Dietary supplement advertising in the US
A review and research agenda

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Dietary supplement advertising is an important, yet neglected, advertising research subject. This article overviews the US dietary supplement industry, describes advertising practices for dietary supplement products, and reviews the existing research on the topic. Based on the literature review, we offer a research agenda for advertising researchers around the world to stimulate and guide future investigations of dietary supplement advertising.

Introduction

Research on health-related product advertising has appeared in marketing and advertising journals for many years. Studies have examined a number of different issues and forms of health-related product advertising including nutrition claims in food advertising (e.g. Andrews et al. 2000; Parker 2003; Kim et al. 2009), children’s understanding of advertisers’ tactics (e.g. Rozendaal et al. 2011), weight-loss advertising (e.g. Amos & Spears 2010), alcohol and tobacco advertising (e.g. Dorsett & Dickerson 2004; Capella et al. 2008), cosmetic surgery advertising (e.g. Hennink-Kaminski et al. 2010) and DTC advertising (e.g. Huh & Becker 2005; DeLorme et al. 2006; Yuan 2008). However, little of this research has focused on dietary supplement (DS) advertising specifically, a distinct type of pharmaceutical advertising.

In this article, we review the literature on DS advertising from a scholarly point of view. The review highlights deficits in the literature domain and provides advertising researchers with: (1) a broad overview of the US DS market, (2) a description of the current state of DS advertising, (3) a discussion of how this advertising is regulated, (4) a review and synthesis of the existing published DS advertising studies and their contributions, and (5) a future research agenda derived from the reviewed literature to direct and stimulate
investigations of DS advertising content, processes and effects. As emphasised by Taylor (2011) in a recent IJA editorial, there is a need for scholars formally trained in the study of advertising to call attention to advertising and society issues deserving more research. Prompting discussion and systematic investigation of these complex topics can have a substantial impact on advancing current knowledge and potential for long-term meaningful influence through generation of subsequent research (Taylor 2011).

DS advertising is important to investigate because the products are heavily advertised and readily available in the US, purchased and consumed widely and increasingly (Mintel 2009; Bailey et al. 2011; Samadi 2011), have significant public health implications, and are marketed within a controversial regulatory context and challenging information environment with potentially problematic unintended consequences (Mason & Scammon 2011) including a 'climate of experimentation' in how DS products are being used (Nichter & Thompson 2006, p. 204). Given the limited nature of existing research, it is hoped that greater study of DS advertising from researchers within and outside the advertising field will strengthen disciplinary knowledge of the advertising form as well as produce a more complete empirical understanding of the phenomenon that can be applied by advertisers in an effective and socially responsible manner. As chronicled herein, DS advertising offers new avenues for advertising researchers to apply existing theories and concepts to this unique context thereby advancing fundamental disciplinary knowledge of how the form of pharmaceutical advertising works.

**Definitional boundaries**

A dietary supplement (DS) is 'any product designed to supplement the diet that bears one of the following ingredients: a vitamin, a mineral, a herb or other botanical agent, an amino acid, weight-loss supplement, or herbal remedy' (Main et al. 2004, p. 129). Examples include calcium, echinacea, glucosamine-chondroitin, omega-3 fatty acids and vitamin C. Because many medical conditions are nutritionally related, DSs are considered helpful in disease prevention and health maintenance. However, DSs are not intended to be medical treatments and there is debate about their safety and effectiveness. Particular DSs (e.g. vitamins D and B12 for older adults, folic acid for women of childbearing age) have scientific documentation about health benefits, but others need more study (Sadovsky et al. 2008).

Advertising is thought to play a key role in the purchasing and consumption of DS products and, along with other sources, helps meet consumers' informational needs. However, DS advertising is complex relative to other advertising for several reasons. First, it involves communicating to consumers faced with decisions about a vast quantity of different types of DSs on the market and ongoing conflicting media reports on the efficacy of various DSs (Mintel 2009). Second, it involves promoting a health-related product with potential physical risks to consumers that often contains a substantial amount of detailed ingredients with unfamiliar scientific terminology. Third, it involves a product that has been legally placed in a unique 'liminal' regulatory category such that it is regulated as neither a food nor a drug (Nichter & Thompson 2006). This situation has created
an ambiguous marketplace information environment (Mason & Scammon 2011; Nichter & Thompson 2006), and DS products and their ad claims have been the subject of public criticism and regulatory scrutiny.

Common health claims found in modern DS ads include 'fibre maintains bowel regularity', 'antioxidants maintain cell integrity' and 'helps restore mental alertness or wakefulness when experiencing fatigue or drowsiness' (Johnson 2004). Some DS ingredients have known safety issues, yet are advertised as safe to use for various health benefits. For example, certain ads promoting St John's Wort products claimed that consumers could safely use this supplement to treat a number of diseases including AIDS, tuberculosis and hepatitis. These ads triggered the FTC's legal actions and the marketers were required to include a statement in their ads warning consumers about possible dangerous interactions with particular prescription (Rx) drugs, and advising consumers to consult with a physician before taking this supplement (Goldstein 2002). Recently, POM Wonderful, a company selling pomegranate juice and supplement products, advertised its products as helping to reduce the risk of heart disease, prostate cancer and impotence. The FTC found that scientific evidence does not support those claims and brought legal actions to prevent the company from making any further medical claims (Wyatt 2010).

Research questions and methodology

To advance knowledge on DS advertising, we sought to answer three research questions:

RQ1: What is the current state of DS advertising within the context of marketplace trends and the regulatory environment?

RQ2: What are the scope, characteristics and major findings of existing published academic studies on DS advertising?

RQ3: What directions for future research can be offered to advertising researchers based on the reviewed literature?

To answer the first research question, our methodological approach involved acquiring and reading books, trade journal articles, publicly available research reports and secondary data about the DS industry. We then conducted an extensive search of scholarly publications to identify empirical studies on DS advertising to answer the second research question. The process began by searching electronic research databases (e.g. ABI/INFORM, Academic Search Premier, Business Source Premier, Communication & Mass Media Complete, EBSCOhost, Expanded Academic ASAP) and Google Scholar using various combinations of keywords such as 'dietary supplements', 'nutritional supplements', 'vitamins', 'minerals', 'herbs', 'weight loss', 'nutrition', 'advertising', 'marketing', 'promotion' and 'communication'. The contents of the three main advertising-focused scholarly journals (Journal of Advertising, International Journal of Advertising, Journal of Advertising Research) were also searched electronically using these keywords.
Next, the titles of articles in the lists that resulted from this search were scanned for relevance. The literature review sections and reference lists in the resulting relevant articles were then perused to retrieve potentially pertinent work that had not already been identified. Analysis involved reading the resulting set of identified DS advertising-focused articles, looking for patterns in the content, and making comparisons across the studies. Interpretations of this analysis helped answer our third research question.

Results

We report our results in two sections. First, a broad overview of the US DS industry is presented to establish the context of the current state of DS advertising, followed by a review of the empirical research.

The current state of dietary supplement advertising

US dietary supplement market trends

DS consumption in the US is widespread and has increased steadily over the past 20 years (Eisenberg et al. 1998; Balluz et al. 2000; Tindle et al. 2005; Bardia et al. 2007; Mintel 2009; Bailey et al. 2011; Samadi 2011). Findings from the most recent National Health and Nutrition Examination Survey (NHANES) revealed that 49% (44% of males, 53% of females) of the US population (age one year and older) and 54% of adults reported use of at least one DS (Bailey et al. 2011). The majority of DS users (79%) reported consumption daily within the past 30 days (Bailey et al. 2011). While most users take only one DS, 10% of Americans reported taking five or more (Bailey et al. 2011). Among DS types, multi-vitamin/multi-mineral use was the most frequent (reported by about one-third of the US population) (Bailey et al. 2011).

