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Presence and effects of health and nutrition-related (HNR) claims with benefit-seeking and risk-avoidance appeals in female-orientated magazine food advertisements

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A multi-method study was conducted to, first, establish the prevalence of types of health- and nutrition-related (HNR) claims (nutrient content, structure/function and health claims) with benefit-seeking and risk-avoidance appeals in food advertisements appearing in magazines with large female audiences and, second, determine the effects of the two HNR-paired appeal types on females' evaluative judgements of food advertisements. Analysis of 633 food advertisements from eight women-orientated magazines found a substantial use of risk-avoidance appeals in food advertising, primarily in association with nutrient content claims. Risk-avoidance appeals were especially present in product categories considered relatively unhealthy and less nutritious. Two experiments conducted to examine appeal-type effects in association with nutrient content claims found that both benefit-seeking and risk-avoidance appeals enhanced perceived healthiness of advertised food products among females; however, risk-avoidance appeals were preferred to benefit-seeking appeals, regardless of food healthiness.

Introduction

Food advertising is a subject of considerable research importance in the fields of advertising, health communication, marketing and nutrition (e.g. Andrews *et al.* 2000; Parker 2003; Young 2003; Dutta-Bergman 2004a, 2004b; Wansink & Chandon 2006; Ambler 2007; Chandon & Wansink 2007; Roberts & Pettigrew 2007; Brennan *et al.* 2008; Kim *et al.* 2009; Wicks *et al.* 2009; Culp *et al.* 2010; Hota *et al.* 2010; Yoon *et al.* 2010; Amos & Grau 2011; Knoll *et al.* 2011; Nicklas *et al.* 2011; Choi *et al.* 2012; Ho *et al.* 2012). Yet, many questions about the content and effects of food advertising remain unanswered, including the focus of this study – the presence of different types of health- and nutrition-related (HNR) claims with benefit-seeking and risk-avoidance appeals in food advertisements appearing in women-orientated magazines, and the effects of the two HNR-paired appeals on female consumers' perceptual judgements of advertised food products.

Public concern about the detrimental effects of health- and nutrition-related (HNR) claims in food advertising has escalated over the past few decades (Jeffrey & French 1998; Lobstein & Dobb 2005; Nestle 2007). The concern has generally centred on the association between HNR claims in advertisements and commercials for food products of poor nutritional quality (i.e. high in sugar, fat, sodium, calories, etc.; low in vitamins, minerals, etc.) and unhealthy eating habits and resulting eating disorders (e.g. obesity, anorexia, bulimia nervosa), especially among children, female adolescents and minority populations (e.g. Jeffrey & French 1998; Nestle & Jacobson 2000; Brownell 2002; Drewnowski & Specter 2004; Drewnowski & Darmon 2005; Henderson & Kelly 2005; Folta *et al.* 2006; Harker *et al.* 2007; Nestle 2007; Abbatangelo-Gray *et al.* 2008; Bell *et al.* 2009; Culp *et al.* 2010; Flegal *et al.* 2010; Nicklas *et al.* 2011; von Hippel & Trivers 2011).

HNR claims became especially problematic following the passage of three acts in the 1990s (Kozup *et al.* 2003): the Nutrition Labeling and Education Act (NLEA) of 1990, Dietary Supplement Health and Education Act (DSHEA) of 1994, and the Food and Drug Administration Modernization Act (FDMA) of 1997 (see Nestle & Jacobson 2000; Ebbeling, Pawlak & Ludwig 2002; Nestle 2007). The three acts were enacted to: (1) encourage food companies to manufacture healthy foods in general; (2) improve the utility of nutrition information on food packaging panels; and (3) promote the use of three types of HNR claims in food advertising: nutrient content, structure/function and health claims.

As others have noted, HNR claims represent a regulatory hierarchy with different authorisation requirements (Andrews *et al.* 1998; Andrews *et al.* 2000; Parker 2003). Nutrient content claims emphasise the specific enhancement of healthy nutrients or reduction of unhealthy ingredients in foods (e.g. vitamin added, 50% less fat) and it is relatively easy to obtain authorisation to use them in messaging. Food products can be advertised with nutrient content claims without mention of poor nutritional quality (e.g. low-fat chocolate still has high sugar, low-calorie beef jerky still has high sodium), and nutrient content claims are legally allowed when a specific ingredient included in a product meets optimum amounts/percentages of the daily value (DV) (e.g. calcium in soda) (NLEA 1990; DSHEA 1994; Nestle 2007). Health claims emphasise how added healthy nutrients or removed unhealthy ingredients protect consumers from certain diseases (e.g.

reduce the risk of osteoporosis), and are the most difficult claim type to obtain authorisation to use. The use of nutrient content and health claims is allowed by NLEA and FDAMA when substantiated by 'significant scientific agreement among qualified experts' (e.g. substantiated by authoritative statements from public health agencies or the National Academy of Sciences; see Parker 2003). Structure/function claims resemble health claims, but pre-authorisation is not required from the Food and Drug Administration (FDA); rather, authorisation from the Federal Trade Commission (FTC) is required. Structure/function claims do not identify a particular disease; they refer to improving body structure and function (e.g. vitamin C helps the immune function) (Parker 2003). Although structure/function claims are prohibited from mentioning relationships with specific diseases, such claims promote perceptual association with diseases (e.g. 'Promotes healthy cardiovascular function' equals 'Protects against heart disease') (Nestle 2007). The use of structure/function claims is authorised by the DSHEA. Extensive information on NLEA, DSHEA and FDAMA is available elsewhere (Nestle 2007; Mason & Scammon 2011; Moon *et al.* 2011; Mohr *et al.* 2012).

