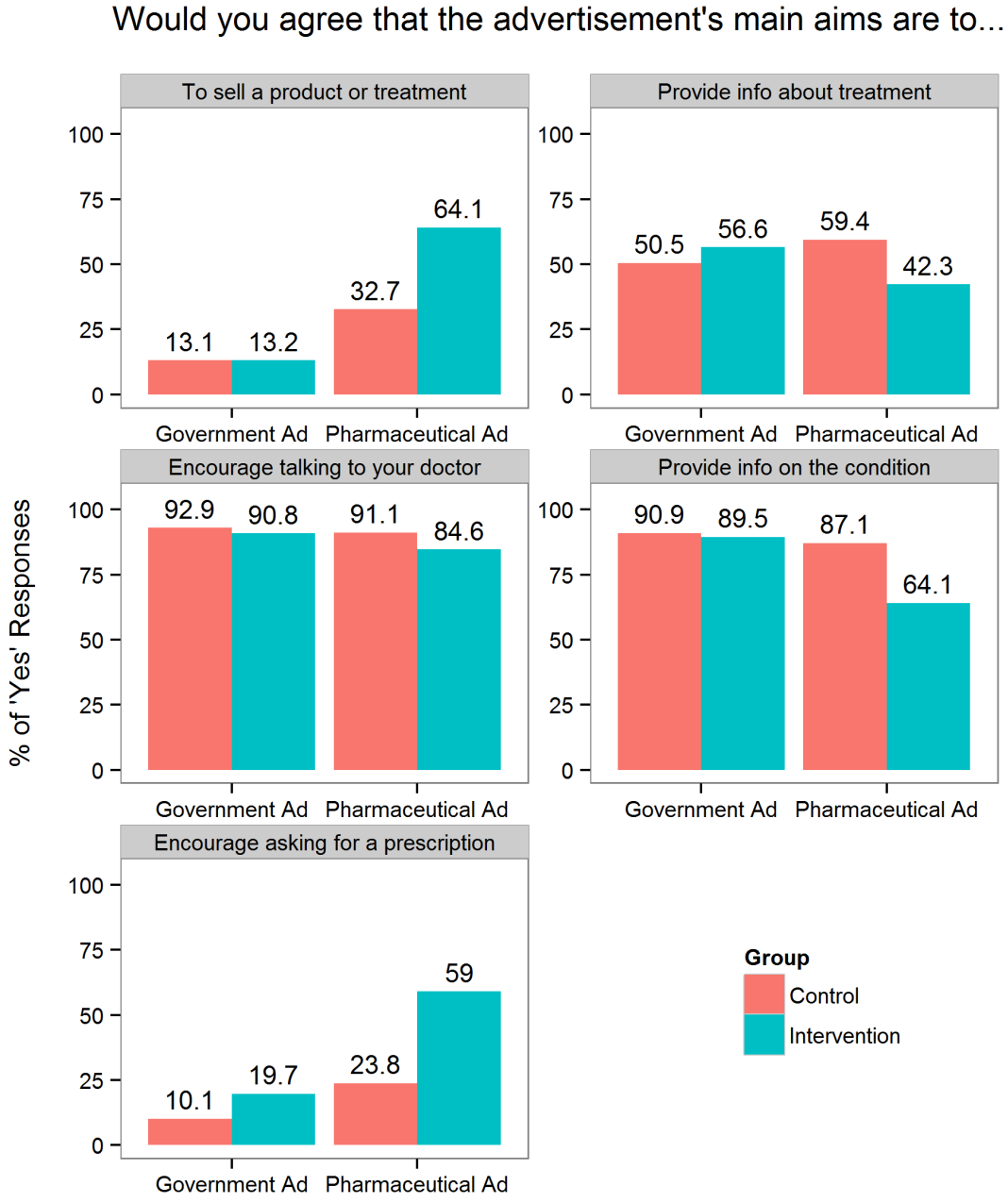


Figure 5.5. Percentage of yes responses to the perceived purpose of ad items across group and sponsor-type.

Table 5.7
Logistic GEE Models on the Effect of Group and Sponsor-type on Responses to the Perceived Purpose of the Ad Measure

Item	Effect	*OR*	CI_{95} *OR*	Wald χ^2	*p*-value	Interaction *p*-value
To sell product or treatment	For Control					
	(Industry vs. Government)	3.21	[1.64, 6.28]	11.63	< .001	
	For Intervention					
	(Industry vs. Government)	11.79	[5.35, 25.95]	37.54	< .001	.01
	For Government					
	(Intervention vs. Control)	1.00	[0.41, 2.43]	< .001	1.00	
	For Industry					
	(Intervention vs. Control)	3.68	[1.98, 6.85]	16.85	< .001	
Provide info about treatment	For Control					
	(Industry vs. Government)	1.43	[0.88, 2.34]	2.10	.15	
	For Intervention					
	(Government vs. Industry)	1.78	[1.02, 3.10]	4.08	.04	.01
	For Government					
	(Intervention vs. Control)	1.28	[0.70, 2.33]	0.64	.43	
	For Industry					
	(Control vs. Intervention)	2.00	[1.10, 3.63]	5.10	.02	

Note. *OR* = odds ratio, CI_{95} = 95% confidence interval.

(continued)

Table 5.7 (continued)

Results: Perceived Purpose

Item	Effect	*OR*	CI_{95}*OR*	Wald χ^2	*p*-value	Interaction *p*-value
Encourage talking to your doctor	Control vs. Intervention	1.62	[0.78, 3.37]	1.67	.20	NA
	Government vs. Industry	1.53	[0.78, 3.02]	1.51	.22	
Provide info on the condition	Control vs. Intervention	2.54	[1.38, 4.70]	8.87	.003	NA
	Government vs. Industry	2.84	[1.53, 5.25]	11.03	< .001	
Encourage asking for a prescription	Intervention vs. Control	3.58	[2.05, 6.26]	19.96	< .001	NA
	Industry vs. Government	4.26	[2.54, 7.15]	30.27	< .001	

Note. *OR* = odds ratio, CI_{95} = 95% confidence interval.

Behavioural intentions. Figure 5.6 shows the percentage of *yes* responses to each behavioural intention across group and sponsor-type. The results of the six logistic GEE models are reported in Table 5.8. Two items: *talk to your doctor about the condition* and *look for information as directed by the ad* had significant group × sponsor-type interaction effects. In Experiment 2, the aforementioned items and *ask your doctor about treatments or tests* had significant interactions. However, none demonstrated healthy scepticism amongst the intervention group. All three items displayed an increase in trust towards government-sponsored ads among the intervention group rather than an increased scepticism towards industry-sponsored ads. I speculated that this was because participants were unaware that doctors too are subject and possibly vulnerable to persuasive pharmaceutical advertising. Consequently, they may not have regarded consulting with their doctor after viewing an industry-sponsored ad as potentially problematic because they trust that their doctor will provide them with reliable information. However, my latest intervention explained to participants that doctors are exposed and vulnerable to pharmaceutical advertising too. As a result, in Experiment 3, this effect was not observed. The intervention group displayed increased scepticism towards industry-sponsored ads by being less likely than the control group to report the intention to talk to their doctor about the condition and look for information as directed by the ad, only when the ad was industry-sponsored. Interestingly, the intervention group was less likely to talk to their doctor about the condition after viewing an industry-sponsored ad compared to a government-sponsored ad, but did not differentiate across sponsor-type in their intention to talk to their doctor about treatments or tests. Perhaps, participants thought that it is premature to consult their doctor about treatment or tests simply after viewing an ad, even when the ad was government-sponsored. But, were open to discussing the condition with their doctor.

Consistent with findings from Experiment 2, no significant effects were found for the *look for information from other sources* item. Although the intervention group was not more likely than the control group to seek further information from other sources, at least half of the individuals in both groups indicated an intention to seek further information from other sources. The unexpected result of the intervention group being more likely than the control group to ask their doctor for a prescription or referral observed in Experiment 2 was not replicated. Whilst, there was a trend towards the intervention group being less likely than the control group, it was not statistically significant. Non-significance was not surprising considering only a minority of participants were in agreement. This floor effect made it difficult to detect group differences. Lastly, there was a significant group main effect for *do nothing*. In Experiment 2, the control group was more likely than the intervention group to do nothing after seeing an ad. On the contrary, in Experiment 3, it was the intervention group who were more likely to do nothing. Thankfully, only a minority of participants were inclined to do nothing.

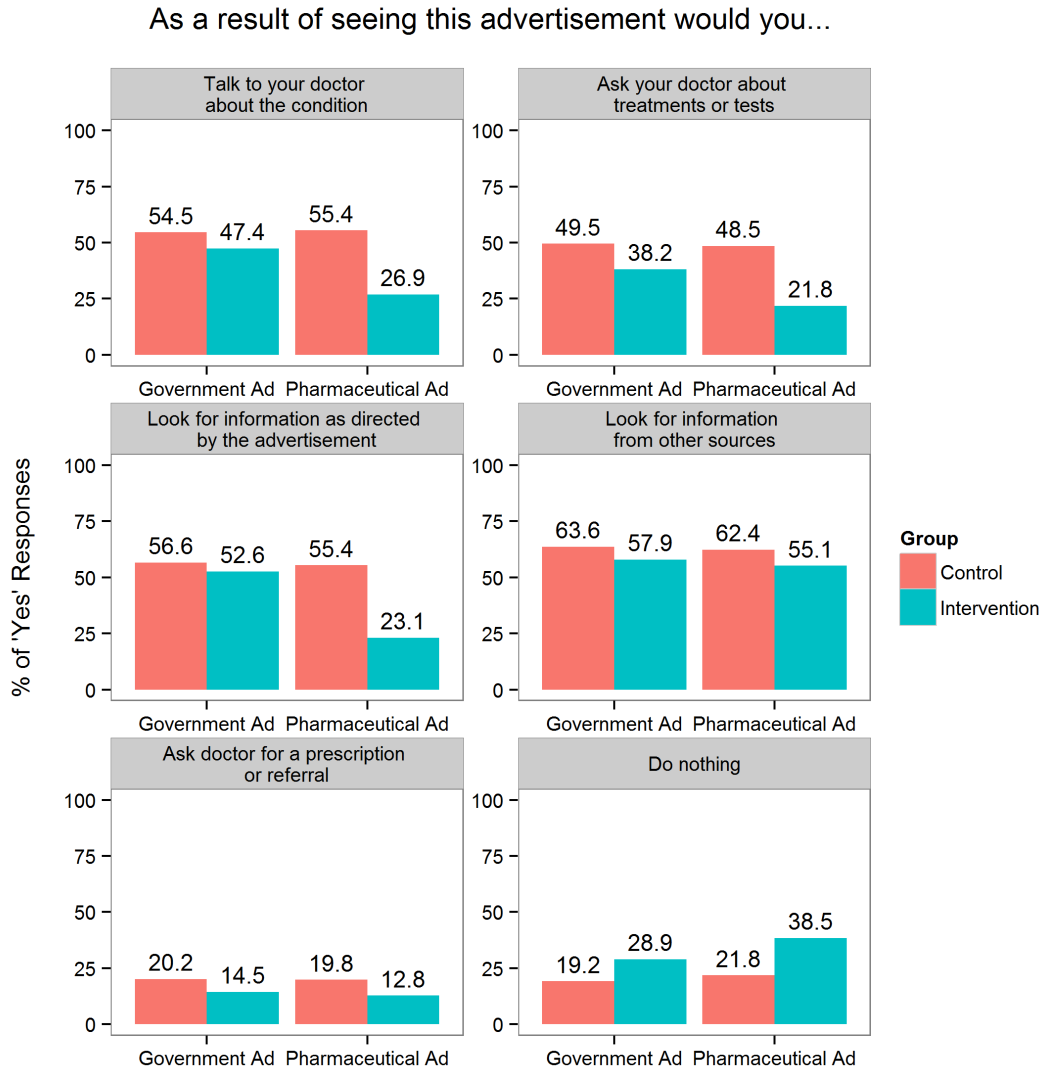


Figure 5.6. Percentage of *yes* responses from participants on their behavioural intentions after viewing each ad across groups.

Table 5.8
Logistic GEE Models on the Effect of Group and Sponsor-type on Responses to each Behavioural Intention

Behavioural Intention	Effect	*OR*	$CI_{95}OR$	Wald χ^2	*p*-value	Interaction *p*-value
Talk to your doctor about the condition	For Control					
	(Industry vs. Government)	1.04	[0.64, 1.68]	0.02	.88	
	For Intervention					
	(Government vs. Industry)	2.44	[1.36, 4.40]	8.86	.003	.02
	For Government					
	(Control vs. Intervention)	1.33	[0.73, 2.43]	0.88	.35	
	For Industry					
	(Control vs. Intervention)	3.38	[1.79, 6.38]	14.08	< .001	
Ask your doctor about treatments or tests	Control vs. Intervention	2.27	[1.39, 3.70]	10.67	.001	NA
	Government vs. Industry	1.39	[0.95, 2.03]	2.95	.09	
Look for info as directed by the ad	For Control					
	(Government vs. Industry)	1.05	[0.68, 1.61]	0.04	.84	.001
	For Intervention					
	(Government vs. Industry)	3.70	[2.00, 6.84]	17.47	< .001	
	For Government					
	(Control vs. Intervention)	1.17	[0.64, 2.14]	0.27	.60	

Note. *OR* = odds ratio, CI_{95} = 95% confidence interval.

(continued)

Table 5.8 (continued)

Behavioural Intention	Effect	*OR*	CI_{95}*OR*	Wald χ^2	*p*-value	Interaction *p*-value
	For Industry					
	(Control vs. Intervention)	4.15	[2.15, 8.00]	18.02	< .001	
Look for info from other sources	Control vs. Intervention	1.31	[0.80, 2.16]	1.13	.29	NA
	Government vs. Industry	1.08	[0.77, 1.53]	0.21	.65	
Ask your doctor for a prescription or referral	Control vs. Intervention	1.58	[0.82, 3.05]	1.89	.17	NA
	Government vs. Industry	1.07	[0.67, 1.70]	0.08	.78	
Do nothing	Intervention vs. Control	1.98	[1.11, 3.54]	5.36	.02	NA
	Industry vs. Government	1.35	[0.95, 1.92]	2.71	.10	

Note. *OR* = odds ratio, CI_{95} = 95% confidence interval.

Perceived prevalence, severity, and susceptibility. Responses to the perceived prevalence measure violated the assumption of normality, $K^2 = 12.2$, $p = .002$. Consequently, for this measure, a non-parametric alternative: the ANOVA-Type Statistic (ATS) was applied.

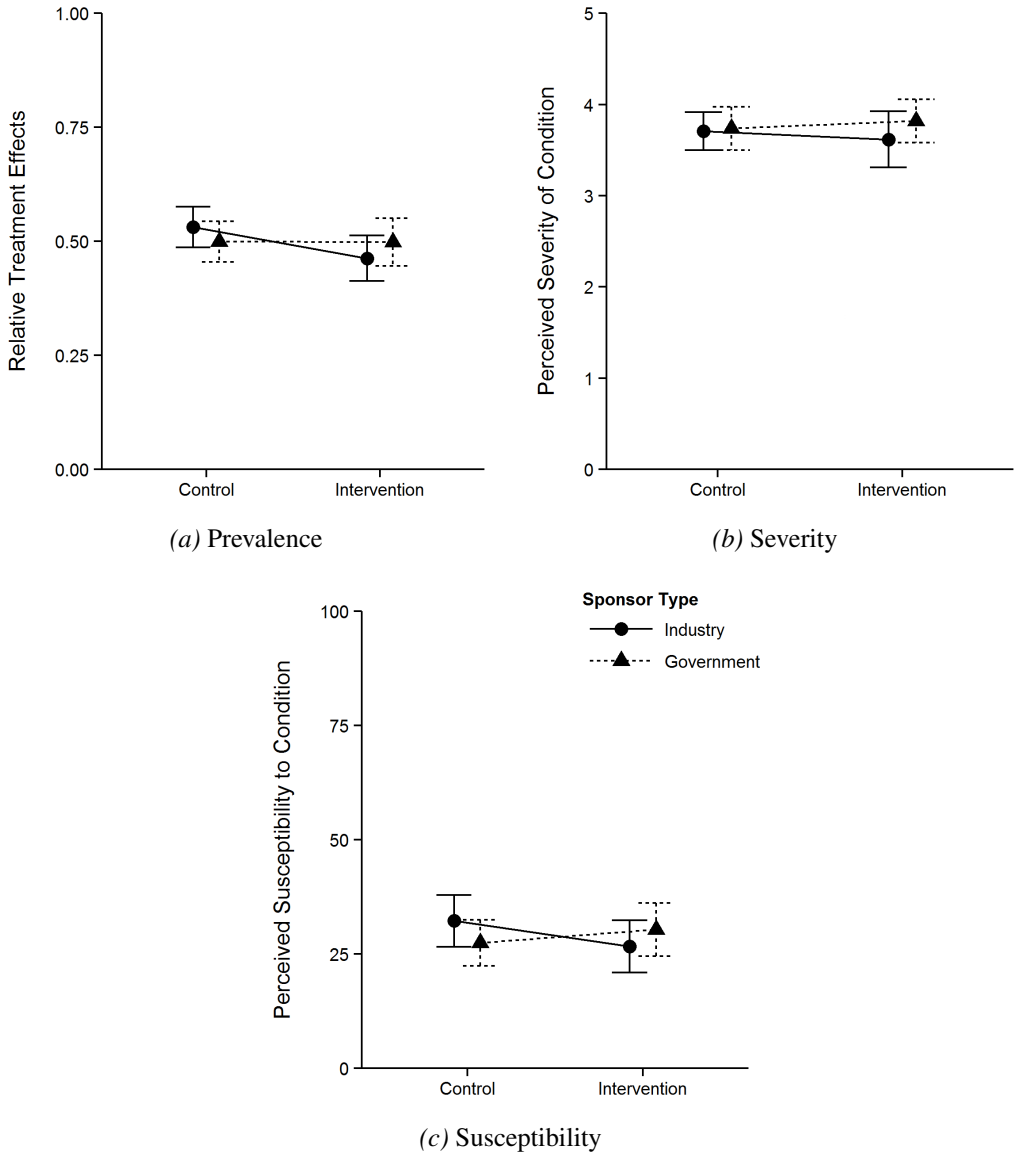
Figure 5.7 presents the group × sponsor-type interaction plots for the three measures. The interaction was non-significant for perceived prevalence, ATS(1) = 2.87, $p = .09$. The main effects for group and sponsor-type were non-significant too, ATS(1) = 0.77, $p = .38$ and ATS(1) = 0.01, $p = .93$, respectively. Consistent with Experiment 1 and 2, undergoing the latest intervention did not result in participants perceiving a condition as less prevalent when the ad was industry-sponsored. The unexpected main effect for sponsor-type observed in Experiment 2 was not reproduced. Thus, counter-balancing was successful in Experiment 3.