Supplements are purchased and consumed for various and often overlapping combinations of physical, psychological, social and economic reasons (Nichter & Thompson 2006). In terms of physical benefits, DSs are believed to offer nutritional support; reduce stress; improve energy, strength or endurance; help in weight loss or build muscle; boost the immune system; or prevent or manage a certain ailment (US FDA 2008; Mintel 2009). Psychological purchase motives include peace of mind if DSs are perceived as prevention and protection against future health issues (Peters et al. 2003). Other factors for use are financial. In the recession, the rise in unemployment and subsequent loss of health insurance coverage has led consumers to turn to DSs in an attempt to avoid expensive Rx drugs and to minimise doctors’ visits and medical bills (Jiang 2009; Mintel 2009; ‘Nutritional Supplements’ 2011; Samadi 2011).

The DS market is huge and diverse. While use is common across all socioeconomic levels, national surveys and other studies have shown that heavier consumption has been connected to being older, female, Caucasian, educated and affluent (Lyle et al. 1998; Balluz et al. 2000; Greger 2001; Fennell 2004; Gunther et al. 2004; Mintel 2009; Bailey et al. 2011). Along with the ageing US population, a national average life expectancy approaching 80 years has dictated high demand for vitamins and supplements that battle
age-related issues, such as osteoporosis and heart disease (Samadi 2011, p. 6). Probably reflecting this trend is data that reveal 36% of the DS market comprises consumers aged 65 and older, 34% is 35–64, 21% is 19–34, and 9% is 18 and younger (Samadi 2011).

Consumption has also been associated with healthy lifestyles. For instance, DS users are more likely to be non-smokers, non-drinkers and to eat more nutritious (Greger 2001). Although the relationship between DS use and physical exercise is unclear, supplements are popular among professional and recreational athletes, body builders and fitness enthusiasts for sports nutrition and to enhance performance (Greger 2001; Samadi 2011). In addition, many consumers purchase and use supplements marketed for weight loss assistance (e.g. herbal diet pills) (Blanck et al. 2007; Jordan & Haywood 2007; Pillitteri et al. 2008). For example, a nationally representative survey of adults (Pillitteri et al. 2008) found that, of respondents who reported making a serious weight-loss attempt, one third (33.9%) reported ever using a dietary supplement for weight loss.

DSs may be recommended by healthcare practitioners but the majority of DS use is self-prescribed (Thompson & Nichter 2007). Research on how consumers use DSs is scant but there is some evidence that a lot of individual experimentation occurs in dosage, frequency and duration of use, and taking combinations of DSs alone and mixed with over-the-counter (OTC) and Rx drugs (Nichter & Thompson 2006; Thompson & Nichter 2007).

Despite the struggling US economy, the DS market is large and continuing to thrive (Samadi 2011), though exact industry figures are difficult to identify. One source estimated total industry revenue to be $27.9 billion in 2010, and forecasted revenue to grow 3.9% in 2011, with an average rate of 4.5% annually through 2016 to reach $34.7 billion (Samadi 2011). It is expected that herbal and botanical supplements will generate 45.7% of this revenue, vitamins 25.4%, minerals 19.8%, and amino acids and proteins 9.1% (Samadi 2011). Another source, a market research company, Packaged Facts, estimated US DS sales exceeded $9 billion in 2009, an 8% increase over 2008, and forecasted that sales would exceed $13 billion in 2014 ('Nutritional Supplements’ 2011).

Expanding DS sales have been attributed to a combination of factors including an ageing population (Mintel 2009; Samadi 2011), increased consumer health consciousness, greater public and professional acceptance and usage of complementary and alternative medicine (CAM) of which DSs are among the more popular modalities (Eisenberg et al. 1998; Tindle et al. 2005; Bardia et al. 2007), new DS products on the market prompted in part by regulatory changes (Bardia et al. 2007) and escalating costs of traditional healthcare (Mintel 2009; Samadi 2011).

The supplement industry is also competitive. Approximately 30,000 different DS products are available in the US and about 1,000 new ones enter the market each year (Triplett 2004). Supplements can be readily purchased without an Rx through various retailers, direct marketing and the internet (Mintel 2009; ‘Nutritional Supplements’ 2011). Of total DS sales, food, drug and mass-market stores (e.g. Kmart, Target, Walmart) contribute about 30%, speciality health food stores about 20%, and the remainder is generated through professionals such as physicians and dieticians (‘Nutritional Supplements’ 2011). The brand selection is vast, with Nature’s Bounty, Nature Made, Centrum Silver and
Osteo Bi Flex among the nation's current leaders (Johnson 2009). A report by Mintel indicated that nearly three in ten DS users use store brands (Mintel 2009).

A growing trend is that the DS market is becoming more specialised (Mintel 2009). The number of products on the market designed specifically for women only, or men only, has been growing over the past several years and many products are also customised for certain age groups (Mintel 2009). For instance, Bayer's line extensions include One a Day Men's Health Formula, One A Day Women's, One A Day 50+ Advantage, One A Day Teen Advantage and One A Day Energy that claims to 'support mental alertness' and provide 'an energetic feeling'. As consumers are becoming more aware of the potential benefits of DSs, they are demanding that these products cater to their personal dietary needs, nutritional regimens, health goals or gender-related conditions (Mintel 2009). Examples include Knox NutraJoint Plus Glucosamine Chondroitin, and MSM Supplement and Garden of Life Vitamin Code Raw Prenatal Dietary Supplement (Mintel 2009). Some 'savvy supplement marketers have turned the internet into an arena for far-reaching health and wellness information, with the sales pitch interwoven with the educational content of websites. An excellent example of this is the Remifemin website, which offers a 'personal support programme' for women using their herbal product for treatment of the symptoms of menopause (Nichter & Thompson 2006, p. 199). The demand for goal-orientated and individualised DS products is expected to increase in the future (Mintel 2009).

Dietary supplement advertising trends

Consumer advertising has long played a pivotal role in DS marketing and continues to be a prominent force. DS advertising spending has risen steadily, climbing to $904 million in 2008, which is about 10% growth from $826.5 million in 2007 (TNS Media Intelligence 2009). Magazines comprised 40.3% of the total 2008 ad media expenditures, revealing DS marketers' heavy reliance on magazine advertisements and advertorials (TNS Media Intelligence 2009). More recent data show that DS advertising spending in the US has slightly declined, along with the decreases in other advertising sectors. For the year 2010, total spending was $838 million, with magazine ads taking the largest share (46.6%) followed closely by TV ads (43.7%) (TNS Media Intelligence 2011). Data on DS advertising spending by media are presented in Figure 1. Top-spending brands included Carnation Essentials Instant Breakfast Drink Mix ($19.2 million), Soyjoy Nutrition Bar ($17.7 million), Phillips Colon Health Probiotic Supplement ($16.1 million), Force Factor Nutritional Supplements ($14.4 million), Ensure Nutritional Supplements ($13.4 million), Hydroxycut ($11.3 million) and Emergen-C ($11.1 million) (TNS Media Intelligence 2011).

The prevalence of DS advertising in the US is reflected in a 2010 nationally representative telephone survey by Thomson Reuters. The survey found approximately two-thirds (63%) of respondents had experienced some form of DS advertising in the past six months and, of those respondents, 12% reported being influenced to purchase the

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1 The advertising spending total for each year was calculated by summatng advertising expenditures for three product categories – vitamins & minerals, weight loss & gain aids, and nutritional supplements.
product (Thomson Reuters 2010). Yet, a survey by Mintel found 42% of DS users say they are confused by the vast variety of DSs on the market, nearly four in ten believe all brands work the same, and 29% of respondents report frequently changing DSs based on information in the news (Mintel 2009).

About 60% of total respondents of a Thomson Reuters study on consumer attitudes towards advertising for both Rx drugs and DSs think DS ad claims are untrustworthy, with more educated and affluent consumers indicating higher levels of scepticism of this advertising form (Thomson Reuters 2010). Lack of consumer trust is thought to be associated with a few publicised incidents about DS companies making unsubstantiated claims about their products (Mintel 2009). ‘Bayer, for one, has faced increasing scrutiny of its advertising claims for its One a Day brand from the FTC and other groups, which claim that One A Day products do not do as advertised in preventing cancer and helping weight loss’ (Mintel 2009, pp. 1–2). Further, in the largest settlement to date for a multi-state case made against a DS manufacturer, Airborne maker Knight-McDowell agreed to pay a seven-million-dollar settlement to settle allegations that the company made unlawful marketing claims about its products’ benefits (Mintel 2009). However, results of a Mintel survey indicate 35% of their respondents who use DSs report being unconvinced they work, but take them anyway (Mintel 2009).