Research has established that HNR claims are present in today's food advertising for a wide variety of different product categories. A content analysis by Parker (2003), for example, reported that 41% of the food advertisements published in 1998–2000 magazine issues contained at least one HNR claim type. Bread, cereal and fruit/juice were the most dominant product categories using HNR claims; in fact, 97% of cereal advertisements used at least one HNR claim (Parker 2003). Similarly, Yoon *et al.* (2010) reported that more than 70% of the food commercials appearing in 2007 ABC, NBC, CBS and Fox primetime programming made at least one HNR claim. Parker (2003) speculated that Americans are now exposed to more health information about food via mass media than at any time in history.

However, many researchers have expressed apprehension that imperfect regulatory policy allows HNR claims to be used even for unhealthy products (Andrews *et al.* 1998, 2000; Roe *et al.* 1999; Balasubramanian & Cole 2002; Kozup *et al.* 2003; Parker 2003; Wansink & Chandon 2006; Chandon & Wansink 2007; Choi *et al.* 2012; Choi & Springston in press). They warn that HNR claims may actually mislead consumers into believing poor-nutritional-value food products are healthy without them recognising that the advertised products contain other unhealthy ingredients (e.g. fat, cholesterol and sodium) (Andrews *et al.* 1998, 2000; Roe *et al.* 1999; Kozup *et al.* 2003; Parker 2003; Nestle 2007; Choi & Springston in press). Researchers contend that misleading HNR claims truncate further search for information about unhealthy ingredients (e.g. sodium, fat, sugar) leading the consumer to judge a product as healthy (Roe *et al.* 1999; Heller 2001; Choi & Springston in press). The researchers argue that the misperception problem is especially acute for less regulated nutrient content and structure/function claims (Andrews *et al.* 1998, 2000; Roe *et al.* 1999; Balasubramanian & Cole 2002; Kozup *et al.* 2003; Parker 2003; Wansink & Chandon 2006; Chandon & Wansink 2007; Nestle 2007; Choi *et al.* 2012; Choi & Springston in press).

The content analytic findings provide an empirical basis for the expressed concern: nutrient content and structure/function claims are used more often in food advertisements

than are health claims (e.g. Parker 2003; Yoon *et al.* 2010). Accordingly, researchers have expressed the opinion that food marketers prefer using the less regulated nutrient content and structure/function claims to health claims (Andrews *et al.* 1998; Parker 2003; Burton & Creyer 2004; Wansink & Chandon 2006; Nestle 2007), and warn that all three claim types might result in enhanced effects on consumers' health-related evaluations (Mazis & Raymond 1997; Andrews *et al.* 1998; Kozup *et al.* 2003; Wansink & Chandon 2006).

In this article, we report a multi-method investigation of the presence and effects of HNR claims in magazine food advertisements directed to female consumers, using a scheme classifying HNR claims in association with two motivational appeals, benefit-seeking and risk-avoidance appeals. Specifically, we conducted the research to: (1) establish the extent to which different types of HNR claims reflecting consumers' basic food choice motivations (HNR claims with benefit-seeking and risk-avoidance appeals) are present in food advertisements appearing in popular women-orientated magazines; and (2) determine the effects of the two appeal types on female consumers' evaluative judgements of advertisements. As described later, the two research phases are brought together by using the most frequently appearing HNR claim-type in the food ads to create experimental ads with benefit-seeking and risk-avoidance appeals. The research was driven by a fundamental presumption: for benefit-seeking and risk-avoidance appeals in HNR-based advertisements to influence female consumers' perceptual judgements of advertised food products, such content must be present in media encountered by female audiences (i.e. ad exposure opportunity).

As mentioned earlier, other studies have suggested that HNR claims enhance consumers' health-related perceptions of advertised food products (Mazis & Raymond 1997; Andrews *et al.* 1998, 2000; Kozup *et al.* 2003), leading consumers to judge unhealthy foods products as healthy (see also Wansink & Chandon 2006). This study addresses the question of enhancement effects, and advances prior research in two specific ways: (1) the results uncover how HNR-associated benefit-seeking and risk-avoidance appeals are related to the perceived healthiness of advertised food products among a distinct but important consumer segment – female consumers; and (2) they provide additional knowledge on advertising-associated choice motivations underlying female consumers' judgements of healthy and unhealthy food products.

Studying females as a separate consumer segment is important for two basic reasons. First, American females are the principal household food shoppers and thus the primary targets of food advertising (MRI 2009; Parkin 2006). Second, females are especially vulnerable to eating-related social pressures (e.g. to maintain thinness) and eating disorders (Garner *et al.* 1980; Hesse-Biber *et al.* 2006). These conditions make understanding potential associations between the content of food ads appearing in women-orientated media and female ad-associated behaviour especially important because the results contribute not only to fundamental disciplinary knowledge on food advertising effects, but also to public policy considerations about the possible effects of food advertising on women. Though secondary to knowledge and policy concerns, they also inform food marketers' decision making regarding advertising targeting and message delivery strategies for both healthy and unhealthy foods.