A 2 × 2 mixed between-within subjects ANOVA revealed that the group × sponsor-type interaction for perceived severity was non-significant too (see Figure 5.7b), $F(1, 172) = 0.42$, $p = .52$, $\eta^2_G = .001$, CI_{95} [.00, .04]. The main effect for group and sponsor-type were non-significant too, $F(1, 172) < .001$, $p = .98$, $\eta^2_G < .001$ and $F(1, 172) = 0.77$, $p = .38$, $\eta^2_G = .003$, respectively. Hence, like in Experiment 1 and 2, undergoing the latest intervention did not result in participants perceiving the condition as less severe compared to the control group when the ad was industry-sponsored.

Finally, as observed in Experiment 1 and 2, intervention group participants did not perceive themselves as less susceptible compared to control group participants when the ad was industry-sponsored (see Figure 5.7c). The group × sponsor-type interaction was non-significant, $F(1, 172) = 2.63$, $p = .11$, $\eta^2_G = .01$, CI_{95} [.00, .07]. The main effects for group and sponsor-type were non-significant too, $F(1, 172) = 0.20$, $p = .66$, $\eta^2_G < .001$ and $F(1, 172) = 0.05$, $p = .83$, $\eta^2_G < .001$, respectively.

5.3 Discussion of Experiments 1, 2, & 3

My aim was to use the psychological tool of dispelling an individual's unique invulnerability to develop a brief but effective educational intervention that improves the critical analysis of disease awareness ads. Specifically, the goal was to cultivate healthy sceptics rather than cynics. Three experiments were conducted to evaluate progressive iterations of this intervention. Because the purpose of Experiment 3 was to both replicate the results observed in Experiment 1 and 2 as well as to overcome their limitations, Experiment 3 was the most robust and rigorous test of the intervention's efficacy. Hence, my discussion will mainly focus on the results observed in Experiment 3.



(a) Prevalence

(b) Severity

(c) Susceptibility

Figure 5.7. Interaction plots for perceived prevalence, severity, and susceptibility across group and sponsor-type. Error bars represent 95% confidence intervals. Points are offset horizontally for clarity.

5.3.1 Identification Accuracy & Scepticism towards Pharmaceutical Advertising

Experiment 1 provided the first empirical evidence that without education, individuals do not pay sufficient attention to sponsorship information when viewing disease awareness ads. All three experiments provided evidence that the intervention improved sponsor identification accuracy and increased scepticism towards pharmaceutical advertising. Thus, the intervention succeeded in motivating individuals to pay more attention to sponsorship information and increased their scepticism towards pharmaceutical advertising.

5.3.2 Cultivating Healthy Scepticism

Cultivating healthy scepticism proved a much tougher task. In Experiment 2 and 3, the intervention group demonstrated healthy scepticism by being less likely than the control group to agree that an ad was valuable only, when it was industry-sponsored (this trend was observed in Experiment 1 too but the interaction was not statistically significant). Likewise, there was a consistent trend towards the intervention group being less likely to agree that the purpose of an ad is to provide information on the condition than the control group, only when the ad was industry-sponsored in Experiment 2 and 3, but the interaction was not statistically significant in both experiments. Whilst I observed consistent results for these measures, inconsistencies within and between experiments were observed too.

Within experiments, response patterns to the outcome measures were not always in line with healthy sceptic behaviour. For example, in Experiment 2, the intervention group responded as healthy sceptics would when asked if they agreed that a main purpose of a disease awareness ad was to encourage talking to their doctor or asking for a prescription. But they did not respond as healthy sceptics when asked if they agreed that a main purpose was to sell a product or treatment or provide information about treatment. Similarly, in Experiment 3, the intervention group responded as healthy sceptics would when asked if they intended to talk to their doctor about the condition or look for information as directed by the ad. But, they did not respond as healthy sceptics when asked if they intended to ask their doctor about treatment or ask for a prescription or referral.

There were unexpected inconsistencies across experiments too. For example, in Experiment 2, the intervention group responded as healthy sceptics when asked if they agreed that a main purpose of a disease awareness ad was to encourage asking for a prescription, but not when asked if they agreed that a main purpose was to sell a product or treatment. However, I observed the reverse in Experiment 3. The intervention group responded as healthy sceptics when asked if they agreed that a main purpose was to sell a product or treatment, but not when asked if they agreed that a main purpose was to encourage asking for a prescription. Likewise, in Experiment 2, the control group was more likely than the intervention group to report an intention to do nothing after viewing a disease awareness ad, regardless of sponsor-type. However, in Experiment 3, it was the intervention group that were more likely to do nothing, regardless of sponsor-type.

It is unclear why these inconsistencies within and across experiments exist. The differences seem random or arbitrary. If the nature of the measures was driving the differences, it could explain the inconsistencies within an experiment, but not across experiments. The only changes between Experiment 2 and 3 are the sample and intervention. On aggregate, the two samples are similar, so it is unlikely to be the cause of the inconsistencies. However, it is difficult to comprehend why or understand how the changes to the intervention could influence participants

to respond differently to an identical measure without any clear association between the changes and the measure. This is different from the intentional reversal in Experiment 3 of interaction effects observed in Experiment 2. In Experiment 2, the intervention group did not become more sceptical of industry-sponsored ads, but instead, became more trusting of government-sponsored ads. The intervention group was more likely than the control group to agree that the purpose of a disease awareness ad was to provide information about treatment and report the intention to consult their doctor about the medical condition or its treatments or tests, or look for information as directed by the ad, only when it was government-sponsored. As discussed earlier, I postulated that this observation may have stemmed from participants being unaware that the call to consult your doctor included in industry-sponsored ads is a critical part of the promotional strategy. Furthermore, they may have been unaware that doctors too are subject and possibly vulnerable to persuasive pharmaceutical advertising. Consequently, the intervention in Experiment 3 included more information on the industry's promotional practices and why it is important to differentiate industry and non-industry sponsored ads. These additions to the intervention successfully reversed the effects observed in Experiment 2. As such, these differences across Experiment 2 and 3 were intended and expected. In contrast, additional information on industry promotional practices cannot help explain why participants in Experiment 2 responded as healthy sceptics and only agreed that a main purpose of a disease awareness ad was to encourage asking for a prescription when the ad was industry-sponsored, but participants in Experiment 3 did not. It remains a mystery why these inconsistencies were observed.

While I did not succeed in demonstrating healthy sceptic behaviour across every measure, my latest intervention has produced very encouraging results. Post-intervention:

- participants could better identify whether a disease awareness ad was industry or non-industry sponsored
- participants' scepticism towards industry-sponsored advertising was increased
- participants only perceived industry-sponsored ads as less valuable
- participants were more likely to agree that a main purpose of an industry-sponsored ad is to sell a product or treatment and less likely to agree that its purpose is to provide information about treatment
- participants were less likely to report the intention to talk to their doctor about the condition or look for information as directed by the ad, only when the ad is industry-sponsored

5.3.3 Limitations

All three experiments were conducted on-line. Consequently, there was a greater risk of participant distraction and/or non-compliance (e.g. clicking through the experiment without reading,

or giving random responses). Therefore, a set of exclusion criteria was enforced to weed out such participants. I acknowledge that this practice reduces external validity because any evaluation of the effectiveness of the intervention from this sub-sample will not accurately reflect its efficacy under real-world conditions. However, because the intervention is in its early stages of development, I prioritised experimental control over real-world efficacy. In order to fine-tune the intervention I had to understand how it performed under ideal experimental conditions.

Secondly, responses to the outcome measures were obtained immediately after the intervention. I cannot discount the possibility that demand effects contributed to the observed differences between the intervention and control groups. However, if demand effects were solely at play, then I would not have observed the inconsistencies within experiments discussed earlier. Another shortfall of my experiments is that it is unknown if the changes brought on by the intervention are resilient over time. For instance, did participants' scepticism towards pharmaceutical advertising increase permanently or was it a temporary boost? After three iterations, the intervention has finally progressed to a stage where it is ready to be evaluated by longitudinal experiments. Thus, my next goal is to test the efficacy of the intervention over time.

In addition, my measures only tapped into participants' attitudes and behavioural intentions. It is unknown whether the changes in attitude and assertions of behaviour actually translate into behavioural change. Although challenging to implement, it would be great if post-intervention behaviour is measured in the future. For example, a QR code[1] or URL link that links to a mock website could be included in a disease awareness ad. Post-intervention behaviour would be operationalised as the number of participants that proceed to visit the website.

Lastly, all three experiments were conducted with a relatively homogeneous sample, which limits the generalisability of my findings. My samples were predominately female, relatively young, and well-educated. However, my findings should not be discounted just because of this drawback. In fact, by sampling a young and healthy group, who are not as concerned about their health as an older population, probably attenuated the impact of the intervention.

5.3.3.1 Conclusion

My aim was to use the psychological tool of dispelling an individual's unique invulnerability to develop a brief but effective educational intervention that improves the critical analysis of disease awareness ads. Specifically, the goal was to cultivate healthy sceptics rather than cynics. Over three iterations, the intervention has demonstrated its effectiveness at improving sponsor

[1] A QR (quick response) code is the trademark for a type of matrix bar code. QR codes are commonly used in consumer advertising. Typically, a smart-phone or tablet is used as the code scanner to convert the bar code into some useful form such as a URL link. This removes the hassle of having to type out an address to visit a website.

identification and increasing scepticism towards pharmaceutical advertising, and was moderately successful at cultivating healthy scepticism among participants. In my concluding chapter, I will recap the key findings of my research and discuss its implications.

Chapter 6

General Discussion

The common theme throughout this thesis is the use of psychological knowledge to address current shortfalls in the literature on pharmaceutical promotion. As reviewed in Chapter 1, the industry favours a push and pull marketing strategy. They use a plethora of promotional activities to push their products to doctors to ensure that their product is prescribed over its competitors. At the same time, they use direct-to-consumer advertising or disease awareness campaigns to pull consumers into the doctor's consultation room. It is uncertain whether this strategy is beneficial or detrimental to the provision of healthcare. As outlined in section 1.3, the pharmaceutical industry has had a poor track record of disseminating accurate and impartial information to both healthcare professionals and consumers, and has at times employed the push and pull strategy irresponsibly.

Given the industry's poor track record, healthcare professionals and consumers are not as sceptical or wary of promotional material as would be appropriate (see section 1.4 for a detailed discussion). The lack of empirical research on the causal impact of pharmaceutical promotion has impeded efforts to convince doctors to avoid promotional material. To date, Grande and colleagues' (2009) paper remains the only published study that has experimentally shown the causal effects of pharmaceutical promotion on medical professionals. Similarly, to my knowledge, no published study has attempted to educate consumers about pharmaceutical promotion practices. Considering the unbridled access to information that technology has made available today and the dangers of the inappropriate use of pharmaceuticals, it is imperative that health professionals and consumers be wary of potentially misleading or inaccurate information, and have the know-how to evaluate whether its source is reliable or unreliable.

In response, this thesis adopted a two-pronged approach by 1) investigating the impact of pharmaceutical print advertising on medical students and 2) developing an educational intervention to cultivate the critical assessment of disease awareness advertising among consumers. The key findings of these parallel lines of research are summarised in the following section.

6.1 Key Findings

6.1.1 The IAT Study

Grande and colleagues (2009) were the first to use a randomised controlled experiment to investigate the impact of pharmaceutical promotion. Using an Implicit Association Test (IAT), they demonstrated that incidental exposure (i.e. without conscious awareness) to small branded drug advertising paraphernalia influenced 4^{th} year medical students' implicit attitude towards the advertised drug. Participants who were enrolled in a University with lax policies on pharmaceutical promotion had a stronger positive implicit attitude after exposure, while participants from a University with strict policies had a stronger negative implicit attitude after exposure. Their findings were extremely important. Medical professionals strive to make the best decisions for their patients and pride themselves as rational decision-makers. Consequently, they have been largely resistant to the notion that they could be vulnerable to the persuasive attempts of the pharmaceutical industry. Grande and colleagues' (2009) findings demonstrated that at the very least, implicit attitudes are impacted by mere exposure to pharmaceutical advertising. More importantly, they showed that the effect of exposure is malleable. A strict policy and a wariness of promotional material can reverse the intended brand-building effort and result in negative implicit attitude formation. Building on their findings, I sought to replicate their results using a different advertising medium: print ads.

Unfortunately, as detailed in Chapter 2, my experiment was fraught with recruitment issues. The lack of statistical power made it unlikely that an effect would be detected, should it really exist. In other words, there was likely to be a high false negative rate associated with those significance tests. As such, while I was unable to detect any group differences in implicit or explicit attitudes, I cannot infer with confidence that no group differences exists in the population. However, my experiment did reveal a robust block order effect, whereby participants who were presented with a block sequence that began with an incompatible pairing registered slower response times than participants who began with a compatible pairing. The block order effect has been widely documented (Greenwald et al., 1998; Messner & Vosgerau, 2010; Nosek et al., 2007) and a range of solutions have been proposed to counter it (Back et al., 2005; Brunel et al., 2004; Messner & Vosgerau, 2010; Nosek et al., 2005; Rothermund et al., 2009; Teige-Mocigemba et al., 2008). I adopted the approach advocated by Messner and Vosgerau (2010) and counter-balanced block order 4 times within subjects. Whilst Messner and Vosgerau (2010) managed to eliminate block order effects after 4 iterations of a Coca-cola–Pepsi IAT, I could not achieve the same with my drug IAT. The block order effects may have been eliminated had more iterations been implemented. However, adding more blocks would have increased participant fatigue and experiment duration quite significantly, and hence, was impractical. Investigations into the reliability and

validity of the IAT is beyond the scope of this thesis, thus, no further experiments were conducted. However, the presence of a block-order effect in my experiment is further evidence that this methodological flaw needs further investigation.

6.1.2 The Healthy Scepticism Study

This line of research builds on the pioneering work of Hall and colleagues on disease awareness advertising targeting Australian consumers (see section 3.1.2 for a review). Firstly, D. V. Hall, Jones, and Iverson (2011) found no differences between consumers' perceptions of disease for industry-sponsored, co-sponsored, or non-profit-sponsored disease awareness ads. However, the absence of a manipulation check meant that it was impossible to determine why there were no differences. Did their participants see the sponsorship information and decide that it was irrelevant? Or did they simply not notice the sponsorship information? By measuring sponsor identification accuracy in my experiments, I was able to empirically test whether people pay sufficient attention to sponsorship information. My results suggest that they do not. Identification accuracy among the control group was especially low when the ad was industry-sponsored.