Supplement manufacturers use various standard advertising techniques, though ads are typically more claim based than brand image orientated. All media forms have been used to deliver these messages. As the DS industry has become increasingly competitive, companies have been facing greater pressures to establish unique claims for their products.
Advertisers commonly use health-related claims to create healthful product perceptions and, thus, sales. Often, these claims are presented as 'expert' endorsements, celebrity endorsements and consumer testimonials (e.g. 'before' and 'after' photos) (McCann 2005). It is imperative that DS advertising be truthful and non-misleading so consumers can make safe, appropriate and informed decisions. Yet there have been difficult concerns in promoting these products.

DS advertising is increasingly using condition-specific claims (i.e. claims about the benefits of using certain DSs to prevent or address particular conditions such as those that are age-related or gender-related) (Mintel 2009). For example, a 2009 Pharmovite television spot focuses on how Nature Made vitamins provide energy to help a middle-aged couple manage a bed and breakfast, and a 2008 Wyeth television spot for Centrum Cardio employs an older spokesperson to emphasize the product’s cholesterol-lowering properties to help reduce the risk of heart problems (Mintel 2009). ‘Centrum Cardio is marketed as the “first and only” complete daily multivitamin among leading brands that reduces the risk of heart attack by lowering cholesterol’ (Mintel 2009, p. 1).

**Dietary supplement advertising regulation in the US**

In the US, the FTC has jurisdiction over DS advertising regulation and the FDA has regulatory authority for DS claims in labelling. However, the distinction between advertising and labelling is not always clear, often leading to controversies (Villafranco & Lustigman 2007). In principle, if the information accompanies the product at the point of sale, it is labelling. Otherwise, it is considered advertising (Abood 2008). That is, the FDA is responsible for regulating claims on supplement labelling (i.e. affixed label, packaging, inserts, point-of-sale materials), while the FTC regulates claims in broadcast commercials, print ads, direct marketing materials, internet ads and infomercials (US FTC 1998; Villafranco & Lustigman 2007; US FDA 2008).

For FTC guideline compliance, DS ad claims must be truthful, non-misleading and adequately substantiated, as in other ad claims. Further, in 1998 the FTC issued *Dietary Supplements: An Advertising Guide for Industry*. The Guide specifies and illustrates how the FTC’s truth-in-advertising law and substantiation standards apply to health-related claims in DS advertising (Stroube et al. 2002; Shaheen & Mudge 2008). It also discusses ad techniques that have prompted scrutiny (e.g. testimonials, endorsements).

For example, to constitute substantiation of DS ad claims, a reasonable claim, based on competent and reliable scientific evidence, should be made. The FTC interprets ‘competent and reliable scientific evidence’ as any ‘test, analyses, research, studies or other evidence based on the expertise of professionals in the relevant area that have been conducted and evaluated in an objective manner by persons qualified to do so, using procedures generally accepted in the profession to yield accurate and reliable results’ (US FTC 1998, p. 9).

The key ingredient of a DS should meet the competent and reliable standard. Regarding ad claims for products containing multiple ingredients, the FTC suggests where ‘the combination of two herbs with similar stimulant properties could produce a stronger cumulative stimulant effect that might present safety hazards’, studies on
individual ingredients may be insufficient and testing the combination may be warranted (US FTC 1998, p. 17). DS ads, however, do not have to be approved by the FTC before dissemination (Ashar et al. 2008).

DS advertising is also self-regulated. The primary self-regulatory bodies include the National Advertising Division (NAD) and the Council for Responsible Nutrition (CRN), a major DS industry trade association. Others include media organisations (e.g. National Association of Broadcasters) and professional advertising associations (e.g. American Advertising Federation) (Labarbera 1980). These groups have self-governance systems and codes of conduct that augment the FDA and FTC requirements. The CRN operates its own self-regulatory programme specifically for DS advertising and there have been efforts towards more rigour. In 2007, the CRN and NAD partnered to improve DS advertising scrutiny (Villafranco & Lustigman 2007; Shaheen & Mudge 2008; Cavaliere 2009). Specifically, CRN funded grants for an additional NAD staff attorney to focus exclusively on DS ad regulation (Villafranco & Lustigman 2007; Cavaliere 2009).

Two federal legislations enacted in the 1990s are among regulatory factors explaining the increase in DS ad spending: the 1990 NLEA (Nutritional Labeling and Education Act) and the 1994 DSHEA (Dietary Supplement Health and Education Act). NLEA clarified definitions of nutritional terms and enabled food companies to utilise standardised nutritional labelling information, possibly leading to greater consumer interest in food labelling, more reliance on nutritional label information for purchase decisions, and a stronger association between food and health conditions resulting in acceptance of DS ad claims (Stroube et al. 2002).

DSHEA substantially changed the way supplements are regulated, affecting ad practices. Because it allows manufacturers to advertise certain supplements without FDA's pre-approval, specific use-related hazards may not be discovered until extensive consumption reveals any adverse effects. As noted by Crawford and Leventis (2005, p. 435), 'dietary supplements are subject to far less regulation than prescription drugs, non-prescription drugs, food additives, infant formulas, and virtually any other products subject to public consumption'. DSHEA, a catalyst for the substantial increase in DS advertising and associated issues, will be explained next. Along with the ageing population, economic conditions and trend of greater consumer interest in CAM, DSHEA has been a significant and influential driver of the DS market and advertising.

**Origin and content of the Dietary Supplement Health and Education Act (DSHEA)**

DS advertising is situated within a long and complicated legal debate involving acceptable health-related claims (Mason 1998; Nestle 2002). DS industry lobbying and a consumer grassroots campaign prompted the US Congress to pass the 1994 Dietary Supplement Health and Education Act (DSHEA), which amended the Federal Food, Drug, and Cosmetic Act and created a new regulatory framework for DS safety and labelling (Trippelett 2004). The central argument for DSHEA was that it would improve consumer access to DS information (Seamon & Clauson 2005; Mason et al. 2007).
Unlike pharmaceutical companies, DS manufacturers are legally prohibited from using a 'disease claim' (e.g. 'treats insomnia', 'treats dyspepsia') for their products (Crawford & Leventis 2005; Nichter & Thompson 2006; Chung et al. 2007). That is, DS advertising cannot use statements that claim to prevent, diagnose, treat, mitigate or cure a specific disease (US FDA 2005). This restriction is intended for consumer protection because for DSs 'as mandated by DSHEA, neither manufacturers nor the FDA is required to prove that a product does what it claims to' (Nichter & Thompson 2006, p. 177). According to DSHEA, a DS label may include a 'health claim' (statement about a relationship between an ingredient and reduced risk of a health condition; e.g. 'may reduce the risk of osteoporosis'), or a 'nutrient content claim' (description of the relative amount of a substance in a product; e.g. 'good source of calcium'), or a 'structure/function claim' (statement about how a product may affect organs or bodily systems; e.g. 'builds strong bones') (Nestle 2002; Crawford & Leventis 2005; Chung et al. 2007).

However, controversy exists as to whether the difference between 'structure/function claims' and 'disease claims' is meaningful and easy to distinguish from consumers' perspectives. Although DS advertising cannot claim to 'cure cancer' or 'treat diabetes', it can instead claim to 'support healthy immune function' or 'maintain healthy blood sugar'. Curing cancer or treating diabetes are classified as 'disease claims', but supporting healthy immune function (for cancer treatment) or maintaining healthy blood sugar (for diabetes treatment) can be considered 'structure/function claims'. Furthermore, while DS advertising cannot claim to 'treat migraine', the disease condition can be included on product names, such as 'Migraine B-Gone' (Harris 2000). Due to the different enforcement standards for health claims by the FDA for labelling and the FTC for advertising, DS marketers are making fewer health claims in advertising but more claims in labelling (Mason 1998).