Theoretical foundation

In this research, it is proposed that Elliot's (2008) distinction between approach and avoidance motivation is fundamental and integral to the study of HNR claims in food advertising. The approach–avoidance distinction represents a conceptual lens through which the structure of HNR-associated benefiting-seeking and risk-avoidance appeals in food advertising may be viewed. In particular, the classification scheme used to analyse HNR-paired appeal types in food advertisements and to study their effects on female consumer judgements is based on theoretical reasoning and empirical research, which suggest that people tend to regulate their varying behaviours as a function of approach or avoidance motivation (Elliot & Thrash 2002; Elliot 2008). According to Elliot (2008), approach motivation affects people by directing their behaviours towards positive stimuli (e.g. objects, events, possibilities), whereas avoidance motivation directs their behaviour away from negative stimuli (e.g. objects, events, possibilities). Both approach and avoidance concepts have been observed across a diversity of empirical investigations, including persuasion tactics (Knowles & Linn 2004; Elliot 2008) and consumer food choice (Heimbach 1987; Guthrie *et al.* 1995; Dutta-Bergman 2004a, 2004b; Choi & Springston *in press*). The underlying hypothesis of food choice research is that consumer choice judgements are motivated and affected by benefit seeking representing approach motivation and by risk avoidance representing avoidance motivation. That is, the fundamental nature of approach and avoidance motivations appears to exemplify the benefit-seeking and risk-avoidance strategies in food selection (see Choi & Springston *in press*).

According to Choi and Springston (*in press*), Heimbach (1987) was the first researcher to contend that food choice is motivated not only by the need to seek healthy nutrients (e.g. fibre and protein), but also by the need to avoid unhealthy ingredients (e.g. too many calories and too much fat). Guthrie and her associates (1995) confirmed the contention. In their factor analysis using national consumer samples, they identified two principal components of food choice motivation: approaching healthy benefit (i.e. motivated to consumer food products having a variety of healthy nutrients, e.g. grain, fibre, starch) and avoiding unhealthy risk (i.e. motivated to avoid food products having too many unhealthy ingredients, e.g. fat, salt, cholesterol). More recently, Dutta-Bergman (2004a, 2004b) confirmed that both benefit-seeking and risk-avoidance motivations play a critical role in evaluating individuals' healthy eating level.

Another body of research has adopted the basic principles of the halo effect to advance understanding of consumer judgements of HNR claims (e.g. Roe *et al.* 1999; Wansink & Chandon 2006; Chandon & Wansink 2007; Choi & Springston *in press*). In the view of cognitive consistency theory, the halo effect occurs when individuals make biased decisions and generalisations because they seek to maintain cognitive consistency with prior knowledge and feeling for a particular object feature (see Thorndike 1920; Bagozzi 1996). In the case of HNR claims, the presence of HNR claims induces cognitive biases: consumers provide better product ratings merely on the basis of the presence of HNR claims, and attribute improper health benefits to the product (Roe *et al.* 1999; Andrews *et al.* 2000; Wansink & Chandon 2006; Choi & Springston *in press*).

In the present research context, the notions of approach/avoidance motivation and halo effect are joined to make the assumption that HNR-paired benefit-seeking and risk-avoidance appeals in food advertising function as 'health halos' related to benefit-seeking and risk-avoidance motivations of female consumers, irrespective of the regulatory classification of HNR claims (also see Choi & Springston in press). Thus, we theorise that HNR claims with the two appeals produce different effects when encountered in food advertisements.

Building on the theoretical framework of approach-avoidance motivation (Elliot 2008; Elliot & Thrash 2002), a benefit-seeking appeal is conceptualised as a type of HNR claim emphasising the enhancement of healthy benefits, such as 'vitamin added' and 'calcium builds strong bones', whereas a risk-avoidance appeal is conceptualised as a type of HNR claim emphasising the avoidance of unhealthy risk, such as 'non-fat' and 'reduce the risk of osteoporosis'. Following Choi and Springston (in press), we believe the halo effect is related to the manner in which benefit-seeking and risk-avoidance appeals function in HNR-claimed food advertisements to enhance the perceived benefits or to reduce the perceived risks of featured food products. The assumed inverse relationship between perceived benefit and risk in people's minds was confirmed by Alhakami and Slovic (1994), who found that when the perceived benefit of an object or behaviour is highly rated in people's minds, the perceived risk of the object or behaviour is lowly rated, and vice versa. They attributed their findings to the halo effect resulting from the need for cognitive consistency.

In light of the inverse relationship between perceived benefit and risk, it can be asserted that the two appeals used in association with HNR claims in food advertisements function either to enhance the perceived healthiness of an advertised food by increasing perceived benefit or by reducing perceived risk. Empirical justification for the assertion is provided by a study of young male and female college students conducted by Choi and Springston (in press), who noted that additional experimental research is needed to advance the generalisability of their findings. Thus, the present study identifies representative benefit-seeking and risk-avoidance ad appeals targeted to female consumers, and examines the effect of those ad appeals to test the female consumers' judgements of the perceived healthiness of advertised foods. Later, research questions and hypotheses drawn from the above discussion are posed for experimental testing.