Secondly, as noted in Chapter 1, there is a need to educate consumers that information from pharmaceutical companies may be biased or misleading and equip them with the necessary know-how to critically evaluate health information. Specifically, within the context of Australia, D. V. Hall and Jones (2008) demonstrated that when compared to New Zealand direct-to-consumer product ads, Australian disease awareness ads were rated as more valuable and perceived their intent as educational, but yet these ads were rated as the least informative. This suggests that because there is no overt indication to sell or promote a product, consumers are not alerted to the pharmaceutical company's persuasive intent. They will perceive the ads as educational and valuable, even when these ads contain insufficient information.

To address the naivete surrounding industry-sponsored disease awareness ads, an educational intervention was fine-tuned and evaluated over three experiments. The intervention consistently demonstrated an improvement in sponsor-identification accuracy, regardless of whether the ad was industry or government sponsored. The intervention also consistently showed that it results in an increase in scepticism towards pharmaceutical advertising. Lastly, for the most part, the intervention cultivated healthy sceptics (see section 5.3.2 for a detailed discussion). It was important that consumers did not become too cynical about disease awareness ads and thus dismiss important health messages from reliable sources. Post-intervention, participants were more likely to agree that the main purpose of an ad was to sell a product or treatment and less likely to agree that its purpose was to provide information about treatment, only when the ad

was industry-sponsored. They were also less likely to report an intention to talk to their doctor about the condition or look for information as directed by the ad, only when the ad was industry-sponsored.

6.2 Applicability of Findings & Implications

Taking a step back, these findings shed light on core questions about pharmaceutical promotion: understanding how it impacts on healthcare professionals and consumers, and how best to foster and promote a healthy scepticism of pharmaceutical promotion.

6.2.1 Does Advertising have an Impact?

We are still a long way away from establishing the causal impact of pharmaceutical promotion. Grande and colleagues' (2009) study remains the only published paper that demonstrates the direct causal impact of promotion on medical professionals. It remains unclear whether I could have replicated their findings with a larger sample. However, the experiment did raise questions about the reliability and validity of the IAT. Considering the robustness of the block-order effect, it might be more prudent to explore other means of assessing the impact of pharmaceutical promotion. The idea of tapping into implicit attitudes is appealing as it independent of the social desirability bias. However, attitudes – explicit or implicit, are not the sole determinants of behaviour. To establish the causal impact of promotion and the magnitude of its effect beyond any doubt, randomized controlled studies using behavioural measures are required.

6.2.2 How Do Consumers Evaluate Disease Awareness Advertisements?

My research on consumers has revealed that Australians are largely unconcerned about the sponsorship information disclosed on disease awareness advertisements. When shown an ad, people do not pay sufficient attention to sponsorship information, disclosure statements, or the fine print. Instead, they assume that the government or state is responsible and that the information presented is reliable and trustworthy. Thus, there is clearly a need for an educational intervention to address this lack of scepticism. At the very least, my findings support the case for ensuring that conflict of interest disclosures and sponsorship information are displayed prominently on any promotional material. Unless consumers are educated effectively on the importance of identifying sponsorship information, regulators need to facilitate the process by ensuring sponsorship information is clearly noticeable.

6.2.3 Can We Cultivate Healthy Scepticism?

My research has provided insights into how best we can foster healthy scepticism. My moderate success in cultivating healthy scepticism demonstrates the immense potential of my brief psychologically-driven intervention. In less than 30 minutes, and in a medium that is both widely assessable and low-cost to deliver, this intervention was able to help consumers become better at critically evaluating health information and more wary of pharmaceutical company-sponsored information. In addition, whilst the intervention was delivered on-line in my experiments, it can be paper-based if access to the internet is an issue. I expect this intervention to reduce the risk of adverse events brought on by misinformation and reduce the impact of pharmaceutical advertising on patients' beliefs and behaviours. The reduction in misinformation and unnecessary consultations is likely to strengthen the patient-doctor relationship and alleviate the strain on the healthcare system.

In addition, I have shown that the approach of dispelling the illusion of invulnerability is an effective way to motivate people to become healthy sceptics. By making the issue personally relevant, we can avoid individuals feeling blasé. The majority of participants agreed that they paid more attention because of the realisation that they were vulnerable. However, despite my best efforts to fine-tune the intervention, the act of dispelling the illusion of unique invulnerability came across as paternalistic or condescending to a small minority of people. As such, researchers need to pay particular attention to the tone of their message when trying to dispel the illusion of unique invulnerability to reduce the risk of eliciting reactance.

6.2.4 Applicability to other Domains

Finally, although the intervention was designed to improve consumer knowledge of pharmaceutical company-sponsored disease awareness campaigns, it can certainly be applied to other related domains such as the promotion of dietary supplements or other over-the-counter health products, the marketing of "superfoods", or the use of misleading food labelling.

6.3 Conclusion

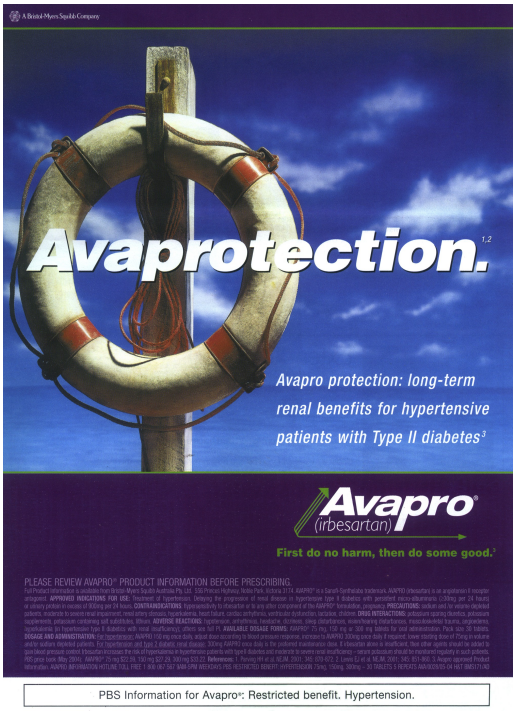
Psychology has a lot to contribute to research on pharmaceutical promotion. Theories on persuasion, social influence, and attitude formation can help us understand how promotional activities influence an individual. Our experience in developing and implementing cognitive and behavioural interventions in social or health psychology is a huge asset. Successful approaches can be adapted and applied to the context of pharmaceutical promotion. My research has demonstrated the benefits of integrating an effective counter-persuasion technique into an educational

intervention. After a brief single session, participants' sponsor identification accuracy significantly improved and became more sceptical of pharmaceutical advertising. The intervention aimed to cultivate healthy scepticism and was effective at that aim for most but not all measures related to healthy scepticism. After the intervention, participants' perception of the value of a disease awareness ad was lower when it was sponsored by a pharmaceutical company compared to when it was government-sponsored. Likewise, they were more likely to agree that a main purpose of the ad was to sell a product and less likely to agree that its purpose was to provide information about treatment, only when the ad was sponsored by a pharmaceutical company. Finally, they were less likely to report the intention to consult a doctor or follow-up on information provided by the ad, only when the ad was industry-sponsored. Importantly, these changes on measures related to healthy scepticism occurred only when the ad was pharmaceutical company-sponsored rather than government-sponsored. Thus the intervention was successful at landing on the intended target rather than having an indiscriminate effect on all disease awareness ads.

Appendix A

Priming Stimuli for IAT Study

A.1 Avapro Mock Journal Set



PBS Information for Avapro®: Restricted benefit. Hypertension.

ORIGNIAL ARTICLE

THE READABILITY OF ORIGINAL ARTICLES IN SURGICAL JOURNALS

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Background: Readability indices have been developed based on sentence length and the use of long words. One such measure is the Reading Ease Scale developed by Rudolf Flesch. Texts that are easy to read have high scores: texts with scores below 30 are similar to legal contracts. This study uses Flesch scores to evaluate the readability of surgical journals.
Methods: Flesch scores were calculated for articles published in the *Archives of Surgery*, the *British Journal of Surgery*, and the *ANZ Journal of Surgery*. The first 30 original articles published in each journal in 2005 were selected for study. Excluded from study were editorials, reviews and case reports.
Results: The overall median score was 15.1 (0.0–29.1). The median scores for each of the journals were 12.4 (*Archives of Surgery*), 14.4 (*British Journal of Surgery*), and 18.6 (*ANZ Journal of Surgery*). There was only a minor link between Flesch scores and the use of surgical terms.
Conclusion: Original articles published in surgical journals contain too many long sentences and complex words. Readability indices are useful tools because they promote the use of simple English. It is realistic for authors to aim for Flesch scores above 30 when creating manuscripts.

Key words: **language test, literature, peer review, publishing, surgery.**

INTRODUCTION

In the 1930s, psychologists began to study how written information is processed by the brain. They concluded that long sentences are bad – it is difficult to retain the meaning of sentences that contain more than 20 words – and readers find it easier to grasp simple words.[1] Only 36 of the 1000 most often used words have more than two syllables.

Readability indices have been developed based on sentence length and the number of 'hard words'. Editors are very interested in such indices because good readability fosters popularity, which increases publication volume and profit. The most commonly used measures are the Fog Index devised by Gunning[2] and Flesch's Reading Ease Scale.[3]

Both of the readability indices are easy to calculate (Table 1). However, the Fog Index contains discretionary judgements about 'hard words' that might lead to variations between markers. On the other hand, the Flesch score involves clear-cut calculations and it has been adopted for use in word processing programs. This means that it is possible to obtain Flesch scores that are both precise and objective.

This study uses Flesch scores to evaluate the readability of original articles published in surgical journals. Flesch scores range between 0 and 100. The higher the score, the easier it is to read the text. A secondary objective was to scrutinize the relationship between the use of long technical words and the readability score.

METHODS

The journals studied were the *Archives of Surgery*, the *British Journal of Surgery*, and the *ANZ Journal of Surgery*. Digital copies of the first 30 original articles published in each journal from the start of 2005 were obtained. Each article contained original data and a structured abstract. Excluded from study were editorials, reviews and case reports.

The 'Introduction' and 'Discussion' sections of each article were then isolated for review. They were submitted to two forms of editing. First, minor errors resulting from the download-

Table 1. How to calculate two indices of readability

Select a block of text that contains more than 200 words.

Calculate the average number of words per sentence (regard colons and semicolons as full stops). Count the number of words with three or more syllables (hard words) – don't count words that are capitalized, combinations of short words, or verbs where the third syllable is a terminal 'ed' or 'es'.

The Fog Index:

Fog Index = 0.4(ASL + % of hard words)

The Flesch Score:

Flesch Score = 206.835 – (1.015xASL) – (84.6xASW),

where ASL = the average sentence length, ASW = the average number of syllables per word.

ing of HTML files were removed. Second, the reference numbers in superscript were deleted—a pilot study of 10 articles selected at random found that removal of the references increased the median Flesch score by 2.5 (0.2–8.5). The Flesch scores were calculated using the grammar-checking facility in Microsoft Word 2002 (Microsoft Corporation, Redmond, WA, USA).

Twenty articles, the 10 with the highest scores and the 10 with the lowest scores, underwent a further evaluation. The 'find and replace' feature in the word processing program was used to reduce the length of three selected words from each article. Each of these words contained three syllables or more. They were then reduced to a stem word (e.g. 'cholecystectomy' to 'cyst', 'colorectal' to 'rectal'). The Flesch scores were determined before and after these changes.

Data were described using the median value and the absolute range. Comparative statistics were not used in this descriptive study.

RESULTS

Figure 1 details the Flesch scores for the three surgical journals. The overall median score was 15.1 (0.0–29.1); the median scores for each of the journals were 12.4 (*Archives of Surgery*), 14.4 (*British Journal of Surgery*), and 18.6 (*ANZ Journal of Surgery*). Six articles had a score of zero. Although the formula indicates that it is possible to have a negative Flesch score, in practice, negative scores are rated as zero.

Table 2. Readability scores for selected passages of text

	Flesch Score
Ernest the Fierce Mouse , 'ideal for 6–8 year olds'.[5]	78.0
Haworth, a travel essay by Virginia Woolf.[6]	62.8
Notes from a Small Island, travel writing by Bill Bryson.[7]	62.1
Review of the *BMW M6* at CarPoint on MSN by Jonathon Hawley (http:// ninemsn.com.au, accessed 30 May 2005)	47.3
What is Science? , an essay by George Orwell.[8]	46.8
Can Education be Defined?, a lecture delivered by T. S. Eliot at the University of Chicago in 1950.[9]	43.9
Media Watch Files Part Five: The 'soft-leftie ' politics of Media Watch , The Australian newspaper (http:// www.theaustralian.news.com.au, accessed 30 May 2005).	41.0
Physical Meaning of Geometrical Propositions by Albert Einstein, a 'popular exposition' of relativity for readers with a 'high school education'.[10]	35.5
Media Release Archives by the Royal Australasian College of Surgeons for May 2005 (http:// www.surgeons.org, accessed 30 May 2005).	32.9
His Brain, Her Brain by Larry Cahill on Scientific American.com (http:// www.sciam.com, accessed 8 June 2005).	32.3
Our System of Government on the Australian Prime Minister's website (http:// www.pm.gov.au, accessed 30 May 2005).	27.7
The will of Elvis Presley (http://www.taxlawyers.com.au/Publications/FamousWills/ Elvis.htm, accessed 8 June 2005).	10.9

specific surgical terms into stem words. For articles with low Flesch scores, this resulted in a median increase in the score from 0 to 10.9. This is well short of being acceptable. It is inevitable that clearing the text of such words will improve the Flesch scores. But the changes are relatively minor. There is more to the poor readability of surgical articles than the use of complex surgical terms. It is the style of writing that is the problem.

How should readability scores be used? They can be used on sections of text to identify problem areas. They signal the need for further editing. Table 3 shows how editing can improve the readability of a passage of text. Of course, the final judge on whether such changes are acceptable is the reader. But there is more to readability than the use of short sentences and simple words. Writing to generate a low readability score can result in a jerky and impoverished text. This is why the use of readability indices is probably of greatest benefit during the final drafting stage.

Computerized assessments of readability vary according to the choice of software program.[15] So it is advisable to calculate readability scores using a standard procedure.

It is easy to get more information about readability scores.

Typing 'readability' into the Help menu of a word processing program will provide the core facts, and searching on the Internet will show a diverse array of interesting sites. It is also im-

Table 3. An example of text revision resulting in a higher Flesch score

Original Text:[14]

The proposal published recently in the UICC TNM supplement 2003, to subdivide T1 tumours into T1a (diameter up to 10 mm) and T1b (diameter between 11 and 20 mm), will increase the confusion because in the fifth edition the suffix 'a' denotes unifocality and the suffix 'b' multifocality. The authors recommend reinstitution of the T classification of the fifth edition until evidence-based data are available to justify its modification. (Flesch score = 1.3)

Revised Text:

It has been proposed to subdivide T1 tumours into T1a (diameter up to 10 mm) and T1b (diameter between 11 and 20 mm). This is confusing because 'a' and 'b' have indicated unifocality and multifocality. We suggest that there should be no change unless it is based on good evidence. (Flesch score = 42.7)

The replacement of long technical terms with stem words increased the median scores. For the bottom 10 scoring articles, it increased from 0.0 (0.0–4.3) to 10.9 (2.4–16.9), while for the top 10 scoring articles, it increased from 26.4 (25.2–29.1) to 29.9 (28.7–36.0). It was also noted that some articles tended to repeat the same surgical term. One article with an average sentence length of 25.5 words used the term 'parathyroid' once in every 22.5 words.[4]

DISCUSSION

The following quote from Sir Winston Churchill has a Flesch score of 95: 'We shall go on to the end. We shall fight in France. We shall fight in the seas and oceans. We shall fight on the beaches, in the fields, in the streets, and in the hills. We shall never surrender.' But it is hard to maintain this style without the text becoming staccato and losing its high impact.

What is a suitable Flesch score for the surgical literature? It is generally recommended that writers should aim for a score between approximately 60 and 70. However, Table 2 suggests that it might be more realistic to aim for scores between 30 and 50. After all, many nonmedical writers have such scores when conveying opinions that involve the use of complex terms. Even T. S. Eliot, whose poems tended to be allegorical to the point of obscurity, was able to maintain a Flesch score of above 40 when explaining his ideas about scholarship.

This study of surgical articles found a median Flesch score of 15. In comparison, reviews of articles published in the *British Medical Journal*,[11] the *Journal of the American Medical Association*,[11] and the *Annals of Internal Medicine*[12] have reported mean Flesch scores of approximately 30. This is of major concern. Texts with Flesch scores below 30 have been compared to legal contracts.[13] But legal documents need to define complex situations. There is no reason for the surgical literature to mimic legal documents.

Editorial processes only have a marginal effect on the readability of articles. Roberts *et al.* looked at manuscripts sent to the *Annals of Internal Medicine*.[12] The mean Flesch score was 28.9 on submission and this only rose to 29.1 at the time of publication. The authors concluded that the papers 'remained difficult to read at publication'. Editorial staff do not have the time or the resources to rewrite papers. Well-written papers have a greater chance of being accepted for publication. Poorly written papers are more likely to be rejected.