DSHEA contained four basic provisions. It: (1) broadened the legal definition of DSs beyond vitamins and minerals to encompass less studied botanical, herbal and diet products; (2) provided that manufacturers are not required to prove the safety, efficacy and quality of their products to the FDA before marketing them; (3) specified the FDA is responsible for demonstrating products are unsafe before removing from the market; and (4) allowed manufacturers to label their products with a new claim – a 'structure/function claim' that, unlike 'health claims' and 'nutrient content claims', does not require FDA approval: (a) if the manufacturer notified the FDA within 30 days of first marketing the product, (b) has substantiation for the statement on file, and (c) if the following disclaimer is included on the label: ‘This statement has not been evaluated by the FDA. This product is not intended to diagnose, treat, cure, or prevent any disease’ (Nestle 2002; Villafranco & Lustigman 2007).

DSHEA generated controversy among stakeholders including manufacturers, industry associations, health practitioners, policy makers, public interest groups and consumers. According to critics, DSHEA allows too many claims with inadequate supporting evidence while limiting the FDA's regulatory ability. They also argue the FDA lacks resources for adequate enforcement. However, proponents emphasise the DS industry's self-regulatory ability; that manufacturers must have claim substantiation evidence on
hand; and that the mandated ‘structure/function disclaimer’ alerts consumers about the product’s lack of FDA review (Triplett 2004). While some say the recent Dietary Supplement and Nonprescription Drug Consumer Protection Act requiring manufacturers to report all serious DS-related adverse events to the FDA is progress towards tighter regulation (Ashar et al. 2008), the debate continues.

Consequences of the Dietary Supplement Health and Education Act (DSHEA)

DSHEA has had significant advertising-related consequences. First, with broadening of the DS definition, the quantity and diversity of DS products has proliferated (Ashar et al. 2008). A wider variety of DSs has benefits for consumers. For instance, supplements are available to consumers at a lower price than drugs due to reduced development costs, and access to health information is increased. Many DSs appear to help in health maintenance or improvement, and most present no major health threats. Because consumers typically take DSs without medical supervision, however, lack of proper usage directions and risk awareness is a concern (Nichter & Thompson 2006; Thompson & Nichter 2007). They may have little understanding of the dangers of excessive intake and long-term effects; how DSs may interact with medications, other DSs, or health conditions; and how they can cause allergic reactions or toxicity (Balluz et al. 2000). For example, products containing the stimulant ephedra (ma huang), which were advertised for weight loss and muscle gain, have been banned in the US since 2004 because of reported risks to cardiovascular and central nervous system functioning, and links to over 150 deaths (Ives 2003; Triplett 2004).

Second, DSHEA’s relaxed federal regulation regarding premarket approval allows consumption of potentially harmful or ineffective DSs due to lack of ingredient standardization or from contamination (Crawford & Leventis 2005; Sadovsky et al. 2008). While there are voluntary guidelines, regulations to ensure DS quality are just now being implemented. Even safe but ineffective supplements put consumers at risk if they have a serious health condition better treated with conventional medications (Mason 1998). Consumers are also harmed financially by wasting money on ineffective DSs.

Third, stemming from DSHEA’s ‘structure/function claim’ category, companies have been making all kinds of label claims about their products’ health-related benefits, some unproven or exaggerated (Scally & Hodge 2000). As noted by Mason and Scammon (2011, p. 202), ‘The regulation created an incentive for marketers to make relatively non-specific structure-function claims rather than more explicit health claims because structure-function claims did not require documentation of safety or proof of efficacy.’ For instance, DS advertising can claim to ‘maintain urinary tract health’ (‘structure/function claim’) without documentation of safety or proof of efficacy, although they are prohibited from claiming to ‘treat urinary tract infections’ (‘disease claim’).

A fourth consequence of DSHEA is that, while increasing health information, it may have added confusion (Nichter & Thompson 2006; Mason & Scammon 2011). Consumers may be overwhelmed by the preponderance of products and claims or misled.
by similarities in claims on supplements and pharmaceuticals (Mason 1998), leading them to harmful, inappropriate or unnecessary DS uses (Mason & Scammon 2000; Nichter & Thompson 2006). Some research (Nichter & Thompson 2006; Mason & Scammon 2011) has indicated that consumers are interpreting DS information (claims and disclaimers) on product labels and other materials in ways that are biased towards the DS seller and/or in favour of their own idiosyncratic DS usage motivations and not necessarily in the manner intended from the government’s policy intervention (DSHEA). For example, a qualitative study of DS users (Mason & Scammon 2011) found that the vagueness of ‘structure/function claims’ seemed to contribute to consumers’ misinterpretations such that they read into the claims what they hoped to experience from DSs based on their motivations for taking them.

Fifth, DSHEA accelerated DS advertising volume and variety (US FTC 1998). It loosened the FDA’s regulation of DS labelling, but did not change the FTC’s regulation of DS advertising (Villafranco & Lustigman 2007). The FTC has stricter standards for health-related claims in DS advertising than the FDA’s for labelling, and over the years has filed hundreds of actions for allegedly false or misleading claims in DS ads (Mason 1998; Sopher 2005). Still, DSHEA seems to have prompted, ‘a proliferation of advertisements which, despite FTC guidelines, contain misleading, erroneous, or unsubstantiated information’ (Ashar et al. 2008, p. 23). For instance, some manufacturers have resorted to tactics such as using dramatic testimonials claiming miraculous results, sensationalistic portrayals and unsubstantiated research with scientific jargon (Sopher 2005; Torok & Murray 2008). Concerns stem not only from direct verbal claims but also from visual associations that imply unrealistic benefits (McCann 2005).

Apparently, many manufacturers were unclear about the regulatory distinctions or deliberately tried to capitalise on the ambiguity. ‘As marketers are able to make more suggestive claims in labelling, they could assume that these claims also would be allowed in advertising or perceive that action may not be taken against them because of the FTC’s constrained resources for enforcement’ (Mason 1998, p. 301). Thus, there have been calls for stricter DS ad regulation.

Another potential issue emerging from DSHEA is that as DSs continue to become increasingly available and highly advertised, consumers may develop a false sense of safety (Blendon et al. 2001; Ashar et al. 2008). They may assume, incorrectly, that these products are closely regulated by the government, regulated like pharmaceuticals and always advertised truthfully (Blendon et al. 2001; McCann 2005). For example, ‘a nationwide 2002 Harris poll revealed that more than half the respondents believed – wrongly on all counts – that supplements couldn’t be sold without government approval, that warnings of possible side effects had to appear on labels, and that claims of safety had to be backed by scientifically rigorous proof’ (Triplett 2004, p. 716).

Other studies have also revealed misperceptions (overestimation) by consumers regarding DSs’ safety, efficacy and regulation (e.g. Nichter & Thompson 2006; Dodge & Kaufman 2007; Pillitteri et al. 2008; Dodge et al. 2011; Mason & Scammon 2011). Pillitteri and colleagues (2008) found that for both DS users and non-users in their study, approximately half mistakenly believed DSs are evaluated by the FDA for safety and
efficacy before being marketed, approximately two-thirds believed side effect warnings had to appear on labels, and at least one-third believed DSs are safer than OTC or Rx drugs. Research by Dodge and colleagues (2011) also indicated a lack of knowledge by consumers about DSHEA, despite its existence for over 15 years. Regarding the persistence of misperceptions, Mason and Scammon (2011, pp. 211–212) note that 'individuals seem to have been socialised to infer a level of regulation that does not exist in the supplement industry'. There are further concerns with the promotion and perception of DSs as 'natural' and therefore harmless, which is not always true (McCann 2005; Nichter & Thompson 2006).

**FDA and FTC collaboration for internet advertising regulation**

While the internet has many advantages for DS manufacturers and consumers, there are also issues with its popularity as a promotional tool (Anthony 2002). The average consumer probably receives hundreds of emails a year trying to sell DSs using unproven claims (Drazen 2003). Many questionable DSs have also been promoted improperly through websites making illegal 'disease claims' or failing to disclose possible contraindications or adverse effects (Ashar et al. 2003; Morris & Avorn 2003; Triplett 2004).

The plethora of potentially inaccurate or incomplete health-related information on the internet poses significant risks for consumers. While the basic FTC principles for truth-in-advertising also apply to the internet, it is difficult to control DS claims in this dynamic venue (Crawford & Leventis 2005; Jordan & Haywood 2007). The FTC issued internet marketing guidelines in an effort to address these unique issues (Villafranco & Lustigman 2007).