Additionally, drawing from prospect theory (Salovey *et al.* 2002), we believe the concepts of benefit-seeking and risk-avoidance appeals are similar to the distinction between gain- and loss-framed messages. However, the structure of message framing is difficult to apply in the context of our study for the following major reasons, and thus not applicable. First, using message framing typically requires both action (attain-not attain) and outcome dimensions (desirable-undesirable) in messaging manipulation (Detweiler *et al.* 1999; Banks 2001; McCaul *et al.* 2002; Salovey *et al.* 2002). Such theoretical reasoning is applicable to structure/function and health claims since they both have action and outcome (see Van Kleef *et al.* 2005). In contrast, message framing is not as applicable to nutrient content claims because this claim type does not feature outcome values. For

example, although ‘low fat’ or ‘more vitamins’ nutrient content claims include actions to be attainable or not attainable, they do not explain explicitly in the claims whether the outcomes would be desirable or undesirable. Second, according to many message framing studies, gain- and loss-framed messages are manipulated using the same object, such as sunscreen (Detweiler *et al.* 1999), flu shot (McCaul, *et al.* 2002), mammography (Banks 2001), and so on. Our study categorises different HNR claims into benefit-seeking and risk-avoidance appeals exclusively.

Stage 1: content analysis

Food ads from 2007–2009 issues of eight women-orientated magazines were content analysed to provide empirical insight into: (1) food marketers’ actual HNR claim usage; (2) the use of HNR claims in association with benefit-seeking and risk-avoidance appeals; and (3) the differences among HNR-paired benefit-seeking and risk-avoidance appeals in advertisements across different food product categories. As described below, HNR claims in the ads emphasising healthy benefits (e.g. vitamin added, more calcium, calcium builds strong bones) were classified as benefit-seeking appeals; claims de-emphasising unhealthy risks (e.g. non-fat, fewer calories, protects against heart disease) were classified as risk-avoidance appeals. Two research questions and one hypothesis were addressed by the content analysis:

- RQ1:** To what degree do HNR claims with benefit-seeking and risk-avoidance appeals appear in food advertisements seen by female audiences?
- RQ2:** To what degree do benefit-seeking and risk-avoidance appeals appear in association to nutrient content claims in food advertisements published by popular magazines targeted at women?
- H1:** In food advertisements published by popular magazines targeted at women, benefit-seeking appeals will be present more often in association with structure/function claims, while risk-avoidance appeals will be present more often in association health claims.

RQ1 is posed to determine the frequency of the two appeals relative to HNR claims in food advertisements. RQ2 is posed to identify whether there is a tendency for benefit-seeking or risk-avoidance appeals in association with HNR claims to be differentially used depending on the food product category. The expectation of H1 is derived from the conceptual definitions of benefit-seeking and risk-avoidance appeals. Since health claims emphasise how particular ingredients protect from diseases such claims inherently incorporate the appeal to risk-avoidance. Similarly, because structure/function claims emphasise enhancement of body structure and function through particular food ingredients, such claims appeal to benefit-seeking.

Methodology

Advertisers of food, beverage and candy products spend a substantial proportion of their budgets on consumer magazines (e.g. \$2.3 million in 2010, 27.1% of media total; Advertising Age 2011). Therefore, using MRI+ data, we first selected representative magazines with circulations of more than a million based on average circulation for the years 2007 to 2009. From those, we then selected magazines with female readership of two-thirds or more (67%). Among the identified magazine pool, eight magazines were randomly selected as popular women-orientated magazines for analysis: *People*, *Cosmopolitan*, *Glamour*, *US Weekly*, *Elle*, *Vogue*, *In Style* and *Seventeen*. The median age of the magazine audiences was from 26 to 41. Thus, a considerable portion of both young and mature female audiences was represented by the eight magazines.

All September 2007 to September 2009 issues of the magazines were obtained. Magazine food ads one-quarter of a page or larger were selected for analysis. Double-page-spread ads were treated as one advertisement. In total, 931 food ads were collected from the magazines. Of the 931, a sample of 633 unique, unduplicated ads were used for analysis.

Coding scheme

The coding scheme included the following variables: (1) product category – fast food, bread/cereal, meat/protein, dairy, fruit/vegetable/juice, fats/sweet breads/candy/sweets/cookies, coffee/tea, soda, condiments and pre-prepared food/frozen meals; (2) types of HNR claim – nutrient content, structure function and health; and (3) types of appeal – benefit seeking or risk avoidance. These categories were adopted from Dutta-Bergman (2004a, 2004b), Guthrie *et al.* (1995) and Parker (2003). Table 1 presents the operational definitions and coding categories.

To code mutually exhaustive and exclusive categories, foods were classified into ten category types. Although the Food Pyramid was revised in 2005, we followed Parker's categorisation using the original Food Pyramid for comparative consistency. The original Pyramid is more discrete and detailed in its food categorisation; the revised Pyramid has been criticised for being too abstract (Nestle 2007; Carman 2011; Hellmich 2011). However, we modified the original food categorisations in the two ways. First, the vegetable category was merged into a fruit/vegetable/juice category because vegetables had the least number of observations in Parker's study (4%). Second, Parker's combination foods category was divided into fast food and pre-prepared food/frozen dinner categories. In the same way, we added the condiments, coffee/tea and soda categories, which were combined in the 'other' category of Parker's study (2003).