Why do Flesch scores vary between journals? This study observed that the American journal had the lowest median Flesch scores. Also, Weeks and Wallace found that articles published in the *British Medical Journal* were easier to read than those published in the *Journal of the American Medical Association*, as indicated by higher mean Flesch scores (31.5 vs 27.8).[11] This raises two issues. First, these differences are marginal. They would not be evident to the readers. Second, the comparisons are not reliable—the papers were not chosen at random, only one journal from each country was selected for study, there is no allowance for the nature and quality of the content, and not enough papers have been selected for study.

This study looked at the effect of contracting

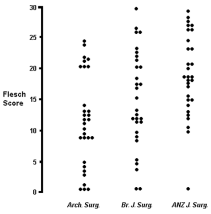

Fig. 1. Flesch Reading Ease Scores for selected text from the first 30 original articles published in 2005 in the *Archives of Surgery* (*Arch. Surg.*), *British Journal of Surgery* (*Br. J. Surg.*), and the *ANZ Journal of Surgery* (*ANZ J. Surg.*).

portant to note that some programs make it difficult to re-evaluate the same document. A useful strategy is to open the draft document, copy the relevant text, open a new file and paste the text into it, calculate the readability score, close the temporary file, and then continue to revise the draft document. Incidentally, the Flesch score for this article, minus the references and illustrations, is 41.2.

In conclusion, original articles in surgical journals are difficult to read. This is because of the use of long sentences and complex words. However, this situation could be improved if authors used readability scores when composing text. It is realistic for authors to aim for Flesch scores above 30 when creating manuscripts.

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A.2 Karvea Mock Journal Set

ORIGNIAL ARTICLE

THE READABILITY OF ORIGINAL ARTICLES IN SURGICAL JOURNALS

JOHN C. HALL

University Department of Surgery, Royal Perth Hospital, Perth, Western Australia, Australia

Background: Readability indices have been developed based on sentence length and the use of long words. One such measure is the Reading Ease Scale developed by Rudolf Flesch. Texts that are easy to read have high scores: texts with scores below 30 are similar to legal contracts. This study uses Flesch scores to evaluate the readability of surgical journals.
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Conclusion: Original articles published in surgical journals contain too many long sentences and complex words. Readability indices are useful tools because they promote the use of simple English. It is realistic for authors to aim for Flesch scores above 30 when creating manuscripts.

Key words: language test, literature, peer review, publishing, surgery.

INTRODUCTION

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This study uses Flesch scores to evaluate the readability of original articles published in surgical journals. Flesch scores range between 0 and 100. The higher the score, the easier it is to read the text. A secondary objective was to scrutinize the relationship between the use of long technical words and the readability score.

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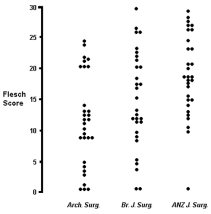

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Typing 'readability' into the Help menu of a word processing program will provide the core facts, and searching on the Internet will show a diverse array of interesting sites. It is also im-

portant to note that some programs make it difficult to re-evaluate the same document. A useful strategy is to open the draft document, copy the relevant text, open a new file and paste the text into it, calculate the readability score, close the temporary file, and then continue to revise the draft document. Incidentally, the Flesch score for this article, minus the references and illustrations, is 41.2.

In conclusion, original articles in surgical journals are difficult to read. This is because of the use of long sentences and complex words. However, this situation could be improved if authors used readability scores when composing text. It is realistic for authors to aim for Flesch scores above 30 when creating manuscripts.

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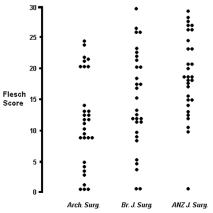

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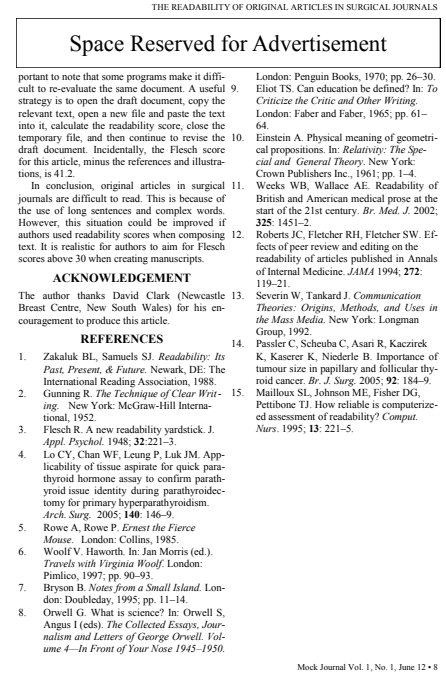

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A.4 IAT Exemplars for Avapro & Karvea

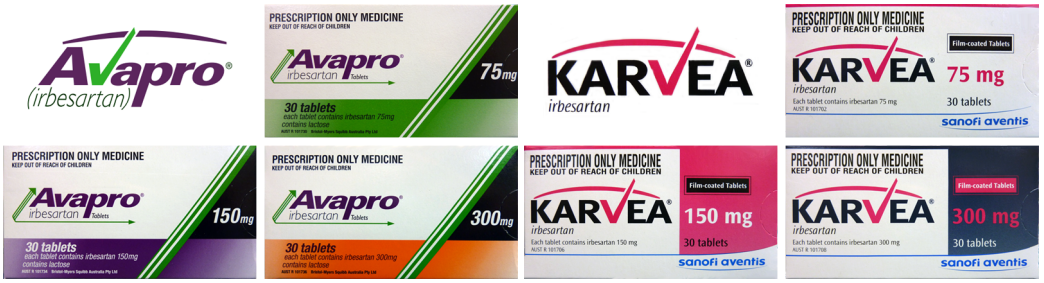


Figure A.1. From top-left to bottom-right: Avapro brand name, Avapro 75mg box packaging, Karvea brand name, Karvea 75mg box packaging, Avapro 150mg box packaging, Avapro 300mg box packaging, Karvea 150mg box packaging, and Karvea 300mg box packaging.

Appendix B

Self-report Measures & Debriefing Information for IAT Study

B.1 Explicit Attitude towards Drug Measure

Each item is rated on a 5-point scale (*Avapro strongly preferred* = 1, *Avapro preferred* = 2, *no preference* = 3, *Karvea preferred* = 4, *Karvea strongly preferred* = 5). A low score indicates a preference for Avapro, while a high score indicates a preference for Karvea.

For each of the following factors, please indicate your preferred choice between Avapro or Karvea:

1. Product quality
2. Side-effects
3. Efficacy
4. Cost
5. Accessibility to patients
6. Safety
7. Personal preference
8. Superiority

B.2 Attitudes toward Pharmaceutical Promotion

All items are rated as follows: 1 = *strongly agree*, 2 = *agree*, 3 = *uncertain*, 4 = *disagree*, 5 = *strongly disagree*. Items marked with an "*" are reverse scored. Ratings for each item were collapsed together to form a total score. Higher scores indicate a more negative attitude towards pharmaceutical promotion.

General attitudes

1. Drug company materials are a useful way to learn about new drugs
2. Once they have finished their formal training, physicians have no alternative but to rely on pharmaceutical promotion to learn about new drugs
3. Drug companies do not try to be accurate with their claims for their products*
4. Information provided about drug effectiveness from pharmaceutical companies is untrustworthy*
5. Five drugs from five different companies are identical in terms of price, efficacy, and effectiveness. I would preferentially prescribe a drug from one of the companies that provided me with gifts or incentives over those from companies that did not
6. Pharmaceutical promotion to students/physicians does not significantly increase health care costs to patients
7. Exposure to pharmaceutical promotion (e.g. PR detailing, gifts, advertising) increases the chance that I will eventually prescribe the drug company's products*
8. Exposure to pharmaceutical promotion (e.g. PR detailing, gifts, advertising) increases the chances that my fellow peers will eventually prescribe the drug company's products*

Attitude towards industry involvement in medical education

9. Most grand rounds sponsored by drug companies are helpful and educational
10. Funds to medical schools from drug companies are a helpful way to lower tuition
11. Drug company–sponsored grand rounds are often biased in favour of the company's products*
12. Students should not have any interaction with drug companies in medical school*

13. When drug companies sponsor physicians to go to seminars at resort locations this biases the subsequent behaviour of those physicians (e.g. they prescribe more of the company's product)*
14. It is unethical for physicians to accept drug company funding to attend seminars at resort locations*
15. It is acceptable for drug companies to sponsor events/educational seminars during medical school

Attitude towards gifts

16. It is sometimes okay for students/physicians to accept gifts and lunches from drug companies because drug companies have minimal influence on students/physicians
17. It is unethical for student/physicians to accept free textbooks or other educational materials from drug companies*
18. It is unethical for student/physicians to accept free pens, calendars, or other non educational materials from drug companies*

Attitude towards pharmaceutical print advertising

19. Product information presented in a drug advertisement provides you with educational material about the drug
20. Physicians are persuaded by advertising to use new drugs before they have been adequately tested*
21. Pharmaceutical print advertising is designed to develop a more positive brand image for the product advertised*
22. Pharmaceutical print advertising increases the likelihood that my fellow peers will have a more positive attitude towards the product*
23. Pharmaceutical print advertising increases the likelihood that I will have a more positive attitude towards the product*

B.3 Pharmaceutical Advertising SKEP Scale

All items are rated as follows: 1 = *strongly agree*, 2 = *agree*, 3 = *neutral*, 4 = *disagree*, 5 = *strongly disagree*. Items marked with an "*" are reverse scored. Higher scores indicate greater scepticism towards pharmaceutical advertising.

1. We can depend on getting the truth in most pharmaceutical advertising
2. Pharmaceutical advertising's aim is to inform the consumer
3. I believe pharmaceutical advertising is not informative*
4. Pharmaceutical advertising is generally truthful
5. Pharmaceutical advertising is not a reliable source of information about the quality and performance of the product being advertised*
6. Pharmaceutical advertising is truth well told
7. In general, pharmaceutical advertising does not present a true picture of the product being advertised*
8. I feel I've been accurately informed after viewing most pharmaceutical advertisements
9. Most pharmaceutical advertising does not provide consumers with essential information*

B.4 Rational-Experiential Inventory–revised

Each sub-scale has 10 items. Participants are asked to rate their degree of agreement to items on a 5-point scale (1 = *definitely not true of myself*, 5 = *definitely true of myself*). Participants' rational ability score and rational engagement score were summed to form a total rationality score. Likewise, their experiential ability score and experiential engagement score were summed to form a total experientiality score. Items marked with an "*" are reverse scored.

Rational ability

1. I'm not that good at figuring out complicated problems*
2. I am not very good at solving problems that require careful logical analysis*
3. I am not a very analytical thinker*
4. I don't reason well under pressure*
5. I am much better at figuring things out logically than most people
6. I have a logical mind
7. I have no problem thinking things through carefully
8. Using logic usually works well for me in figuring out problems in my life

9. I usually have clear, explainable reasons for my decisions
10. Reasoning things out carefully is not one of my strong points*

Rational engagement

11. I try to avoid situations that require thinking in depth about something*
12. I enjoy intellectual challenges
13. I don't like to have to do a lot of thinking*
14. I enjoy solving problems that require hard thinking
15. Thinking is not my idea of an enjoyable activity*
16. I prefer complex problems to simple problems
17. Thinking hard and for a long time about something gives me little satisfaction*
18. I enjoy thinking in abstract terms
19. Knowing the answer without having to understand the reasoning behind it is good enough for me*
20. Learning new ways to think would be very appealing to me

Experiential ability

21. I don't have a very good sense of intuition*
22. Using my gut feelings usually works well for me in figuring out problems in my life
23. I believe in trusting my hunches
24. I trust my initial feelings about people
25. When it comes to trusting people, I can usually rely on my gut feelings
26. If I were to rely on my gut feelings, I would often make mistakes*
27. I hardly ever go wrong when I listen to my deepest gut feelings to find an answer
28. My snap judgments are probably not as good as most people's*
29. I can usually feel when a person is right or wrong, even if I can't explain how I know
30. I suspect my hunches are inaccurate as often as they are accurate*

Experiential engagement

31. I like to rely on my intuitive impressions
32. Intuition can be a very useful way to solve problems
33. I often go by my instincts when deciding on a course of action
34. I don't like situations in which I have to rely on intuition*
35. I think there are times when one should rely on one's intuition
36. I think it is foolish to make important decisions based on feelings*
37. I don't think it is a good idea to rely on one's intuition for important decisions*
38. I generally don't depend on my feelings to help me make decisions*
39. I would not want to depend on anyone who described himself or herself as intuitive*
40. I tend to use my heart as a guide for my actions

B.5 Manipulation Check Questions

1. Did the article you were instructed to read contain advertisements?
   (a) Yes
   (b) No
   (c) Uncertain
2. Were all advertisements for the same or different product/s?
   (a) Same
   (b) Different
   (c) Uncertain
   (d) Article did not contain advertisements
3. Please indicate if any of the following products was advertised in the article.
   (a) Avapro
   (b) Crestor
   (c) Karvea
   (d) Lipitor

(e) Uncertain

(f) Article did not contain advertisements

4. Which statement best summarises what the article was about?

   (a) The font size of surgical journal articles is inadequate.

   (b) Surgical journal articles contain too many long sentences and/or complex words

   (c) Readability of surgical journals is the best among medical literature

   (d) Uncertain

5. What is a Flesch Score?

   (a) An index of font clarity

   (b) An index of readability

   (c) An index for muscle mass

   (d) Uncertain

6. What is the recommended minimum Flesch score for manuscripts, proposed by the author?

   (a) 15

   (b) 30

   (c) 60

   (d) Uncertain

7. Prior to this experiment, have you heard of the drugs Avapro or Karvea?

   (a) Yes, I have heard of Avapro but not Karvea

   (b) Yes, I have heard of Karvea but not Avapro

   (c) Yes, I have heard of both Avapro and Karvea

   (d) No, I have neither heard of Avapro nor Karvea

8. On average, how often do you attend sponsored events or are exposed to material from the pharmaceutical industry?

   (a) Never

   (b) Rarely

   (c) Once every 6 months

   (d) Once every 3 months

   (e) Once a month

   (f) Once a week

   (g) More than once a week

B.6 Demographic Questions

1. How old are you (in whole years)?

   _____

2. Please indicate your gender

   (a) Male

   (b) Female

3. Please indicate the current stage of your medical studies

   (a) $1^{st}/2^{nd}/3^{rd}$ year

   (b) 4^{th} year

   (c) 5^{th} year

   (d) 6^{th} year

B.7 Debriefing Information

Thank you for your participation, your help is greatly appreciated. You may or may not have picked up on this, but the study you have just participated, in truth, **IS NOT** a study investigating how medical information is disseminated from journal articles and integrated into human memory. This was a cover story to hide the true purpose of the study.

The research team sincerely apologises for deceiving you and hopes that information detailed in this debriefing will help you understand why this deception was necessary. You are free to withdraw your consent for participation and your data will be consequently erased without any prejudice. You are also reminded that you have been provided with information with regards to making a complaint, should you wish to do so.

True purpose of the study

The study's true purpose was to investigate through a controlled experiment whether exposure to pharmaceutical print advertisements could influence an individual's attitudes towards the advertised product. Depending on your group allocation, you may have been given a journal article that contained advertisements. If your journal article did not contain ads, you were assigned to the control group.

The computerised test you completed is a type of Implicit Association Test or IAT. The IAT is a widely used test of implicit associations. Implicit associations can be described as an automatic, underlying association between mental representations of objects. Individuals are often unaware of these associations as they operate below the level of consciousness. The IAT you just completed assessed and compared the strengths of associations between two pharmaceutical drugs along a positive-negative attribute dimension. In other words, the IAT assessed whether you have a more positive or negative implicit association for one drug over the other. The IAT provides an objective measure of whether exposure to print ads influences your implicit associations. For more information about IATs, please visit (https://implicit.harvard.edu/implicit/). There are various interesting short IATs available on the website for you to try out online.

Apart from obtaining demographic information, the questionnaires you completed included several published scales that are designed to tap into individual characteristics that may influence your susceptibility or resistance to advertising. These include your general attitude towards the two drugs, your attitude towards pharmaceutical advertising in general, the level of scepticism you have towards pharmaceutical advertising, and your information processing style.

Why deception was necessary?

Unfortunately, due to the sensitive nature of and on-going debate surrounding pharmaceutical promotion, deception was necessary to protect both the internal and external validity of the experiment. Internal validity could have been compromised if reactance from participants towards the experimental manipulation occurred, i.e. the participant succumbed to the social desirability bias when completing the self-report measures or attempted to cheat/fake during the IAT. External validity could have been compromised because having knowledge that the study concerns the impact of pharmaceutical promotion could have altered participants' behaviour/responses. For instance, participants might have intentionally avoided viewing the ads or viewed the ads with greater scepticism. This would not have been a fair reflection of reality whereby medical students are not explicitly forewarned of print advertisements in medical journals and their persuasive intent.