Additionally, the FTC and the FDA have been implementing initiatives for stronger enforcement of fraudulent DS marketing on the internet, such as periodic online searches to identify websites and ads lacking substantiation for claims (Anthony 2002; Nestle 2002; Crawford & Leventis 2005; Villafranco & Lustigman 2007). Hundreds of internet marketers have been issued warning or advisory letters as a result (Crawford & Leventis 2005; Villafranco & Lustigman 2007). Challenges remain, however, due in part to federal agency resource limits.

**Empirical studies on dietary supplement advertising**

Results of our literature search and analysis indicated that much of the existing literature has appeared in US law or public policy–related journals and consisted of non-empirical critical discussions pertaining to: (1) DSHEA and product labelling (e.g. Mason 1998; McCann 2005; Onel 2005), (2) DSHEA and the FTC's regulation of supplement ad claims (e.g. Peeler & Cohn 1995; Pinco & Halpern 1999; Stroube et al. 2002; Villafranco & Lustigman 2007; Villafranco & Bond 2009), and (3) issues with DSs marketed for weight loss (e.g. Galloway 2003; Galloway et al. 2005; Sopher 2005; Gross 2006–2007).

Our search produced few empirical studies on DS advertising exclusively. Research on this subject is also recent. Publications have appeared in the scholarly literature (primarily...
in public health, nutrition and alternative medicine journals) only since the early 1990s. Only two studies have been published in the major advertising journals (Journal of Advertising, International Journal of Advertising, Journal of Advertising Research). These studies have concentrated on a few issues: (1) traditional media and internet advertising content, (2) information sources for consumer DS decision making and the role of DS ads, and (3) consumer perceptions of DS advertising and regulation.

Dietary supplement advertising content

DS advertising message content has been the focus of most of the empirical DS advertising research. This work has aimed to document and evaluate the quantity and quality of information in DS advertising, particularly regarding safety and regulation. Eight content analytic studies have been published to date. The subject of six has been print advertising, specifically magazine ads (Phüen et al. 1992; Kava et al. 2002; Main et al. 2004; Chung et al. 2007; Soller et al. 2007; Shaw et al. 2009) while two examined DS advertising on the internet (Ashar et al. 2003; Jordan & Haywood 2007). These studies have discovered the following about the content of DS ads.

Magazine ads

Philen et al. (1992) examined the frequency and characteristics of DS ads in 12 US health and bodybuilding magazines. Across the entire sample, there were a total of 89 DS companies, 311 different products, 235 unique ingredients and 914 mentions of ingredients. On average, each magazine contained 26 DS ads. Many of the products were promoted for enhanced strength and muscle growth. The most frequent ingredient was amino acids and most frequent health claim was muscle growth. Ads for 90 products did not include any health claims. Further, the amount of each ingredient and recommended dosage were rarely mentioned, and there were few warnings about possible side effects or contraindications.

Kava et al. (2002) published a content analysis of DS articles and ads in ten US magazines with high older adult readership to determine what type of safety information was provided. Across the sample, the number of DS ads was found to decrease the first year but then increase each year over the time period examined (1994–1998). The most frequently advertised DSs were those of interest to older adults (e.g. multivitamins, antioxidants, calcium, ginkgo biloba, garlic, ginseng). Safety information was not covered comprehensively in over two-thirds of the articles and not mentioned in the ads. Further, no relationship was found between the number of DS ads in a magazine and the quality of safety information in the DS articles in the same magazine.

Main et al. (2004) content analysed magazine ads for three product categories – Rx drugs, OTC drugs and DSs – to examine and compare message appeals (rational vs emotional appeal) used in the ads. However, DS advertising was included only briefly for comparative purposes as the main focus of this study was Rx drug advertising (DTC advertising). The results showed that 43% of DS ads contained a rational appeal in either the headline or the visual or both parts, which indicated emotional appeals are more
prevalent than rational appeals in DS advertising. No significant differences were found among the three products regarding use of rational appeals. Positive emotional appeals were used in the visual elements in 58% of DS ads and in the headline in 46% of DS ads, and 36% of DS ads used a positive emotional appeal in both parts. Negative emotional appeals were used less frequently than positive emotional appeals in all three types of product advertising, and DS ads were particularly less likely to use negative emotional appeals in the headline than were Rx drug ads. Nine per cent of DS ads used a negative emotional appeal in the visual, 15% were used in the headline, and 6% were used in both the visual and headline.

Chung and colleagues (2007) published a study that examined non-English DS ads in two high-circulation US ethnic newspapers (Los Angeles Korea Times, Los Angeles Korea Daily) to investigate compliance with relevant federal ad regulations (DSHEA and the FTC’s DS ad regulations) and assess availability of supporting evidence to substantiate health claims. All DS ads (103 total) in the two newspapers were analysed. Determining availability of data to substantiate claims involved requesting the data from the manufacturers and browsing the manufacturers’ websites. The results revealed that of the total sample, 84.5% of the ads made prohibited ‘disease claims’, only 18.4% of the ads included DSHEA warnings, and only 31.3% of the manufacturers provided evidence to substantiate the claims when requested.

Soller et al. (2007) analysed the extent and nature of manufacturers’ voluntary use of a ‘structure/function disclaimer’ in DS ads in three US bodybuilding magazines. The researchers found a total of 163 ‘structure/function claims’ across the entire ad sample (73 different ads), categorised into eight ‘actions’: weight loss, energy, bodybuilding, vasodilator, recovery, strength, hormone-related and pain (some products had more than one ‘action’). Of the total ‘structure/function claims’, approximately 58% were associated with a ‘structure/function disclaimer.’ Further, there was no clear difference among the claim ‘action’ categories regarding use of a ‘structure/function disclaimer’. The researchers also compared the voluntary ‘structure/function disclaimers’ in the DS ads to the FDA-required ‘structure/function disclaimers’ for DS labels. They found that the voluntary ‘structure/function disclaimers’ often were not on the same page as the claims, were not presented prominently, and were not linked to the claims by an asterisk. The study indicates that many manufacturers are using ‘structure/function disclaimers’ voluntarily in their ads. However, these disclaimers are similar to but do not meet the FDA’s required disclaimer for DS labels exactly.

Shaw and colleagues (2009) examined the frequency and accuracy of DS information in ads and articles in eight US magazines with high adolescent readership (three teen magazines and five adult magazines with high teen readership). The study documented 132 total DS products mentioned 238 times in the 88 magazine issues sampled (ads and articles). Fifty issues contained no DS mentions. Seven total DS references were identified across all teen magazines (five in the articles and two in the ads), while 231 total DS references were identified across all adult magazines (139 in the articles and 92 in the ads). The entire sample contained 54 ads, of which there were 94 DS references. Forty-three per cent of the ads were full page, 46% referred to research and 32% used testimonials, half
of which were celebrity endorsements. The majority of ads (79%) did not have a visible ‘structure/function disclaimer’.

Internet advertising
Ashar and colleagues (2003) analysed 32 websites that advertise and market weight loss supplements containing ephedra. Data were collected regarding inclusion of potential side effects or contraindications, disclosure of ephedra content, and incorrect or misleading safety information. Of the total sample, 41% (13 sites) failed to disclose side effects or contraindications, 53% (17 sites) did not include ephedra dosage information, and 34% (11 sites) contained incorrect or misleading safety statements. The most frequent ads were those claiming no side effects. Further, some sites encouraged inappropriate consumption and two made prohibited claims that the supplements treated specific diseases.

Jordan and Haywood (2007) analysed safety information and labelling requirements for 32 websites marketing herbal weight loss supplements. The results revealed that most sites (78.1%) did not contain any product safety statements, 15.6% contained safety statements judged misleading, and only 6.3% listed valid safety claims. Further, a majority posted only minimal required labelling information (e.g. product name, contacts, active ingredients). Information for consumer decision making (e.g. ingredient strengths, evidence of efficacy, potential interactions/contraindications) was listed infrequently, and no information was provided about recommended dosage. Although all sampled sites contained the ‘structure/function disclaimer’, it was sometimes difficult to locate. Table 1 summarises this group of studies and their findings on DS advertising content.