We first coded HNR claims in the ads by claim type: nutrient content (e.g. 'fat free', 'calcium added' and 'no calories'), structure/function (e.g. 'calcium builds strong bones' and 'maintain healthy levels of cholesterol'), and health (e.g. 'reduce the risk of heart disease'). We then classified each HNR claim type as either benefit-seeking or risk-avoidance appeal (see Table 1). If an HNR claim emphasised a health benefit, we considered it a

Table 1: Coding scheme and operational definitions**Product category (0.92)**

1. Fast food (e.g. McDonald's, Wendy's, Burger King)
2. Bread/cereal/whole grains
3. Meat/protein (poultry, eggs/mixtures, tuna)
4. Dairy (milk, yogurt, cheese, cream cheese, NOT butter)
5. Fruit/vegetables/100% juice
6. Fats/sweet breads/candy/sweets/cookies (cake, ice cream, gelatin)
7. Coffee/tea
8. Soda (carbonated)
9. Condiments (steak sauce, spaghetti sauce, dressing, oil, peanut butter, salt, pepper, etc.)
10. Pre-prepared food/frozen meals (soup, ready-to-bake cake dough, microwaveable dinners)

HNR claims*(a) Nutrient-content claims (e.g. calories, vitamins, fat content) (0.97)*

1. No
2. Benefit seeking
3. Risk avoidance
4. Both

(b) Structure/function claims (e.g. calcium builds strong bones, maintain healthy levels of cholesterol, herbs reduce stress and frustration) (0.99)

1. No
2. Benefit seeking
3. Risk avoidance
4. Both

(c) Health claims (e.g. reduction of cancer risks, reduced risk of high blood pressure, improves arthritis in the elderly) (0.99)

1. No
2. Benefit seeking
3. Risk avoidance
4. Both

benefit-seeking appeal. Likewise, if an HNR claim emphasised reduced health risk, we considered it a risk-avoidance appeal. When benefit-seeking and risk-avoidance appeals appeared together, they were coded as both appeals, regardless of within-ad frequency. However, almost all of the advertisements featured only one or two HNR claims (98.9%).

Coding procedure

Two coders separately coded the 633 food ads. Multiple training sessions and group discussions were conducted before pilot testing and actual coding of the 633 ads. Following pilot testing, the coding scheme was further developed with more detailed operational definitions, and another series of training sessions and discussions conducted.

For inter-coder reliability calculation, we adopted Perreault and Leigh's (1989) Index (P/L Index). The P/L Index is appropriate for nominal item coding between two coders (Rust & Cooil 1994). All reliability coefficients ranged from 0.94 to 0.99 (see Table 1), exceeding the sufficient coefficient size of 0.75 (Rust & Cooil 1994). Disagreements were reconciled by the two coders and a third judge who simultaneously examined problematic judgements to achieve consensus.

Content analysis results

RQ1 and H1: HNR claims and benefit-seeking vs risk-avoidance appeals

Of the 633 food advertisements, 278 (43.9%) contained at least one HNR claim type. Consistent with earlier studies (Hickman *et al.* 1993; Teisl *et al.* 1999; Parker 2003), nutrient content claims were the most common type of HNR claim in the food ads (87.1%), followed by structure/function (11.9%) and health claims (1.1%). The differences in frequency of the three HNR claim types were statistically significant ($\chi^2 = 80.58, p < 0.01$).

As shown in Table 2, risk-avoidance appeals constituted more than half (59.4%) of the total 278 HNR-claimed ads. Benefit-seeking appeals were present in 27.7% of the ads, and 12.9% used both appeals. Examination of the two motivational approaches by different HNR-claimed ads indicates that the proportional presence of benefit-seeking and risk-avoidance appeals was different for each claim type. For the nutrient content claim, the risk-avoidance appeal was dominant, appearing in 66.1% of ads in the claim category (i.e. three times the frequency of benefit-seeking appeals (19.0%)). Conversely, benefit-seeking appeals were overwhelmingly dominant in ads with structure/function claims (93.9%). Few benefit-seeking or risk-avoidance appeals appeared in the food ads with health claims. Only three health claim ads were identified and those were risk-avoidance appeals (1.1%) about reducing heart disease. None of the other ads with health claims contained either motivational approach.

Table 2: Portrayal of benefit-seeking and risk-avoidance appeals by HNR claim type

	HNR claim types			Total
	Nutrient content claim	Structure/function claims	Health claims	
Benefit-seeking appeals	46 (19.0%)	31 (93.9%)	0 (0.0%)	77 (27.7%)
Risk-avoidance appeals	160 (66.1%)	2 (6.1%)	3 (100.0%)	164 (59.4%)
Both appeals	36 (14.9%)	0 (0.0%)	0 (0.0%)	36 (12.9%)
Total	242 (87.1%)	33 (11.9%)	3 (1.1%)	278 (100.0%)

Chi-square = 80.55 ($p = 0.00$)

Thus H1, which predicted benefit-seeking appeals, would be present more often in association with structure/function claims, whereas risk-avoidance appeals would be present more often in association health claims, is supported.