Maintaining the cover story

We would like to appeal to you to not discuss any information detailed in this debriefing to other potential participants until the research team has informed you that the study has concluded. The maintenance of the study's cover story is very important to its research integrity and we thank you for your continued cooperation.

Notification of study's results

The research team is happy to share the overall results of this study. Simply sign up by providing your email address to the researcher. Unfortunately, for ethical reasons, the research team will not be able to provide you with the results of your individual data.

Useful information and resources

Here are some useful online resources should you be interested in learning more about the debate surrounding pharmaceutical promotion and its impact on both healthcare professionals as well as consumers:

- Healthy Skepticism (previously MaLAM, the Medical Lobby for Appropriate Marketing, www.healthyskepticism.org/global) is an independent, international, not for profit organisation for people with an interest in improving health. The organisation's headquarters is in Adelaide, Australia but key members live in many countries and their focus is international.
- The website of the 2010 "Selling Sickness" international conference held in Amsterdam. http://www.gezondescepsis.nl/conference-2010.html[1]

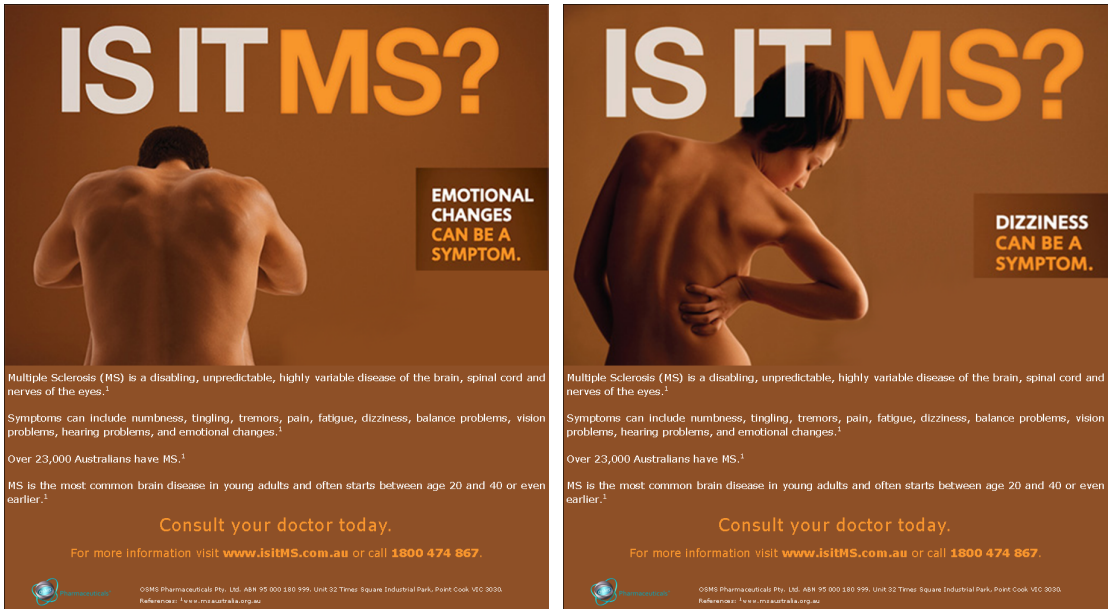
[1]This URL is no longer valid

Appendix C

Disease Awareness Advertisements

C.1 Experiment 1

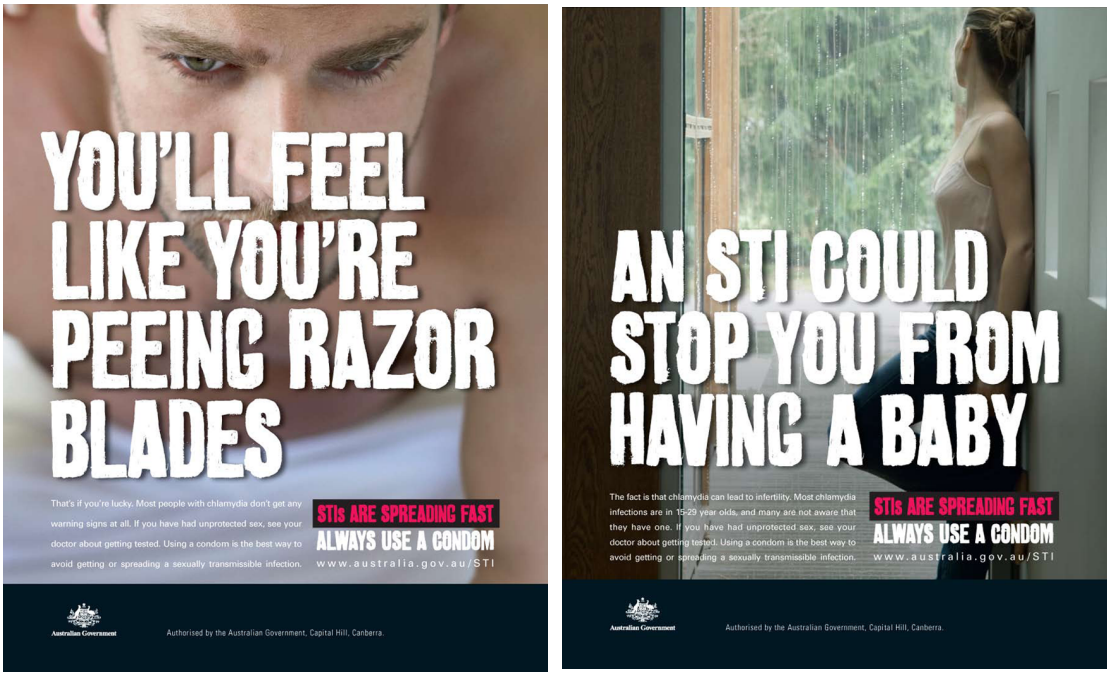
C.1.1 Intervention Ad: Multiple Sclerosis



(a) Male *(b)* Female

Figure C.1. The disease awareness advertisements used during the intervention in Experiment 1.

C.1.2 Government-sponsored Ad: Chlamydia

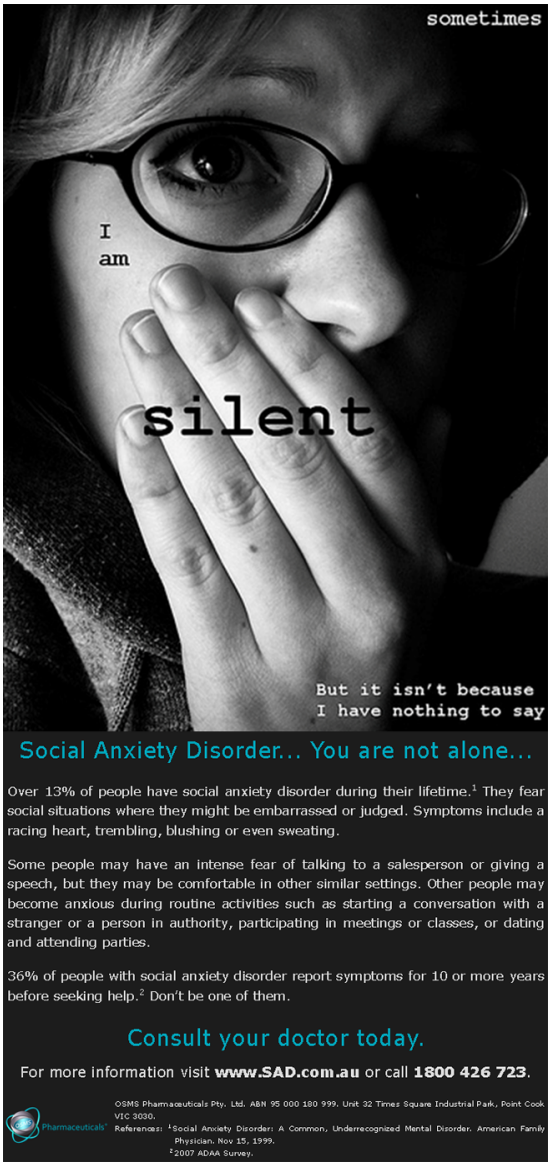


(a) Male *(b)* Female

Figure C.2. The government-sponsored disease awareness advertisements used in Experiment 1.

C.1.3 Industry-sponsored Ad: Social Anxiety Disorder

(a) Male



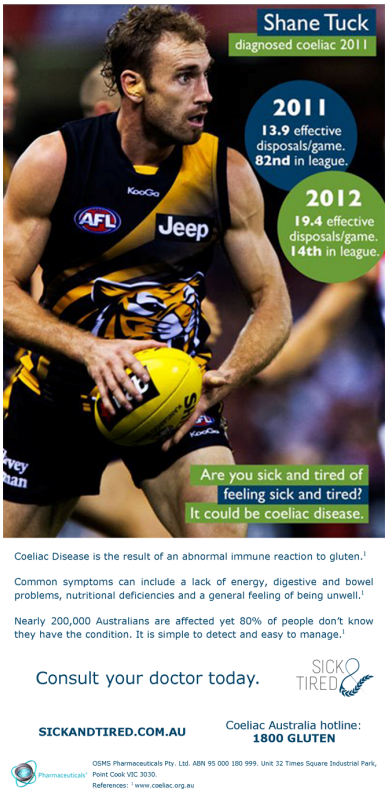
(b) Female

Figure C.3. The industry-sponsored disease awareness advertisements used in Experiment 1.

C.2 Experiment 2 & 3

C.2.1 Coeliac Disease

(a) Male Government-sponsored



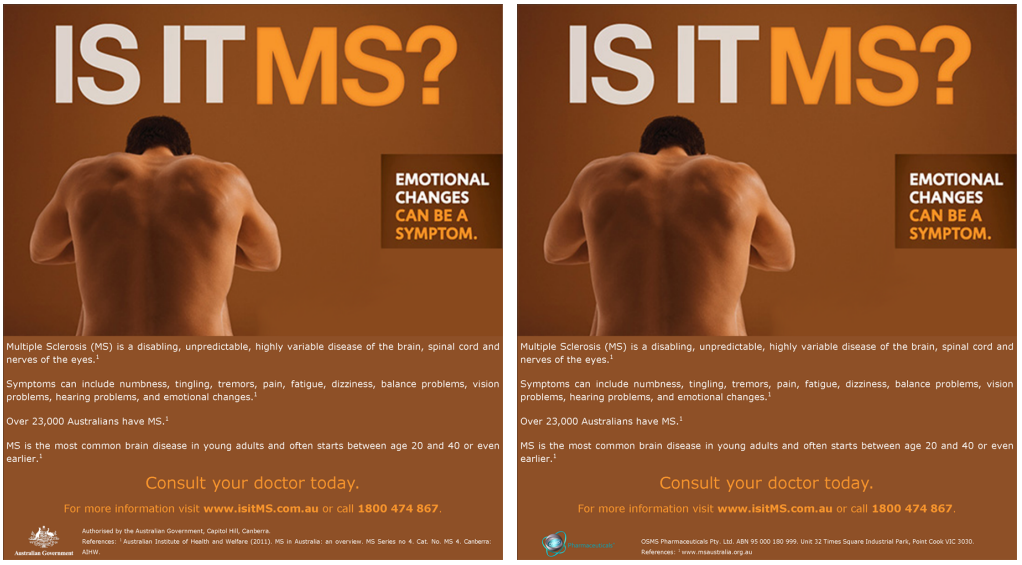
(b) Male Industry-sponsored

(c) Female Government-sponsored

(d) Female Industry-sponsored

Figure C.4. The Coeliac disease awareness advertisements used in Experiment 2 & 3.

C.2.2 Multiple Sclerosis



(a) Male Government-sponsored

(b) Male Industry-sponsored

(c) Female Government-sponsored

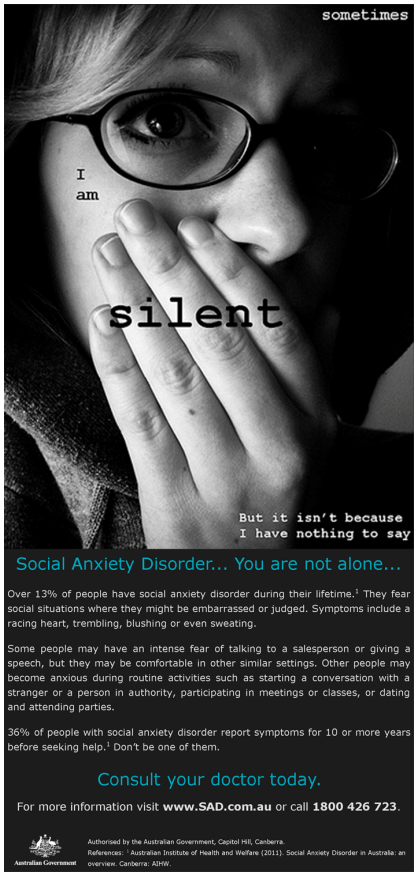
(d) Female Industry-sponsored

Figure C.5. The Multiple Sclerosis disease awareness advertisements used in Experiment 2 & 3.

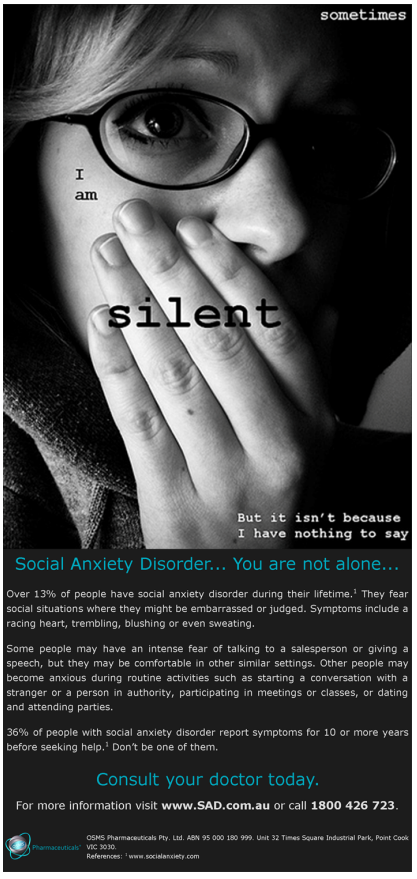
C.2.3 Social Anxiety Disorder

(a) Male Government-sponsored

(b) Male Industry-sponsored



(c) Female Government-sponsored



(d) Female Industry-sponsored

Figure C.6. The Social Anxiety Disorder disease awareness advertisements used in Experiment 2 & 3.

Appendix D

Appendix to Chapters 3, 4, & 5

D.1 Full Dataset Results for Healthy Scepticism I, II, & III

Table D.1
A Comparison of Experiment 1's Results between the Full and Final Sample

Experiment 1 Results	Effect Size	
Measure	Full (N = 148)	Final[a] (N = 131)
Sponsor ID Accuracy		
Group main effect	OR = 2.70***	OR = 2.96***
Sponsor main effect	OR = 3.54***	OR = 3.63***
Scepticism	d = 0.49**	d = 0.49**
Value of Ad		
Group main effect	OR = 2.17**	OR = 2.61***
Sponsor main effect	OR = 1.95**	OR = 2.10**
Purpose of the Ad	Models did not converge	
Behavioural Intentions		
Talk to doctor about condition	No Significant Effects	
Ask doctor about treatments/tests		
Sponsor main effect	OR = 1.89***	OR = 2.11***
Look for info as directed by the ad		
For Industry, Control vs. Intervention	OR = 2.52**	OR = 2.28*

Note. d = Cohen's d, η^2_G = generalised eta-squared, OR = odds ratio, PS = probability of superiority. *** = $p < .001$, ** = $p < .01$, and * = $p < .05$.

[a] The final sample excludes participants who met the exclusion criteria.

(continued)

Table D.1 (continued)

Experiment 1 Results	Effect Size	
Measure	Full (N = 148)	Final[a] (N = 131)
For Intervention, Gov. vs. Industry	OR = 1.83**	OR = 1.95**
Look for info from other sources	No Significant Effects	
Ask doctor for a prescription/referral		
Sponsor main effect	OR = 1.61*	OR = 1.78*
Do nothing	No Significant Effects	
Prevalence of Condition	No Significant Effects	
Severity of Condition		
Sponsor main effect	PS = .66***	PS = .63***
Susceptibility to Condition		
Sponsor main effect	η^2_G = .10***	η^2_G = .09***

Note. d = Cohen's d, η^2_G = generalised eta-squared, OR = odds ratio, PS = probability of superiority. *** = $p < .001$, ** = $p < .01$, and * = $p < .05$.