Dietary supplement information sources and the role of advertising
Empirical research on consumer response and message effects of DS advertising is rare. Only four relevant studies on consumers’ information seeking and decision making about DS and their perceptions and use of DS ads as an information source have been published from 1975 to date. Various methodological approaches have been employed (qualitative, quantitative, mixed-method) to produce the following findings.

Mason and Scammon (1999) conducted in-depth interviews with six recreational body builders to gain an understanding of their initial trial and development of commitment to use DSs and influences on those decisions. All reported taking certain DSs to improve strength, image and performance. The findings indicated the consumers became aware of DSs and their benefits through media (e.g. advertising, news reports, sports articles) and interpersonal sources (e.g. friends, professionals). However, trial did not occur without the consumer talking to someone who had direct product experience. Thus, personal testimony was particularly influential. Further, the researchers found that, once the consumers tried one DS, they then searched for information about others from various media (e.g. magazine articles, ads, websites) and interpersonal sources (e.g. fitness community peers, sales reps). While the participants considered themselves extensive seekers and careful evaluators of DS information, the interview findings revealed a lack of critical assessment and scepticism. The participants focused on the positive and possibly one-sided
### Table 1: Studies on DS advertising content

<table>
<thead>
<tr>
<th>Author(s) and year</th>
<th>Study method</th>
<th>Main findings</th>
<th>Sample size</th>
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<tbody>
<tr>
<td>Philen et al. (1992)</td>
<td>Content analysis of magazine ads in 12 popular health and bodybuilding magazines in the US</td>
<td>Many of the DS products were promoted for enhanced strength and muscle growth. The most frequent ingredient was amino acids and health claim was muscle growth. Ads for 90 products did not include any health claims. Further, the amount of each ingredient and recommended dosage were rarely mentioned, and there were few warnings about side effects or contraindications.</td>
<td>89 DS companies, 311 DS products, 235 ingredients, and 914 instances of mentioning DS ingredients</td>
</tr>
<tr>
<td>Kava et al. (2002)</td>
<td>Content analysis of DS articles and ads in US magazines popular among older adults</td>
<td>While magazines popular among older readers contain abundant DS information in the articles and ads, information on how to use them safely is lacking. The most frequently advertised DSs were those of interest to older adults. Safety information was not mentioned in the ads. Further, no relationship was found between the number of DS ads in a magazine and the quality of safety information in the DS articles in the same magazine.</td>
<td>254 articles and 2,983 ads</td>
</tr>
<tr>
<td>Ashar et al. (2003)</td>
<td>Content analysis of DS websites</td>
<td>41% failed to disclose side effects or contraindications, 53% did not include dosage information, and 34% contained incorrect or misleading safety statements. Some sites encouraged inappropriate consumption and two made prohibited claims that the DSs treated specific diseases.</td>
<td>32 websites marketing weight loss supplements containing ephedra</td>
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<tr>
<td>Main et al. (2004)</td>
<td>Content analysis of Rx drug (DTC) ads, OTC drug ads, and DS ads placed in US magazines</td>
<td>Emotional appeals are more prevalent than rational appeals in DS advertising. No significant difference was found among the three products in using rational appeals. Among emotional appeals, negative emotional appeals were used less frequently than positive emotional appeals in all three types of product advertising, and DS ads were particularly less likely to use negative emotional appeals in the headline than were Rx drug ads.</td>
<td>195 Rx drug (DTC) ads, 137 OTC drug ads, and 33 DS ads</td>
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<td>Chung et al. (2007)</td>
<td>Content analysis of non-English DS ads in two US ethnic newspapers</td>
<td>DS ads in the ethnic newspapers had a high rate of non-compliance with regulations: (1) 84% of the ads made prohibited ‘disease claims’; (2) only 18% included DSHEA warnings; (3) only 31% of the manufacturers provided evidence to substantiate the claims when requested.</td>
<td>103 ads</td>
</tr>
<tr>
<td>Author(s) and year</td>
<td>Study method</td>
<td>Main findings</td>
<td>Sample size</td>
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<tr>
<td>Jordan &amp; Haywood (2007)</td>
<td>Content analysis of DS websites</td>
<td>Most sites (78%) did not contain any product safety statements, 16% contained safety statements judged misleading, and only 6% listed valid safety claims. A majority posted only minimal required labelling information. Important information for consumer decision making was listed infrequently, and no information was provided about recommended dosage. Although all sites contained the 'structure/function disclaimer', it was sometimes difficult to locate.</td>
<td>32 websites marketing herbal weight loss supplements</td>
</tr>
<tr>
<td>Soller et al. (2007)</td>
<td>Content analysis of DS magazine ads in three popular US bodybuilding magazines</td>
<td>Many DS companies are using 'structure/function (S/F) disclaimers' voluntarily in their ads. However, these disclaimers were not linked to the specific S/F claims, often not on the same page as the S/F claims, often not presented with appropriate prominence, and not clearly set apart from other ad copy. Thus, they are similar to but do not meet the FDA's required disclaimer for DS labels. The researchers concluded that DS ads in bodybuilding magazines are potentially misleading, and urged for re-examination of the regulatory requirements for 'S/F disclaimers'.</td>
<td>73 ads</td>
</tr>
<tr>
<td>Shaw et al. (2009)</td>
<td>Content analysis of DS ads and articles in US teen and adult magazines with high adolescent readership</td>
<td>Of the DS information in ads, 43% were full page or more, 79% did not have a visible 'structure/function disclaimer'. In sum, teen magazines contain little DS information and none is accurate, and adult magazines with high teen readership contain substantial DS information but the accuracy is questionable.</td>
<td>238 DS references: 144 in articles and 94 in ads</td>
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</table>

Information from the DS producer, did not question source objectivity, and disregarded or rationalised any negative information. Further, the researchers found participants’ acceptance of and commitment to DSs intensified as they became more personally invested in improving their physical performance and body image.

Another study that aimed to identify influential sources on DS consumption was by Peters and colleagues (2003). The researchers conducted in-depth interviews with ten DS users and two pharmacists. The findings revealed the primary influence on DS use was the physician. The family was also very influential. Other influences included nutritionists, personal trainers, mass media (magazine articles, TV news stories), friends, pharmacists, other customers, ads, in-store displays, nutrition classes, books, newsletters and the
internet. The researchers then surveyed retail pharmacy customers who reported using DSs. For analysis, respondents were categorised into three user groups: (1) multivitamins only, (2) multivitamin and concentrates, and (3) multivitamin, concentrates and herbs/flowers/roots. Six sources of influence were examined: physician, parents, friends, pharmacist, other customers, and media (ads, magazine articles, TV news stories). The results revealed all groups believed the physician was the best DS information source. The groups differed, however, regarding media influence. Specifically, the third user group reported being more influenced by the media than did the second user group, which reported being more influenced by the media than did the first user group. The finding suggests the more DS types consumers use, the more they rely on media for DS information.

An ethnographic study by Nichter and Thompson (2006) examined consumer motivations for using DSs, how they used them, and information sources that influenced this usage. Data collection involved in-depth interviews with DS users, field visits to DS merchandisers, and a review of DS marketing and education websites. The study found respondents consulted a variety of sources for DS decision making. Regarding advertising, Nichter and Thompson (2006, p. 197) stated that:

The most salient trend we noticed ... was the segmentation of the market into gender-based ads, age-based ads, and performance-enhancement ads. Advertisements targeting the elderly promise youth and vitality; men are offered virility and sex appeal through a variety of herbal supplements riding the success of Viagra; women are presented endless opportunities for weight loss, beauty in the form of healthy hair, skin, and nails, and relief from hormonal changes due to menstruation, pregnancy, and menopause. And athletes hoping to get a legal 'edge' in their sport are offered products for enhanced endurance, bodybuilding, and a faster recovery time. What is notable about all these ads is that they overwhelmingly emphasise the flexible specificity of supplements.