Ads with nutrient content claims emphasised reduced fat and calories (20.6% and 31.6%, respectively), followed by vitamins (10.0%), less sugar (9.1%), fibre (7.1%) and protein (3.6%). Vitamins (48.3%) were the most common nutrient content in the ads with a structure/function claim, followed by protein (27.5%) and fat content (10.3%).

RQ2: food categories and benefit-seeking vs risk-avoidance appeals in association with nutrient content claims

Figure 1 presents the comparison of benefit-seeking and risk-avoidance appeals in association with HNR claims by product categories. Table 3 presents the relative frequencies of benefit-seeking and risk-avoidance appeals for each food product category by HNR claim type.

The two appeals appeared considerably more often in ads with nutrient content claims than in ads with structure/function (242 vs 33) and health claims (242 vs 3), and with greater variation by food category. The risk-avoidance appeal appeared more frequently in

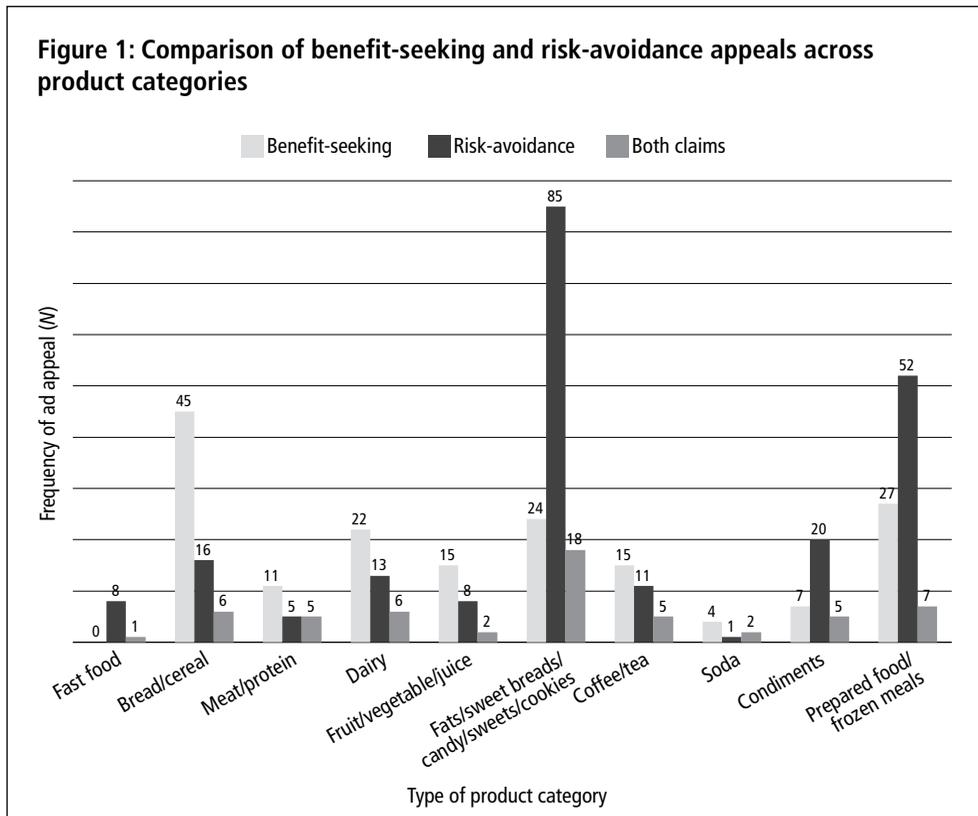


Table 3: Portrayal of benefit-seeking and risk-avoidance appeals by HNR claim type

	Fast food	Bread/ cereal	Meat/ proteins	Dairy	Fruit/ vegetable/ juice	Fats/sweet breads/candy/ sweets/cookie	Coffee/tea	Soda	Condiments	Frozen meals	Pre-prepared food/	Total
Nutrient content claim	Benefit seeking	1 (9.1%)	8 (44.4%)	2 (66.7%)	0 (0.0%)	2 (28.6%)	4 (41.7%)	4 (18.2%)	0 (0.0%)	5 (13.2%)	46 (19.0%)	
	Risk avoidance	9 (81.8%)	8 (44.4%)	1 (33.3%)	9 (75.0%)	2 (28.6%)	19 (39.6%)	11 (50.0%)	5 (83.3%)	32 (82.1%)	160 (66.1%)	
	Both	1 (9.1%)	2 (11.1%)	0 (00.0%)	3 (25.0%)	3 (42.9%)	9 (11.7%)	7 (31.8%)	1 (16.7%)	1 (2.6%)	36 (14.9%)	
	Total	11 (4.5%)	18 (7.4%)	3 (1.2%)	12 (5.0%)	7 (2.9%)	77 (31.8%)	48 (19.8%)	22 (9.1%)	6 (2.5%)	38 (15.7%)	242 (100.0%)
Chi-square = 65.20 (p = 0.00)												
Structure/function claim	Benefit seeking	0 (100.0%)	2 (66.7%)	0 (0.0%)	9 (100.0%)	4 (80.0%)	3 (100.0%)	2 (100.0%)	0 (100.0%)	1 (100.0%)	31 (96.6%)	
	Risk avoidance	0 (0.0%)	1 (33.3%)	0 (0.0%)	0 (0.0%)	1 (20.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	1 (3.4%)	
	Both	0 (0.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	2 (0.0%)	
	Total	0 (0.0%)	3 (9.1%)	0 (0.0%)	9 (27.3%)	5 (15.2%)	3 (9.1%)	10 (30.3%)	2 (6.1%)	0 (0.0%)	1 (3.0%)	33 (100.0%)
Chi-square = 7.24 (p > 0.05)												
Health claims	Benefit seeking	0 (0.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	0 (100.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	
	Risk avoidance	0 (0.0%)	1 (100.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	2 (100.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	3 (100.0%)	
	Both	0 (0.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	
	Total	0 (0.0%)	1 (33.3%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	2 (66.7%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	3 (100.0%)
Chi-square = not available due to small sample size (p = n.a.)												