[a] The final sample excludes participants who met the exclusion criteria.

Table D.2

A Comparison of Experiment 2's Results between the Full and Final Sample

Experiment 2 Results	Effect Size	
Measure	Full (N = 149)	Final[a] (N = 132)
Sponsor ID Accuracy		
For Industry, Intervention vs. Control	OR = 11.10***	OR = 9.90***
For Control, Gov. vs. Industry	OR = 8.26***	OR = 8.30***
Scepticism	d = 1.09***	d = 1.12***
Value of Ad		
For Industry, Control vs. Industry	OR = 8.33***	OR = 8.55***
For Intervention, Gov. vs. Industry	OR = 9.55***	OR = 9.05***
Purpose of the Ad		
Sell product or treatment		
Group main effect	OR = 11.20***	OR = 12.20***

Note. d = Cohen's d, η^2_G = generalised eta-squared, OR = odds ratio, OR_{GA} = odds ratio for government-sponsored ad (only applicable in the presence of an interaction), OR_I = odds ratio for intervention group (only applicable in the presence of an interaction), PS = probability of superiority. *** = $p < .001$, ** = $p < .01$, * = $p < .05$, and ns = p > .05.

[a] The final sample excludes participants who met the exclusion criteria.

(continued)

Table D.2 (continued)

Experiment 2 Results	Effect Size	
Measure	Full (N = 149)	Final[a] (N = 132)
Sponsor main effect	OR = 17.70***	OR = 17.10***
Provide info on treatment		
For Gov., Intervention vs. Control	OR = 2.20*	OR = 2.18*
Encourage talking to your doctor		
For Industry, Control vs. Intervention	OR = 5.15**	OR = 8.63***
For Intervention, Gov. vs. Industry	OR = 2.92**	OR = 3.26**
Provide info on the condition		
Group main effect	OR = 2.98*	OR = 6.07**
Sponsor main effect	OR = 3.52**	OR = 4.38**
Encourage asking for a prescription		
For Industry, Intervention vs. Control	OR = 4.18***	OR = 6.18***
For Intervention, Industry vs. Gov.	OR = 11.20***	OR = 14.10***
Behavioural Intentions		
Talk to doctor about condition		
Group main effect	OR = 1.88*	OR_{GA} = 2.97**
Sponsor main effect	OR = 1.92***	OR_I = 3.12***
Ask doctor about treatments/tests		
Group main effect	OR = 2.51**	OR_{GA} = 4.29***
Sponsor main effect	*ns*	OR_I = 2.19**
Look for info as directed by the ad		
For Gov., Intervention vs. Control	OR = 2.20*	OR = 2.81*
For Intervention, Gov. vs. Industry	OR = 2.25**	OR = 2.72**
Look for info from other sources	No Significant Effects	
Ask doctor for a prescription/referral		
Group main effect	OR = 2.32*	OR = 2.69*
Do nothing		
Group main effect	OR = 2.78***	OR = 3.03***
Prevalence of Condition		
Sponsor main effect	*ns*	PS = .55*

Note. d = Cohen's d, η^2_G = generalised eta-squared, OR = odds ratio, OR_{GA} = odds ratio for government-sponsored ad (only applicable in the presence of an interaction), OR_I = odds ratio for intervention group (only applicable in the presence of an interaction), PS = probability of superiority. *** = $p < .001$, ** = $p < .01$, * = $p < .05$, and *ns* = p > .05.

[a] The final sample excludes participants who met the exclusion criteria.

(continued)

Table D.2 (continued)

Experiment 2 Results	Effect Size	
Measure	Full (N = 149)	Final[a] (N = 132)
Severity of Condition	No Significant Effects	
Susceptibility to Condition	No Significant Effects	

Note. d = Cohen's d, η^2_G = generalised eta-squared, OR = odds ratio, OR_{GA} = odds ratio for government-sponsored ad (only applicable in the presence of an interaction), OR_I = odds ratio for intervention group (only applicable in the presence of an interaction), PS = probability of superiority. *** = $p < .001$, ** = $p < .01$, * = $p < .05$, and ns = p > .05.

[a] The final sample excludes participants who met the exclusion criteria.

Table D.3

A Comparison of Experiment 3's Results between the Full and Final Sample

Experiment 3 Results	Effect Size	
Measure	Full (N = 227)	Final[a] (N = 196)
Sponsor ID Accuracy		
Group main effect	OR = 3.39***	OR = 4.41***
Sponsor main effect	OR = 3.05***	OR = 3.34***
Scepticism	d = 0.66***	d = 0.77***
Value of Ad		
For Industry, Control vs. Intervention	OR = 7.30***	OR = 8.82***
For Intervention, Gov. vs. Industry	OR = 7.67***	OR = 10.10***
Purpose of the Ad		
Sell product or treatment		
For Industry, Intervention vs. Control	OR = 4.21***	OR = 3.68***
For Intervention, Industry vs. Gov.	OR = 8.80***	OR = 11.80***
For Control, Industry vs. Gov.	OR = 2.81**	OR = 3.21***
Provide info on treatment		
For Industry, Control vs. Intervention	ns	OR = 2.00*
For Intervention, Gov. vs. Industry	ns	OR = 1.78*
Encourage talking to your doctor	No Significant Effects	

Note. d = Cohen's d, η^2_G = generalised eta-squared, OR = odds ratio, OR_{IA} = odds ratio for industry-sponsored ad (only applicable in the presence of an interaction), OR_I = odds ratio for intervention group (only applicable in the presence of an interaction), PS = probability of superiority. *** = $p < .001$, ** = $p < .01$, * = $p < .05$, and ns = p > .05.

[a] The final sample excludes participants who met the exclusion criteria.

(continued)

Table D.3 (continued)

Experiment 3 Results	Effect Size	
Measure	Full (N = 227)	Final[a] (N = 196)
Provide info on the condition		
Group main effect	OR = 2.24**	OR = 2.54**
Sponsor main effect	OR = 2.40**	OR = 2.84***
Encourage asking for a prescription		
Group main effect	OR = 3.86***	OR = 3.58***
Sponsor main effect	OR = 4.02***	OR = 4.26***
Behavioural Intentions		
Talk to doctor about condition		
For Industry, Control vs. Intervention	OR = 2.81***	OR = 3.38***
For Intervention, Gov. vs. Industry	OR = 2.24***	OR = 2.44**
Ask doctor about treatments/tests		
Group main effect	OR_{IA} = 2.77***	OR = 2.27***
Sponsor main effect	OR_I = 2.16**	*ns*
Look for info as directed by the ad		
For Industry, Control vs. Intervention	OR = 3.40***	OR = 4.15***
For Intervention, Gov. vs. Industry	OR = 2.99***	OR = 3.70***
Look for info from other sources	No Significant Effects	
Ask doctor for a prescription/referral	No Significant Effects	
Do nothing		
Group main effect	OR = 1.72*	OR = 1.98*
Prevalence of Condition	No Significant Effects	
Severity of Condition	No Significant Effects	
Susceptibility to Condition	No Significant Effects	

Note. d = Cohen's d, η^2_G = generalised eta-squared, OR = odds ratio, OR_{IA} = odds ratio for industry-sponsored ad (only applicable in the presence of an interaction), OR_I = odds ratio for intervention group (only applicable in the presence of an interaction), PS = probability of superiority. *** = $p < .001$, ** = $p < .01$, * = $p < .05$, and *ns* = p > .05.

[a] The final sample excludes participants who met the exclusion criteria.

D.2 Participants' Original Responses to Perceived Value and Purpose of Advertisement Measures in Experiment 1

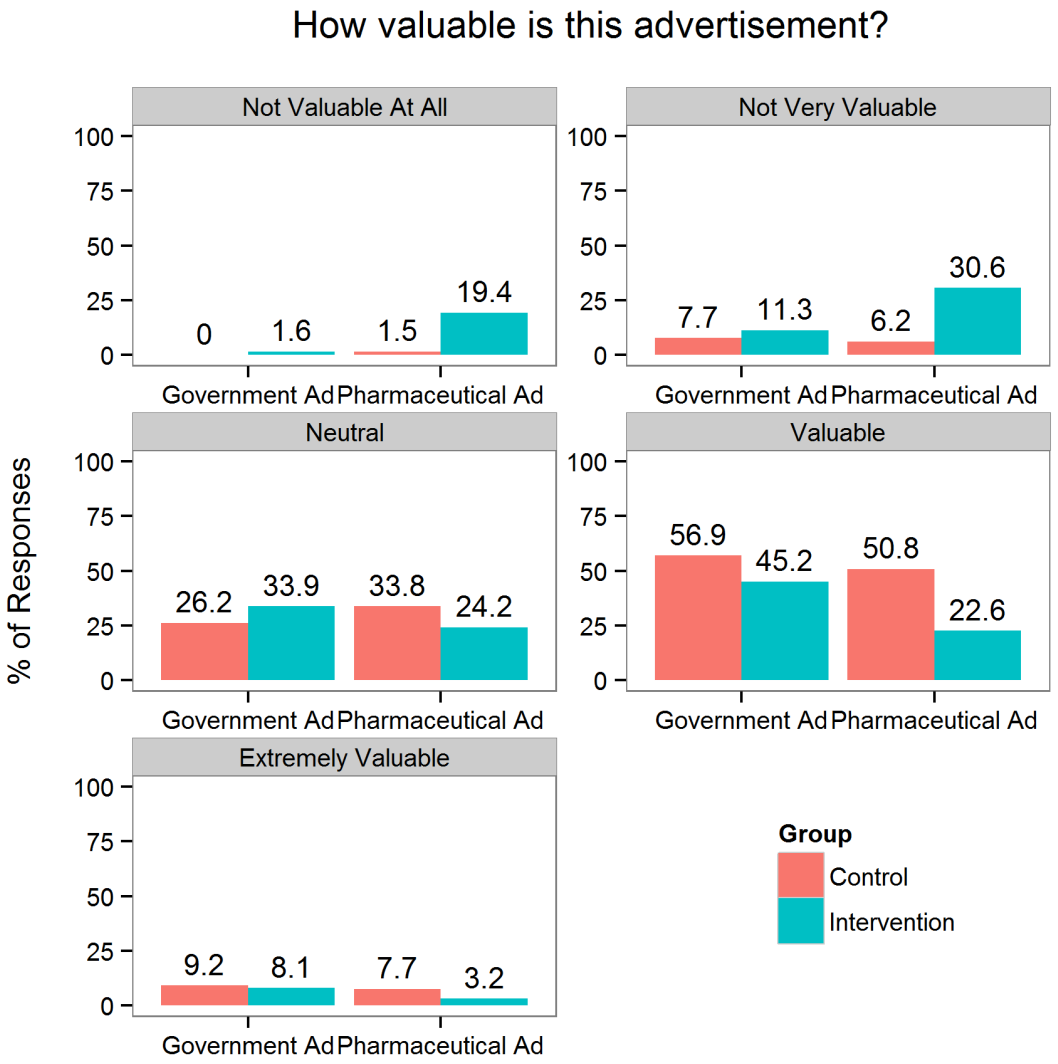


Figure D.1. Percentage of original responses to the perceived value of ad measure across group and sponsor-type .

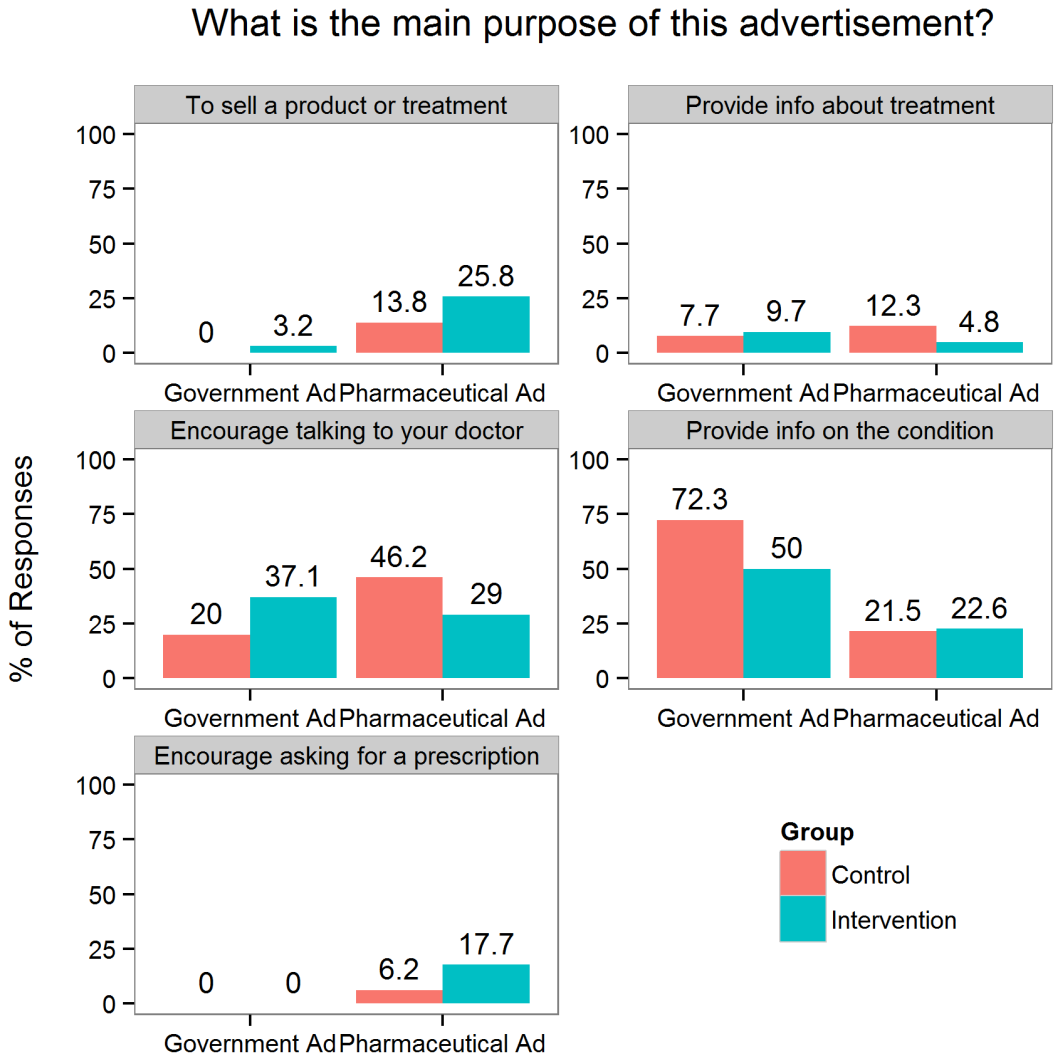


Figure D.2. Percentage of original responses to the perceived purpose of ad measure across group and sponsor-type.

D.3 Participants' Open-ended Feedback on Intervention in Experiment 3

Table D.4
Participants' feedback on how the intervention could be improved

ID	Feedback
15	The people who need to be educated on the manipulative propaganda employed by media and big business are generally not the people who will be completing such surveys thus any form of intellectual intervention will have minimal results; but the generic apathetic and half-alive working class and lower class humans who cannot be reached.
26	Too much information to take in. Survey was long and tedious.
30	Present the participants with an advertisement that is uninformative and deceiving and also then present an advertisement that is informative and truthful. Question the participant's feelings on the respective advertisements and then once they state their opinions of both advertisements, then inform them of their ill-informed knowledge of the business-minded companies trying to slyly persuade us to blindly consume their products. Thank you for the interesting survey :)
79	Just a note - I clicked 'fairly' as opposed to 'not at all' because I don't believe the ad was 'not at all' informative: it still provides a bit of a baseline of information somewhere within it - when I view a biased ad I generally know it's biased but if I feel like I exert one of the symptoms to quite an extreme degree and cant really attribute it to anything else then I might do some more research into the disease but using unbiased sources - so that's why I think they are still a bit useful. However I would not go straight to the doctor and demand the suggested pharmaceutical treatment just because the ad told me to, I would do further research and then judge for myself whether some sort of treatment is necessary. SO what I am trying to say is that just because I picked 'fairly' does not mean I had fallen prey to the article, and thus I found it a bit silly to be harassed about choosing the 'wrong' answer when I picked fairly for a different reason. I still found the intervention quite good though, it was interesting to learn about how much pharmaceutical companies lie.