Despite this finding of highly targeted and specified DS advertising selling propositions, most of the study's respondents indicated being sceptical and denied being influenced by DS ads unless the information corroborated with that from friends who had tried the product (Nichter & Thompson 2006). Regarding the internet, respondents reported visiting DS websites and reading posted marketing materials (including product testimonials) but did not consider it their primary or most trusted DS information source. They turned to the internet to learn more or to confirm information from other sources. Further, they received scientific evidence about DS with some degree of latitude (Nichter & Thompson 2006). The most valued influence on respondents' use of DSs was the advice and experiences of friends and family. Nichter and Thompson (2006) concluded that most of their respondents were cautious consumers of public DS information.

Snyder et al. (2009) surveyed a convenience sample of 112 older adults to investigate their DS use, information sources and perceived safety. Fifty-five per cent (62 respondents) reported using DSs. The researchers found the top DS information sources across the entire sample were print media and TV. Specifically, print media were reported by
55.6% of the sample (60 respondents) and TV by 50.5% (55 respondents). Other frequently reported sources included family and friends, followed by physicians. Store clerks, pharmacists, dieticians and nurses were also mentioned. Among DS users, advertising was the fourth most frequently mentioned influence on DS use. Specifically, 52% reported seeing DS ads was a reason for using them. Only the belief that DSs provide benefits (78%), receiving friends' advice (64%), and receiving family advice (59%) were reported more often. A majority of respondents (95% of DS users, 75% of non-users) perceived DSs as safe. The most influential sources on DS users' perceptions of DS safety were family (68%) and friends (57%). Less common sources included physicians (26%), store clerks (24%), pharmacists (16%), dieticians (11%) and nurses (8%). Non-users' DS safety perceptions were influenced by family (16%), friends (18%), physician (9%), pharmacist (7%) or dietician (2%). For a summary of the studies and their findings discussed in this section see Table 2.

**Consumer perceptions of dietary supplement advertising and regulation**

Two studies examined consumer beliefs and perceptions about DS advertising briefly as part of larger regulation-related research projects (e.g. Blendon et al. 2001; Ashar et al. 2008). Blendon and colleagues (2001) conducted a secondary data analysis of several national polls (e.g. Kaiser Family Foundation, Roper Center) from 1996–1999 on US consumers' views on DS use and regulation. Results revealed a substantial number of consumers viewed DSs favourably in terms of potential health benefits and believed access to these products is important. Yet Blendon et al. (2001) also found broad public support for increased government regulation to ensure truthfulness of ad claims about DS health benefits and purity of product ingredients.

Further, Blendon et al. (2001) showed some differences between regular DS users and non-users. Regular users believed more strongly that DSs could help with an array of medical conditions than did non-users. Many had such strong belief in the health benefits of the DSs they were taking they reported they would continue taking them even if the products were demonstrated to be ineffective by scientific evidence. Most of all, regular users were more likely than non-users to believe DS ad claims. About 60% of regular users believed that DS ad claims were generally true, while only 25% of non-users believed that way. These findings indicate the important role of DS advertising, especially to regular users.

Ashar and colleagues (2008) surveyed consumers' knowledge or assumptions about governmental oversight of DS marketing and advertising, and examined if demographic factors influenced awareness of the actual federal role in DS regulation. A sample of 300 adult patients was shown a printed internet ad promoting a weight-loss DS and then interviewed about their understanding of federal regulation of the advertised DS. Most respondents were incorrect or unsure about the government's role in regulating the product. Specifically, 52% were unaware the product had not been approved while 63% were unaware the ad had not been pre-approved. Ten per cent (30 respondents) reported
Table 2: Studies on information sources for consumer DS decision making and DS ads

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<tr>
<th>Author(s) and year</th>
<th>Study method</th>
<th>Main findings</th>
<th>Sample size</th>
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<tr>
<td>Mason &amp; Scammon (1999)</td>
<td>In-depth interviews</td>
<td>The consumers became aware of DSs and their benefits through media and interpersonal sources. Personal testimony was particularly influential for trial. Once the consumers tried one DS, they then searched for information about others from various sources. The participants focused on the positive and possibly one-sided information from the DS producer, did not question source objectivity, and disregarded or rationalised negative information. Their acceptance of and commitment to DSs intensified as they became more personally invested in body building.</td>
<td>Five men and one woman ages 22 to 42 who are recreational body builders</td>
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<tr>
<td>Peters et al. (2003)</td>
<td>In-depth interviews and survey</td>
<td>For most consumers, physically treating particular ailments was the dominant motivation for DS use, but psychological motivation was also important. The primary influence on DS use was the physician, but family was also influential. While all types of DS users believed the physician was the best information source, significant differences were found regarding media influence. The more DS types consumers used, the more they relied on media for DS information. Thus, the media (including advertising) has potential to have a powerful effect on heavier DS users.</td>
<td>In-depth interviews: 10 DS users and two pharmacists</td>
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<td>Survey: convenience sample of 225 DS users recruited from nine pharmacies</td>
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<td>Nichter &amp; Thompson (2006)</td>
<td>Anthropological research using in-depth interviews, field visits to DS merchandisers, and a review of DS marketing and education websites</td>
<td>DS ads appear to use highly-targeted and specified selling propositions. However, most of the respondents were sceptical and denied being influenced by DS ads unless the information corroborated with that from friends with direct experience. The most valued influence on their use of DSs was advice and experiences of friends and family.</td>
<td>60 DS users for in-depth interviews</td>
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<td>Snyder et al. (2009)</td>
<td>Survey</td>
<td>A majority of the respondents used DSs and the primary reason for using them was added health benefits. The top DS information sources were print media and TV. Other frequently-reported sources included family and friends, followed by physicians. Among DS users, advertising was the fourth most frequently mentioned influence on DS use. A majority of respondents perceived DSs as safe. The most influential sources on users' perceptions of DS safety were family and friends.</td>
<td>Convenience sample of 112 older adults</td>
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</table>
the FDA approved the product, while 42% (141 respondents) were unsure, and 7% (22 respondents) thought the FTC had approved the ad while 56% (168 respondents) were unsure. Two demographic factors (lower education, non-Caucasian race) were associated with lack of awareness about product regulation, while one demographic factor (lower education) was associated with lack of awareness of ad regulation.

Existing studies on consumer beliefs/perceptions of DS advertising and regulation, and key findings are summarised in Table 3.

<table>
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<tr>
<th>Author(s) and year</th>
<th>Study method</th>
<th>Main findings</th>
<th>Sample size</th>
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<tr>
<td>Blendon et al. (2001)</td>
<td>Secondary data analysis of six national survey datasets</td>
<td>A substantial number of consumers viewed DSs favourably in terms of potential health benefits and believed access to DSs is important. Regular users believed more strongly that DSs could help with an array of medical conditions and more likely to believe DS ad claims. Yet, there is broad public support for increased government regulation to ensure truthfulness of DS ad claims.</td>
<td>Each survey had a sample size of approximately 1,000 to 1,200</td>
</tr>
<tr>
<td>Ashar et al. (2008)</td>
<td>Survey</td>
<td>Most respondents were incorrect or unsure about the government’s role in regulating DSs: 52% were unaware the product had not been approved and 63% were unaware the ad had not been pre-approved. Lower education and non-Caucasian race were associated with lack of awareness about DS product regulation, while lower education was associated with lack of awareness of DS ad regulation.</td>
<td>Convenience sample of 300 adult primary care patients</td>
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### Summary and implications

Our review indicates DS advertising is largely under-explored, and existing research is primarily descriptive and atheoretical, although there is some literature on the form of pharmaceutical advertising. The published studies suggest several major findings.

- A variety of DS products are being advertised in both online and offline media, but important safety information is lacking and the accuracy of information is questionable.
- Many DS ads voluntarily include 'structure/function disclaimers', but these disclaimers do not meet the standards of the FDA’s required disclaimer for DS labels.
- Personal testimony seems particularly influential in consumers’ DS product awareness and trial, but DS advertising can play an informative role especially during certain consumer decision making stages. The media have potential to have a particularly powerful effect on heavier DS users.
- Consumers lack critical assessment and scepticism of DS ads, and consumers’ acceptance of and commitment to DSs tends to intensify as they become more personally invested in improving their health and performance.
While consumers support increased government regulation, they are confused about the government's role in regulating the product and its advertising.