ads with nutrient content claims relative to benefit-seeking appeals ($\chi^2 = 65.20, p < 0.001$). Risk-avoidance appeals were dominant in fast food (81.8% vs 9.1%), dairy (75.0% vs 0.0%), fats/sweet breads/candy/sweets/cookies (83.1% vs 5.2%), soda (50.0% vs 18.2%) and pre-prepared food/frozen meals (82.1% vs 13.2%) ads. Benefit-seeking appeals appeared with more frequency in meat/proteins and coffee/tea ads, and both appeals appeared with greater frequency in ads in the fruit/vegetable/juice category. Benefit-seeking and risk-avoidance appeals were equal in the bread/cereal category; benefit-seeking appeals alone and the combination of both appeal types appeared with equal frequency in fast food ads with nutrient content claims.

Though their numbers were small, benefit-seeking appeals were more frequent than risk-avoidance appeals in food ads with structure/function claims across the product categories (96.6% vs 3.4%). Dairy (nine ads) and coffee/tea (ten ads) ads contained the largest number of benefit-seeking appeals; risk-avoidance appeals appeared in two product ads, one for bread/cereal and the other for fruit/vegetable/juice. None of the ads with structure/function claims contained both appeals together. While the structure/function claims related to vitamins were dominant in coffee/tea ads, protein and calcium were major structure/function claims in the dairy product category. Because of the small cell sizes in the structure/function claim category, nothing statistically can be concluded about the relationships ($\chi^2 = 7.24, p > 0.05$).

As noted previously, only three of the 278 food ads (1%) contained health claims. All three were risk-avoidance appeals that emphasised lowering health disease risk in ads from the bread/cereal (one ad) and fats/sweet breads/candy/sweets/cookies (two ads) categories.

Summary of content analysis

From the content analysis, it is apparent that HNR-based food advertisements with benefit-seeking and risk-avoidance appeals are present in magazines seen by female audiences. Their presence means that there is a reasonable probability that female consumers encounter the two HNR-based appeals in food ads and that their judgements of different products may be differentially associated with the presence of the two appeal types.

The findings indicate a disproportionate number of food ads with risk-avoidance appeals (59.4%) are present in women-orientated magazines compared to benefit-seeking appeals (27.7%), with the disproportion especially pronounced in food ads that use nutrient content claims (66.1% vs 19.0%). These results support the observations of researchers and suggest that food marketers tend to use risk-avoidance appeals over benefit-seeking appeals in association with nutrient content claims in food ads seen by females. Though speculation on our part, this finding probably reflects marketers' efforts to reduce perceived health risks associated with certain foods (i.e. fast food, dairy, fats/sweet breads/candy/sweets/cookies, soda and pre-prepared food/frozen meals).

As mentioned earlier, nutrient content claims are allowed when a specific ingredient provides 20% or more of the daily value (DV) reference amount for the product. This requirement is not difficult for food marketers to circumvent scientifically, and provides

a loophole that allows them to escape the more restrictive health and structure/function claim regulations (Heller 2001; Nestle 2007).

The findings become even more robust when the frequencies of benefit-seeking and risk-avoidance appeals in nutrient content claim-based ads are analysed by product category. In ads with nutrient content claims, risk-avoidance appeals are concentrated in the fast food, fats/sweet breads/candy/sweets/cookies, soda and pre-prepared food/frozen meals categories, which are normally perceived as less nutritious and less likely to qualify for nutritious claims (Ippolito & Mathios 1993; Parker 2003). Moreover, the fact that risk-avoidance appeals are rarely present in ads with structure/function and health claims supports the suspicion that food marketers attempt to reduce perceived risk for unhealthy products by making nutrient content claims.

Though the number of benefit-seeking and risk-avoidance appeals in both structure/function and health claims was small, the results do suggest some interesting insights. Benefit-seeking appeals were dominant in food ads with structure/function claims, and only risk-avoidance appeals appeared in ads with health claims. We suspect the reason for this finding is related to the definition of the two claim types. A structure/function claim explains how a food or nutritional supplement enhances the structure or function of the body. Thus, a benefit-seeking appeal would be more appropriate for a structure/function claim because food marketers would want to explain the positive effects of nutrient content on a consumer's body. Food marketers might avoid risk-avoidance appeals because they are seen as less appropriate for ads with structure/function claims.