(continued)

Table D.4 (continued)

ID	Feedback
85	The educational intervention came across as condescending given that I had already identified these factors for myself (source and vagueness of information). A phrase that stuck with me is the part about "did you notice the logo, probably not...it's not your fault". This opinion may be tempered by the fact that I think I have a fairly high level of scientific literacy; it may be different for people who don't consider the source of their information. But then those people may be more likely to skip past text highlighted from journal articles.
93	make it more entertaining
95	Summarise the points and information, make it more concise.
99	Provide more ads made by reliable sources. Instead of just the MS ad by the government, maybe other independent sources should be mentioned.
104	The intervention was well informed, a its persuasiveness stemmed from the referencing of credible resources.
109	Greater advertising campaigns
130	not so much information at one time, small chunks that make the point
133	by making it a little shorter, less text based
136	Great intervention, however it did take longer than estimated to complete. Maybe 30-45 mins would have been a better prediction on the sign-up page. Thanks
140	could add how advertisements try to diverts peoples attention by unnecessary photos, which will make unaware or busy people not pay close attention to the information, rather just what is highlighted.
147	The ending was quite long-winded and would have been better summarised, especially reading all those examples
153	More variety in information deliverance.
155	Don't preach so much, it isn't that important.
165	Multiple examples of the same point could be strung together, so it won't sound too lengthy, people can see the magnitude or degree of the point without having to scroll through multiple pages- increases the chance of them skipping the educational part
178	Decrease the amount of information given to the reader during the intervention, it is a lot of small text, and easy to lose interest.
191	make the tone of writing less paternalistic / avoid capitals / informed participants from at beginning that there would be a debrief
211	Too much information being presented - made me, as a participant, lose a bit of interest during the intervention due to too much reading. Other than that, it was educational.
218	I think this is a good intervention strategy

(continued)

Table D.4 (continued)

ID	Feedback
220	more appealing to the younger age group

Note. Written feedback was optional, hence, the small number of respondents.

Appendix E

Examples of the Educational Interventions used in Healthy Scepticism II & III

E.1 Experiment 2

Below is an example of a typical print advertisement designed to help raise awareness for a particular medical condition.

Please take your time to view the ad. You will not be able to refer back to the ad when answering questions later.

How convincing did you find the advertisement to be?

7-point scale (Not at all – Extremely Convincing)

Which two aspects of the ad were most important to you when making a decision on its convincingness?

Reason 1:

Reason 2:

If participant was at least 'somewhat convinced' by Ad

Take a look below at your answer to the question "How convincing did you find the advertisement to be?"

You answered "XYZ"

You, like most people, have been a victim of an unreliable disease awareness advertisement.

If you want to avoid falling victim again, you need to understand why this health awareness advertisement was unreliable and learn how to identify such unreliable health awareness ads in the future.

If participant was 'not at all convinced'

You rated the ad as 'not at all convincing'.

Now, take a look below at your answers to the question "Which two aspects of the ad were most important to you when making a decision on its convincingness?"

Reason 1: 'ABC'

Reason 2: 'XYZ'

Were you unconvinced because you found the ad to be from an unreliable source of information?

If not, even though you weren't convinced by this particular ad, you may be a victim of an unreliable disease awareness advertisement in the future.

If you want to avoid falling victim in the future, you need to understand why this health awareness advertisement was unreliable and learn how to identify such unreliable health awareness ads in the future.

For a health awareness advertisement to be considered reliable, the information presented has to be from independent sources.

Many health awareness advertisements are created or sponsored by pharmaceutical companies. Pharmaceutical companies make more money if they sell more drugs. Consequently, pharmaceutical companies have an incentive to produce information that is biased towards increasing drug sales.

Take a look at the sponsoring organisation of the ad (above):

Did you notice the logo when you first viewed the ad? Probably not.

You're not to blame, it is designed to be barely noticeable.

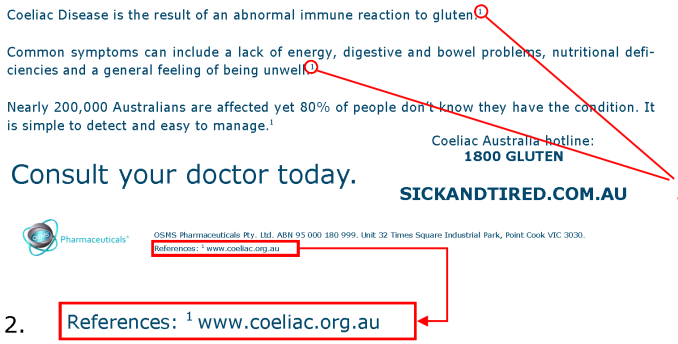
Such ads allow the pharmaceutical industry to circumvent current legislation which prohibits them from advertising prescription drugs directly to consumers.

These ads are disguised as health education initiatives, when in truth they are a form of advertising.

Because the industry cannot promote their drugs to the public, they instead promote the conditions that their drugs treat.

In future when you come across health promotional material, make it a habit to first identify the sponsor(s).

Besides checking the sponsor of the ad, you should also try to evaluate whether the information presented in the ad is reliable.



1.

Do not assume that a claim is reliable just because a reference is provided!

Always check the fine print!

Make sure the reference

2. References: [1] www.coeliac.org.au

Have a look at the reference for this ad.

The claims made were cited from a website. Websites are often unreliable sources of information because, firstly, it is a secondary source. There is no way to verify where the website is getting its information.

Secondly, it is difficult to determine who manages a website. Is it managed by an individual, a patient group, a pharmaceutical company, healthcare professionals in the private sector, or the government?

Only trust peer-reviewed journals or government sanctioned reports.

If participant was at least 'somewhat convinced' by Ad

Now, take a look below at your answers to the question "Which two aspects of the ad were most important to you when making a decision on its convincingness?"

Reason 1: 'ABC'

Reason 2: 'XYZ'

Did any of your reasons relate to the points addressed earlier?

Did you notice that the information you found convincing was from a source that has an incentive to be biased?

Did you think you should seek information from a source with less incentive to be biased before reaching any conclusions about the claims made in the advertisement?

Did you ask yourself whether you should be accepting the information presented as factual, reliable, and unbiased?

If you didn't, then you let yourself be vulnerable to advertisers who may be trying to manipulate you.

Next, you will be shown two new ads and asked to rate each ad independently.

Please take your time to view each ad before answering any questions. You will not be allowed to refer back to the ads while answering the questions.

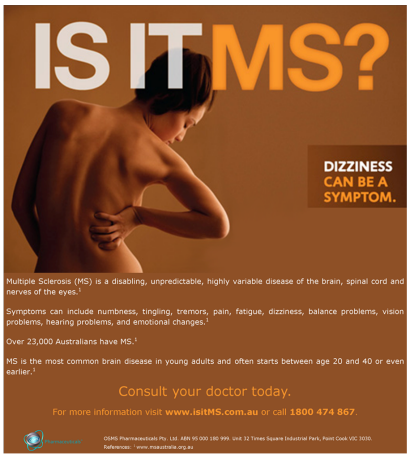
Click on the >> button to start viewing the ads. Please be patient as it may take a while for the ads to appear on your screen.

E.2 Experiment 3

Below is an example of a typical print advertisement designed to help raise awareness for a particular medical condition.

Please take your time to view the ad. You will not be able to refer back to the ad when answering questions later.

Please be patient as it may take a while for the ad below to appear on your screen.



How convincing did you find the advertisement to be?

7-point scale (Not at all – Extremely Convincing)

Which two aspects of the ad were most important to you when making a decision on its convincingness?

Reason 1:

Reason 2:

If participant was at least 'somewhat convinced' by Ad

Take a look below at your answer to the question "How convincing did you find the advertisement to be?"

You answered "XYZ"

You, like most people, have been a victim of an unreliable disease awareness advertisement.

If you want to avoid falling victim again, you need to understand why this health awareness advertisement was unreliable and learn how to identify such unreliable health awareness ads in the future.

If participant was 'not at all convinced'

You rated the ad as 'not at all convincing'.

Now, take a look below at your answers to the question "Which two aspects of the ad were most important to you when making a decision on its convincingness?"

Reason 1: 'ABC'

Reason 2: 'XYZ'

Were you unconvinced because you found the ad to be from an unreliable source of information?

If not, even though you weren't convinced by this particular ad, you may be a victim of an unreliable disease awareness advertisement in the future.

If you want to avoid falling victim in the future, you need to understand why this health awareness advertisement was unreliable and learn how to identify such unreliable health awareness ads in the future.

Before you learn HOW to evaluate help-seeking ads, it is important to understand WHY you need to pay close attention to such ads.

Why? Help-seeking ads can be commissioned by different organisations with different agendas

Typically, help-seeking campaigns are sponsored by:

- The government
- The pharmaceutical industry
- Patient support/welfare organisations
- Professional organisations for doctors, pharmacists etc.

Different organisations have different reasons for initiating a campaign and/or have different campaign goals.

Knowing who is behind the campaign helps you evaluate it.

Why? Pharmaceutical-sponsored ads are a form of advertising.

The pharmaceutical industry favours a two-pronged marketing strategy.

Besides their traditional marketing strategy of advertising to doctors, the pharmaceutical industry is also very keen to engage the general public — who are the consumers of their products.

However, in Australia, the pharmaceutical industry is prohibited from advertising its products to the public. Advertising is only allowed to doctors.

Help-seeking ads offer the industry a medium in which they can circumvent current legislation. Rather than promote their products, help-seeking ads help promote the conditions that their products treat.

Critics have called this strategy: 'disease mongering'.

Why? Pharmaceutical-sponsored ads help with condition branding and the selling of disease

Proceed to the next page for a selection of examples...

An example taken from a medical marketing journal advocating that marketing strategies be applied to medical conditions too...

Building strong condition brands

Keywords *branding, positioning, condition branding, disease branding*

Abstract With blockbuster brands such as Pfizer's Lipitor, GlaxoSmithKline's Advair, AstraZeneca's Nexium and many others, the pharmaceutical industry has demonstrated its expertise in building strong product brands. Product branding-focused marketing, however, leaves many patients untreated. Patients who do not recognise particular symptoms and medical conditions are less likely to seek medical attention and treatment, especially when their family doctor often lacks the time to probe for each and every possible medical condition. Product branding tells consumers about a solution but not about the problem which the solution addresses. Condition branding educates consumers, physicians and other stakeholders about the problem. We propose that the pharmaceutical marketing paradigm be broadened. Pharmaceutical marketers should build strong condition brands, in much the same way as they build strong product brands. Condition branding facilitates customers' decision-making, contributes to better health and may improve the standing of the pharmaceutical industry, which stands accused of overly aggressive product branding efforts, among other criticisms. When condition and product branding are well coordinated, each enhances the effectiveness of the other, raising patient health and brand sales.

Journal of Medical Marketing (2007) **7**, 341–351. doi:10.1057/palgrave.jmm.5050101

An example of how disease definitions and criteria have expanded to include more people...

The Pharmaceutical Industry and the Construction of Psychiatric Diagnoses

Joanna Moncrieff

Senior Lecturer, Department of Mental Health Sciences

University College London, London, UK

ABSTRACT

Psychiatry is fertile ground for the disease mongering activities of the pharmaceutical industry. Over the last few decades, industry influence has helped to create new psychiatric conditions and transform old ones. The modern concept of depression, for example, was established alongside the marketing of antidepressants in the 1950s and 1960s. More recently the label of depression has been applied to an even wider section of the population, associated with intense marketing of SSRIs. Bipolar disorder has also been transformed from a very rare to a relatively common condition in parallel with the promotion of antipsychotic drugs for its treatment. Schizophrenia has also been expanded into the more vague concept of psychosis, and concepts such as "early intervention" and preventive treatment allow more people to be started on potentially life-long antipsychotic drug treatment. Thus marketing has shaped the very nature of psychiatric concepts and psychiatric knowledge. It also distorts service priorities and focuses attention on mass markets in the general population rather than people with the most severe disorders and the greatest needs.

JEMH · April 2009 · 4(Sept. Suppl.) | 1
 (ISSN: 1916-2405)

An example of selling 'disease'...

Framing disease: The example of female hypoactive sexual desire disorder

Annemarie Jutel*

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A B S T R A C T

Disease classification is an important part in the process of medicalisation and one important tool by which medical authority is exerted. The demand for, or proposal of a diagnosis may be the first step in casting life's experiences as medical in nature. Aronowitz has written about how diagnoses result from social framing mechanisms (2008) and consensus (2001), while Brown (1995) has demonstrated a complex range of interactions between lay and professionals, institutions and industries which underpin disease discovery. In any case, there are numerous social factors which shape the diagnosis, and in turn, provide a mechanism by which medicalisation can be enacted. Focussing on diagnostic classification provides an important perspective on the human condition and its relationship to medicine.

To illustrate how layers of social meaning may be concealed in a diagnosis, this paper uses as heuristic the relatively obscure diagnosis of Female Hyposexual Desire Disorder which is currently surfacing in medical and marketing literature as a frequent disorder worthy of concern. I describe how this diagnosis embodies long-standing fascination with female libido, a contemporary focus on female hypersexuality, and commercial interest of the pharmaceutical industry and its medical allies to reify low sexual urge as a pathological disorder in women.

Social Science & Medicine 70 (2010) 1084–1090

Why? The pharmaceutical industry does not have a good track record of providing credible information

Proceed to the next page for a selection of examples...

The industry engages in selective reporting and suppression of negative results that has resulted in death and lawsuits...

International Journal of Risk & Safety in Medicine 20 (2008) 73–81
DOI 10.3233/JRS-2008-0426
IOS Press

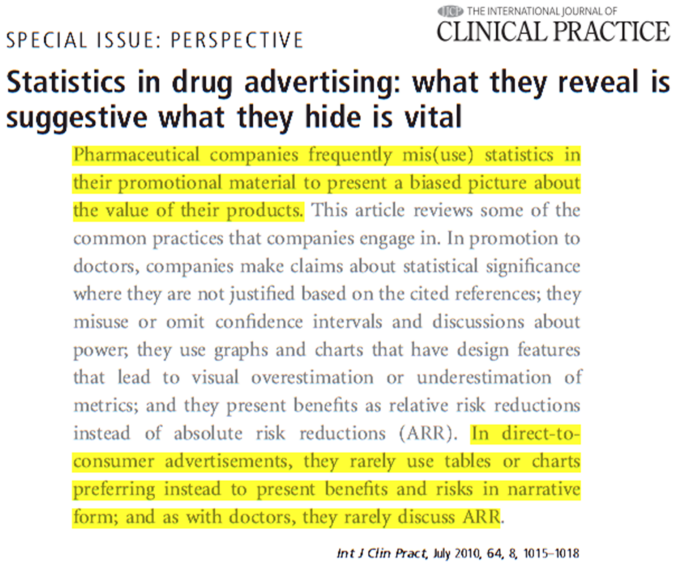
Clinical trials and drug promotion: Selective reporting of study 329

Jon N. Jureidini [a,*], Leemon B. McHenry [b] and Peter R. Mansfield [c]
[a] *Discipline of Psychiatry, University of Adelaide, Adelaide, South Australia*
[b] *Department of Philosophy, California State University, Northridge, CA, USA*
[c] *Discipline of General Practice, University of Adelaide, Adelaide, South Australia*

Abstract. Selective reporting is prevalent in the medical literature, particularly in industry-sponsored research. In this paper, we expose selective reporting that is not evident without access to internal company documents. The published report of study 329 of paroxetine in adolescents sponsored by GlaxoSmithKline claims that "paroxetine is generally well tolerated and effective for major depression in adolescents". By contrast, documents obtained during litigation reveal that study 329 was negative for efficacy on all 8 protocol specified outcomes and positive for harm.

Keywords: Selective reporting, SSRI, litigation, industry sponsorship

They use misleading statistics to fool doctors and use imagery and narrative to persuade consumers...



SPECIAL ISSUE: PERSPECTIVE

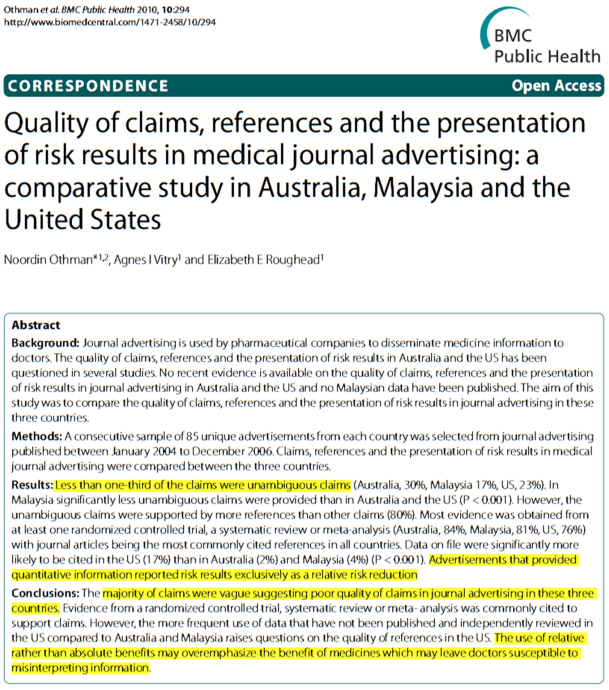
THE INTERNATIONAL JOURNAL OF CLINICAL PRACTICE

Statistics in drug advertising: what they reveal is suggestive what they hide is vital

Pharmaceutical companies frequently mis(use) statistics in their promotional material to present a biased picture about the value of their products. This article reviews some of the common practices that companies engage in. In promotion to doctors, companies make claims about statistical significance where they are not justified based on the cited references; they misuse or omit confidence intervals and discussions about power; they use graphs and charts that have design features that lead to visual overestimation or underestimation of metrics; and they present benefits as relative risk reductions instead of absolute risk reductions (ARR). In direct-to-consumer advertisements, they rarely use tables or charts preferring instead to present benefits and risks in narrative form; and as with doctors, they rarely discuss ARR.