Despite these findings, many gaps remain in understanding and knowledge of DS advertising, and further research is needed to re-examine the existing research results as well as to address unexplored questions. Among the more pressing questions worthy of investigation by advertising researchers are the three listed below.

1. **What are the nature and characteristics of DS advertising content?**

Content analytic studies of DS advertising have only analysed print media and the internet. Future research is needed to assess information content in DS ads in other media, especially television, mobile and social networking media. Existing content analyses also suggest DS ads and websites fail to contain complete and accurate information, an indication that DS advertisements may not be providing consumers with adequate and appropriate information, especially regarding product safety (Phüen et al. 1992; Kava et al. 2002; Ashar et al. 2003; Chung et al. 2007; Soller et al. 2007; Shaw et al. 2009). These findings support the need for improved advertising standards and reform in DS marketing practices (Jordan & Haywood 2007).

Research should work to establish DS ad product claim accuracy because lack of accuracy and disclosure puts consumers at risk for potentially adverse health effects (Hoy 1994). Particularly important questions to address include whether some 'health claims' or 'structure/function claims' might potentially lead consumers to believe that specific diseases could be cured by taking DSs, and how meaningful and easy it is to distinguish between 'structure/function' and 'disease claims' from the consumers' perspectives. Such research would improve the quality of information in DS advertising and assist marketers in being compliant with regulatory requirements and socially responsible.

Additional evidence is needed regarding the balance of information and persuasion, prevalence of health/non-health claims, visual elements, and visceral cues in DS advertising (Amos & Spears 2010). Future content analyses that identify patterns in ad characteristics, claims and creative approaches (techniques/appeals) would be useful in providing comparative data for examinations across different pharmaceutical product categories, media types and consumer audiences. For example, research on comparative claims and copy × copy interactions based on work of Barone and colleagues (1999, 2004) would enhance the body of disciplinary knowledge as well as provide benchmark data for possible message improvements.

2. **How do consumers respond to DS advertising content? What effects are produced?**

Answers to response and effects questions are needed to inform scientific and pragmatic concerns, and should be addressed at the individual, social group and sociological levels. Studies suggest that consumers use various information sources in their decision-making process, and it is crucial to understand how these sources influence their perception and understanding of DS products. Additionally, assessing the impact of such advertising on consumer behavior and health outcomes is vital for ensuring the safety and efficacy of these products.

In conclusion, the complexities and gaps in understanding DS advertising highlight the need for further research to improve the quality of information, enhance consumer education, and ensure compliance with regulatory requirements. This would not only protect consumer health but also promote responsible marketing practices in the DS industry.
making for DS purchase and use. It appears from the existing research literature that the primary sources of information and influence for DSs are interpersonal networks (family and friends). However, other sources (including advertising) seem to play a role as well. As these studies have produced primarily self-report data, it is recommended that future research incorporate observational methods to more fully understand behavioural responses to DS advertising. Thus, closer investigation of consumers’ use and evaluation of different DS information sources for decision making is advocated.

DS advertising effects are not uniform across consumers but vary by product usage characteristics (how consumers use DS and why they use DS). In fact, different attitudes towards DS advertising and usage have been observed between regular DS users and non-users (Mason & Scammon 1999; Blendon et al. 2001). Similarly, research by Peters et al. (2003) has suggested that media (including advertising) have a more powerful influence on heavier DS users. These findings point to the important role of DS advertising. If DS information is communicated properly and accurately via DS ads, it will be beneficial, but a concern arises if unscrupulous marketing tactics are employed. Because regular users may be especially receptive to DS advertising claims, the concern can be compounded if consumers are already vulnerable (e.g. in chronic pain) and eager to try products with little or no evidence of safety or effectiveness. More study is needed to see how regular DS users’ interest and trust towards DS advertising affect their processing of DS claims presented in ads.

Brand usage is also a critical determinant of comparative ads’ persuasiveness (Barone & Miniard 1999; Barone et al. 2004), which awaits investigation in DS advertising. Non-users are especially vulnerable to comparative drug claims, specifically known as copy x copy interaction (Barone & Miniard 1999; Barone et al. 2004). Copy x copy interaction refers to a type of deception whereby the processing of an initial claim affects the encoding of subsequent claims, leading to inaccurate product beliefs. For example, if a DS ad presents two claims – ‘Supplement A works faster than Supplement B. Supplement A has few side effects’ – consumers might form beliefs that Supplement A outperforms Supplement B not only on the comparative feature (works faster), but also on the non-comparative feature (few side effects). Although no comparative claim is made in the ad for the second attribute (side effect), the comparative concept activated by the first claim might bias the encoding of subsequent non-comparative claim. Based on Barone and colleagues’ research, deception is more likely to occur for non-users of the comparison brand, while users of the comparison brand are likely to be immune to such deception. Since there is no empirical study testing the moderating role of brand usage for copy x copy interaction in DS advertising, it remains to be tested whether non-users will be more susceptible to such deception.

Studies to better understand consumers’ perceptions, opinions and scepticism of DS advertising and comprehension of health-related claims should be another priority, especially to compare different ‘DS usage segments’ and the role of prior product knowledge and experience (e.g. usage patterns such as duration and intensity of usage (frequency, degree), product usage versus brand usage, loyal users versus brand switchers, usage of different types of DS, and various motivations/purposes of DS use such as use to maintain
health or use to treat an illness) (Blendon et al. 2001; Shaw et al. 2009). Additionally, studies are also needed on consumers' interpretations of DS ad messages relative to their differing motives and goals.

DS advertising, like all advertising, has unintended consequences beyond the pragmatic communication effects it is designed to achieve (Shimp & Dyer 1979; Chandra & Holt 1999). However, there is yet no research on the unintended effects of DS advertising (e.g. misuse, abuse). Investigations of DS advertising's relationships to consumer misuse and abuse of DSs are warranted to document the possible negative social consequences of the advertising form.

Studies on consumer knowledge and perceptions of regulation suggest that consumers are confused about the roles of the FDA and FTC regarding DS advertising. As a result, research that examines consumers' knowledge, opinions and behavioural intentions regarding DS advertising regulation is recommended.

Causal modelling and experimental studies are needed at the individual and group levels regarding the functional and predictive relationships between cognitive, evaluative and behavioural reactions to describe and explain how DS advertising operates. Of importance would be research that examines advertising's role in information seeking, and decision making about purchase and consumption of specific DS categories. Such research might use choice heuristic procedures (i.e. protocol methods, script analysis, information monitoring and integration, response time analysis) to understand decisional processes – or behavioural models (e.g. health belief model, theory of reasoned action).

At the sociological level, studies are needed that track perceptual and attitudinal trends regarding DS advertising across population segments and time periods. Two frameworks that would seem appropriate starting points are cultivation theory and presumed influence. Cultivation research could address questions about estimation of DS use, advertising influence, and media representations among consumers and correspondence of estimations to actual population statistics. Research involving the theory of presumed influence could address questions about DS advertising's perceived effects on self, social groups and the general population. By providing baselines to explain consumer, health expert and regulator beliefs about the persuasive power of DS advertising, presumed influence studies would inform public policy.

3. What role does the internet play in consumers' DS-related search processes, decision considerations and purchase outcomes relative to other DS information sources, including media advertising?

About 78% of American adults use the internet (Pew Internet & American Life Project 2011) and it has become a mainstream health information seeking tool. According to a Pew Internet & American Life Project (2008) report, about 83% of US internet users look for health/medical information on the web on a typical day. Despite the internet's increasing importance as a health information source and advertising channel, research on DS internet advertising has been scant and focused on DS website content (Ashar et al. 2003; Jordan & Haywood 2007). More study is warranted to address questions on:
(a) the current state of DS internet advertising and sales, (b) how consumers evaluate the credibility and trustworthiness of internet-provided DS information, and (c) DS-related information search processes on the internet, especially those involving social networking sites and relationship marketing (i.e. outcomes involving interpersonal interactions).

Significant research opportunities exist for advancing knowledge, improving DS advertising practice and positively impacting public health regarding DS advertising. We believe appropriate and scientifically driven research is paramount. As stated at the outset, it is our hope that this article will contribute to putting the subject of DS advertising on the scholarly research radar and move advertising researchers around the world towards studying the content, processes and effects of DS advertising.

References

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