Int J Clin Pract, July 2010, 64, 8, 1015–1018

Misleading advertising practices by the pharmaceutical industry occurs in Australia too.....



Othman *et al. BMC Public Health* 2010, **10**:294
http://www.biomedcentral.com/1471-2458/10/294

BMC Public Health

CORRESPONDENCE Open Access

Quality of claims, references and the presentation of risk results in medical journal advertising: a comparative study in Australia, Malaysia and the United States

Noordin Othman*[1,2], Agnes I Vitry[1] and Elizabeth E Roughead[1]

Abstract

Background: Journal advertising is used by pharmaceutical companies to disseminate medicine information to doctors. The quality of claims, references and the presentation of risk results in Australia and the US has been questioned in several studies. No recent evidence is available on the quality of claims, references and the presentation of risk results in journal advertising in Australia and the US and no Malaysian data have been published. The aim of this study was to compare the quality of claims, references and the presentation of risk results in journal advertising in these three countries.

Methods: A consecutive sample of 85 unique advertisements from each country was selected from journal advertising published between January 2004 to December 2006. Claims, references and the presentation of risk results in medical journal advertising were compared between the three countries.

Results: Less than one-third of the claims were unambiguous claims (Australia, 30%, Malaysia 17%, US, 23%). In Malaysia significantly less unambiguous claims were provided than in Australia and the US ($P < 0.001$). However, the unambiguous claims were supported by more references than other claims (80%). Most evidence was obtained from at least one randomized controlled trial, a systematic review or meta-analysis (Australia, 84%, Malaysia, 81%, US, 76%) with journal articles being the most commonly cited references in all countries. Data on file were significantly more likely to be cited in the US (17%) than in Australia (2%) and Malaysia (4%) ($P < 0.001$). Advertisements that provided quantitative information reported risk results exclusively as a relative risk reduction

Conclusions: The majority of claims were vague suggesting poor quality of claims in journal advertising in these three countries. Evidence from a randomized controlled trial, systematic review or meta- analysis was commonly cited to support claims. However, the more frequent use of data that have not been published and independently reviewed in the US compared to Australia and Malaysia raises questions on the quality of references in the US. The use of relative rather than absolute benefits may overemphasize the benefit of medicines which may leave doctors susceptible to misinterpreting information.

Even if claims are referenced, the quality of the references can be dubious or the reference may not actually support the claim.....

BMC Medical Informatics and Decision Making

BioMed Central

Correspondence

Open Access

Accuracy of drug advertisements in medical journals under new law regulating the marketing of pharmaceutical products in Switzerland

Macarena Gonzalez Santiago, Heiner C Bucher and Alain J Nordmann

BMC Medical Informatics and Decision Making 2008, **8**:61 doi:10.1186/1472-6947-8-61

Abstract

Background: New legal regulations for the marketing of pharmaceutical products were introduced in 2002 in Switzerland. We investigated whether claims in drug advertisements citing published scientific studies were justified by these studies after the introduction of these new regulations.

Methods: In this cross-sectional study, two independent reviewers screened all issues of six major Swiss medical journals published in the year 2005 to identify all drug advertisements for analgesic, gastrointestinal and psychopharmacologic drugs and evaluated all drug advertisements referring to at least one publication. The pharmaceutical claim was rated as being supported, being based on a potentially biased study or not to be supported by the cited study according to pre-specified criteria. We also explored factors likely to be associated with supported advertisement claims.

Results: Of 2068 advertisements 577 (28%) promoted analgesic, psychopharmacologic or gastrointestinal drugs. Among them were 323 (56%) advertisements citing at least one reference. After excluding multiple publications of the same drug advertisement and advertisements with non-informative references, there remained 29 unique advertisements with at least one reference to a scientific study. These 29 advertisements contained 78 distinct pairs of claims of analgesic, gastrointestinal and psychopharmacologic drugs and referenced studies. Thirty-seven (47%) claims were supported, 16 (21%) claims were not supported by the corresponding reference, and 25 (32%) claims were based on potentially biased evidence, with no relevant differences between drug groups. Studies with conflict of interest and studies stating industry funding were more likely to support the corresponding claim (RR 1.52, 95% CI 1.07–2.17 and RR 1.50, 95% CI 0.98–2.28) than studies without identified conflict of interest and studies without information on type of funding.

Conclusion: Following the introduction of new regulations for drug advertisement in Switzerland, 53% of all assessed pharmaceutical claims published in major medical journals are not supported by the cited referenced studies or based on potentially biased study information. In light of the discrepancy between the new legislation and the endorsement of these regulations, physicians should not trust drug advertisement claims even when they seem to refer to scientific studies.

More examples of unsubstantiated claims in pharmaceutical advertising...

Claims in advertisements for antihypertensive drugs in a Dutch medical journal

Jacoba P. Greving[a], Petra Denig[a], Dick de Zeeuw[a] and Flora M. Haaijer-Ruskamp[a]

Background Advertising claims must not conflict with the official summary of product characteristics. After a drug has been approved, new clinical evidence may become available.

Aims To determine how the pharmaceutical industry deals with evolving clinical evidence in advertising claims for antihypertensive drugs, and whether such pharmaceutical promotion is up to standard.

Methods We examined all advertisements from the *Dutch Journal of Medicine* published between 1996 and 2004. We judged whether claims were in agreement with the information available from the summary of product characteristics or evidence from cited clinical trials. Subsequently, we reviewed whether these claims had been assessed by the Code of Practice authority.

Results We identified 50 unique advertisements with, in total, 492 appearances for 16 antihypertensive drugs. Claims of blood pressure lowering and convenient use were all judged to be sufficiently substantiated. For calcium-channel blockers, insufficiently supported safety claims had been made in three cases (41 appearances). Claims suggesting effects on long-term outcomes started in 1999 for angiotensin II receptor blockers, and were made during the whole period for several other antihypertensive drugs. In 16 cases (135 appearances), such claims were not supported by the available information. Some claims were premature, others transferred results from a specific patient group to the general population of hypertensive patients. Only two cases were reviewed by the Code of Practice authority.

Conclusions Overall, 35% of the advertisements for antihypertensive drugs contained suggestive claims not supported by the offered evidence. The current system of self-regulation cannot ensure that pharmaceutical promotion is always accurate, balanced and evidence-based. *J Hypertens* 25:713–722 © 2007 Lippincott Williams & Wilkins.

Journal of Hypertension 2007, 25:713–722

Keywords: advertising, antihypertensive agents, drug industry, pharmaceutical promotion, physicians

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Tel: +31 50 363 3205; fax: +31 50 363 2812; e-mail: p.denig@med.umcg.nl

Sponsorship: This study was funded by the University of Groningen. The sponsor had no role in study design, data collection, data analysis, data interpretation, or writing of the manuscript.

Conflict of interest: D.d.Z. has served or serves as advisor to, and/or has collaborated with, AstraZeneca, Boehringer Ingelheim BV, Merck Sharpe & Dohme BV, Novartis Pharma BV, and Sanofi-Aventis BV. None of the authors have any conflicts of interest.

Received 13 March 2006 **Revised** 29 September 2006
Accepted 24 October 2006

More examples of unsubstantiated claims in pharmaceutical advertising...

ORIGINAL ARTICLE

The Accuracy of Psychiatric Medication Advertisements in Medical Journals

Glen I. Spielmans, PhD, Shelly A. Thielges, BA,† Amy L. Dent, BA,† and Roger P. Greenberg, PhD.*

Abstract: Psychiatric medications are frequently advertised in medical journals, yet no study has addressed the veracity of claims made in these advertisements. The present study examined the accuracy of 69 medical journal advertisements for psychiatric medications and the availability of sources cited in these advertisements. Just over half of claims made in advertisements (50.2%) provided no attainable source that could be used to check the veracity of the claim. When sources were attained, they supported the cited claims 65% of the time (95% CI: 61.0–69.1). Claims regarding the efficacy of medications were only supported by obtained cited sources on 53.2% of occasions (95% CI: 46.2–60.2). Attempts to obtain cited data on file from sponsoring drug companies were rarely successful. Given the relatively poor empirical substantiation of claims made in medical journal psychiatric drug advertisements and that most claims provided no attainable sources, increased regulation of such advertising is warranted.

Key Words: Medical journal policy, psychiatric medication advertising, marketing.

(*J Nerv Ment Dis* 2008;196: 267–273)

Why? Their poor track record has resulted in deaths.

Vioxx (rofecoxib): A case study

- A drug for arthritis that was heavily advertised on its release
- Approved for use by the US Food & Drug Administration in 1999
- Merck (the drug manufacturer) was accused of suppressing results that the drug elevated the risk of coronary heart disease
- In 2004, Merck voluntarily redrew the drug from the market
- In the 5 years it was on the market, Vioxx was probably responsible for an estimated 88,000—140,000 cases of serious coronary heart disease, of which an estimated 44% resulted in deaths.[1]
- Merck has settled numerous lawsuits, paying out about US$7 billion (Vioxx generated about US$11 billion in sales revenue), but has never admitted any wrong doing.

[1]Graham DJ, Campen D,Hui R, SpenceM, Cheetham C, et al. 2005. Risk of acute myocardial infarction and sudden cardiac death in patients treated with cyclo-oxynegase 2 selective and non-selective non-steroidal anti-inflammatory drugs: nested case-control study. Lancet 365:475–81

Bottom line: Pay close attention to ads sponsored or co-sponsored by the pharmaceutical industry.

Now let's return to the helping-seeking ad you rated earlier to see HOW you can evaluate ads better.

Take a look at the sponsoring organisation of the ad (enlarged above):

Did you notice the logo when you first viewed the ad?

Probably not.

You're not to blame, it is designed to be barely noticeable.

In future when you come across health promotional material, make it a habit to first identify the sponsor(s).

References: [1] www.msaustralia.org.au

1.

Do not assume that a claim is reliable just because a reference is provided!

Always check the fine print!

Make sure the reference for the

2.

Have a look at the reference for this ad.

The claims made were cited from a website. Websites are often unreliable sources of information because, firstly, it is a secondary source. It is often not possible to verify claims made on websites.

Secondly, it is difficult to determine who manages a website. Is it managed by an individual, a patient group, a pharmaceutical company, healthcare professionals in the private sector, or the government?

Remember that claims made by people or companies who have vested interests may not be trustworthy.

Be wary of calls to consult your doctor.

Pharmaceutical companies advertise to doctors directly too!

Unfortunately, doctors are also susceptible to persuasive advertising.

ORIGINAL INVESTIGATION

Effect of Exposure to Small Pharmaceutical Promotional Items on Treatment Preferences

David Grande, MD, MPA; Dominick L. Frosch, PhD; Andrew W. Perkins, PhD; Barbara E. Kahn, PhD

Background: Policy discussions concerning pharmaceutical promotion often assume that small promotional items are unlikely to influence prescribing behavior. Our experiment measures whether exposure to these items results in more favorable attitudes toward marketed products and whether policies that restrict pharmaceutical marketing mitigate this effect.

Methods: This is a randomized controlled experiment of 352 third- and fourth-year medical students at two US medical schools with differing policies toward pharmaceutical marketing. Participants assigned to treatment were exposed to small branded promotional items for Lipitor (atorvastatin) without knowledge that the exposure was part of the study. We measured differences in implicit (ie, unconscious) attitudes toward Lipitor and Zocor (simvastatin) in exposed and control groups with the Implicit Association Test (IAT). Self-reported attitudes were also measured, and a follow-up survey was administered measuring attitudes toward marketing.

Results: Fourth-year students at the University of Miami Miller School of Medicine exposed to Lipitor promotional items had more favorable implicit attitudes about that brand-name drug compared to the control group (IAT effect: 0.66 vs 0.47; $P = .05$), while the effect was reversed at the University of Pennsylvania School of Medicine (IAT effect: 0.22 vs 0.52; $P = .002$) where restrictive policies are in place limiting pharmaceutical marketing (interaction effect: $P = .003$). No significant effect was observed among third-year students. On a "skepticism" scale, University of Miami students held more favorable attitudes toward pharmaceutical marketing compared to University of Pennsylvania students (0.55 vs 0.42; $P < .001$) but the results were similar to those of a previously published national study (0.42 vs 0.43; $P = .53$).

Conclusions: Subtle exposure to small pharmaceutical promotional items influences implicit attitudes toward marketed products among medical students. We observed a reversal of this effect in the setting of restrictive policies and more negative school-level attitudes toward marketing.

Arch Intern Med. 2009;169(9):887-893

Furthermore, doctors' treatment decisions are not purely rational…

Your requests can weigh heavily on their decisions.

The study presented on the right, employed actors to visit various clinics.

The actors had to adhere to a strict guideline of symptoms and complaints during their consultations with the doctors. The only thing that varied was whether they would make a specific request for a particular drug, a general request for medication, or make no request.

Prescribing rates were much higher when requests were made, even though the medical history presented was identical!

Always thoroughly review health information from independent sources first. Only consult a doctor when you truly feel a need to seek professional advice.

Influence of Patients' Requests for Direct-to-Consumer Advertised Antidepressants

A Randomized Controlled Trial

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Context Direct-to-consumer (DTC) advertising of prescription drugs in the United States is both ubiquitous and controversial. Critics charge that it leads to overprescribing, while proponents counter that it helps avert underuse of effective treatments, especially for conditions that are poorly recognized or stigmatized.

Objective To ascertain the effects of patients' DTC-related requests on physicians' initial treatment decisions in patients with depressive symptoms.

Design Randomized trial using standardized patients (SPs). Six SP roles were created by crossing 2 conditions (major depression or adjustment disorder with depressed mood) with 3 request types (brand-specific, general, or none).

Setting Offices of primary care physicians in Sacramento, Calif; San Francisco, Calif; and Rochester, NY, between May 2003 and May 2004.

Participants One hundred fifty-two family physicians and general internists recruited from solo and group practices and health maintenance organizations; cooperation rates ranged from 53% to 61%.

Interventions The SPs were randomly assigned to make 298 unannounced visits, with assignments constrained so physicians saw 1 SP with major depression and 1 with adjustment disorder. The SPs made a brand-specific drug request, a general drug request, or no request (control condition) in approximately one third of visits.

Main Outcome Measures Data on prescribing, mental health referral, and primary care follow-up obtained from SP written reports, visit audiorecordings, chart review, and analysis of written prescriptions and drug samples. The effects of request type on prescribing were evaluated using contingency tables and confirmed in generalized linear mixed models that accounted for clustering and adjusted for site, physician, and visit characteristics.

Results Standardized patient role fidelity was excellent, and the suspicion rate that physicians had seen an SP was 13%. In major depression, rates of antidepressant prescribing were 53%, 76%, and 31% for SPs making brand-specific, general, and no requests, respectively ($P<.001$). In adjustment disorder, antidepressant prescribing rates were 55%, 39%, and 10%, respectively ($P<.001$). The results were confirmed in multivariate models. Minimally acceptable initial care (any combination of an antidepressant, mental health referral, or follow-up within 2 weeks) was offered to 98% of SPs in the major depression role making a general request, 90% of those making a brand-specific request, and 56% of those making no request ($P<.001$).

Conclusions Patients' requests have a profound effect on physician prescribing in major depression and adjustment disorder. Direct-to-consumer advertising may have competing effects on quality, potentially both averting underuse and promoting overuse.

JAMA. 2005;293:1995-2002 www.jama.com

If participant was at least 'somewhat convinced' by Ad

Now, take a look below at your answers to the question "Which two aspects of the ad were most important to you when making a decision on its convincingness?"

Reason 1: 'ABC'

Reason 2: 'XYZ'

Did any of your reasons relate to the points addressed earlier?

Did you notice that the information you found convincing was from a source that has an incentive to be biased?

Did you think you should seek information from a source with less incentive to be biased before reaching any conclusions about the claims made in the advertisement?

Did you ask yourself whether you should be accepting the information presented as factual, reliable, and unbiased?

If you didn't, then you let yourself be vulnerable to advertisers who may be trying to manipulate you.

Next, you will be shown two new ads and asked to rate each ad independently.

Please take your time to view each ad before answering any questions. You will not be allowed to refer back to the ads while answering the questions.

Click on the >> button to start viewing the ads. Please be patient as it may take a while for the ads to appear on your screen.

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