The near non-existence of food ads with health claims is probably attributable to regulatory requirements. As Parker (2003) explained, the reason for the absence of health claims in food advertising is due to authorisation difficulty. Food marketers might be reluctant to use health claims because pre-authorisation from the FDA is mandated. Instead, they rely more on nutrient content claims, for which authorisation is easier to obtain.

Stage 2: experiments

Given that benefit-seeking and risk-avoidance appeals appear in HNR claim-based food advertisements directed to female magazine audiences, and because few studies have fully examined how various types of HNR claims in food advertisements psychologically motivate and affect consumer judgement (Van Kleef *et al.* 2005; Choi & Springston in press), two experiments were executed to determine how female consumers are influenced by the two appeals in advertisements in association with nutrient content claims. We restricted experimental ad-content to nutrition content claims because the claim type was dominant in food ads (87.1%) from female-orientated magazines and the two appeals appeared in great frequency in ads with the HNR claim type.

Experiment 1

Based on the previously noted theoretical foundation and the call for replication study (Choi & Springston in press), Experiment 1 used a 2 (healthy vs unhealthy product

categories) \times 3 (benefit-seeking vs risk-avoidance vs taste appeals) between-subject design to determine how benefit-seeking and risk-avoidance appeals in association with nutrient content claims affect female consumer judgements of advertised food products, compared to taste appeal (control condition). We posed and experimentally tested two hypotheses on the presumption that benefit-seeking and risk-avoidance appeals used in association with nutrient content claims produce the halo effect among female consumers. We hypothesised that:

- H2a:** Benefit-seeking HNR appeals will increase female consumers' perceived benefit of advertised food products, compared to a control group using taste appeal.
- H2b:** Risk-avoidance HNR appeals will decrease female consumers' perceived risk of advertised food products, compared to a control group using taste appeal.
- H3:** Both benefit-seeking and risk-avoidance appeals will improve female consumers' perceived healthiness of advertised food products, compared to a control group using taste appeal.

Experiment 1 methodology

Pre-test: selection of food products

Prior to Experiment 1, a pre-test was conducted to select foods perceived as 'healthy beneficial' and 'unhealthy risky'. Using the Simmons Choice III marketing database, an initial list of six product categories was derived on the basis of prior purchase experience, high proportion of product usage, and female audience. The food product categories were selected on the presumption they would be distinctively perceived as healthy beneficial (*multigrain granola bar, grilled chicken and whole wheat bread*) or unhealthy risky (*chocolate chip cookies, fried chicken and pepperoni pizza*).

Pre-test data were collected from 32 female students. The pre-test subjects were asked two questions (Alhakami & Slovic 1994; Choi & Springston in press): 'In general, how risky (beneficial) do you consider each of the following food products to be for your health as a whole?' The 7-point bipolar scales were anchored by 'not at all risky (beneficial)' to 'very risky (beneficial)' descriptors.

In line with expectations, the presumed healthy products were perceived more beneficial and less risky to health, while the unhealthy products were perceived less beneficial and more risky. The mean differences of perceived healthy benefit between healthy products and unhealthy products were significant ($p < 0.001$), whereas the mean differences of perceived unhealthy risk of unhealthy products were greater than that of healthy products ($p < 0.001$). Based on the results, we chose two healthy and unhealthy food match-ups using product attribution: *multigrain granola bar vs chocolate chip cookie* and *grilled chicken vs fried chicken*. On the product attribution dimension, *multigrain granola bar* and *chocolate chip cookie* are confectionery foods, while *grilled chicken* and *fried chicken* are poultry foods.

Experimental stimuli

Four advertisements were created for each product match-up. For the *multigrain granola bar* vs *chocolate chip cookie* ads, 'more fibre' and 'reduced calories' claims were made; 'more protein' and 'reduced fat' claims were made in the *grilled chicken* and *fried chicken* ads. The ad claims were determined by: (1) the most frequent nutrient content claims identified in the content analysis; (2) common product attributions; and (3) the existence of actual and similar products on the market.

Nutrient content claims were used in the experimental stimuli. As noted previously, nutrient content claims were dominant in ads from the female-orientated magazines and are considered the most problematic HNR claim type (Wansink & Chandon 2006; Chandon & Wansink 2007; Nestle 2007). Thus, developing ad stimuli with benefit-seeking and risk-avoidance appeals embedded in nutrient content claims will increase the external validity of the experimental data.

The ad stimuli were created by modifying real magazine food advertisements. Layout and background features were constant; only copy communicating appeals was manipulated. Benefit-seeking appeals were created by inflating a product's beneficial nutrient (e.g. '50% more protein, 500% more satisfaction!'); risk-avoidance appeals were created reducing the risky nutrient in a product (e.g. '50% less fat, 500% more satisfaction!'). A real, but unfamiliar international brand, 'Lotteria', was used to enhance external validity and to avoid predispositional bias. The ads were reviewed and refined by a retired advertising copywriter.

Procedure and measures

Four-hundred and seven (407) female respondents were randomly assigned to each experimental group. The age of the respondents ranged from 20 to 31 ($M = 23.69$, $SD = 1.62$). They were first asked to answer a manipulation check question (Choi & Springston in press): 'Compared with a regular _____ (e.g. *chocolate chip cookie*) product, please indicate how likely or unlikely it is that the advertised product possesses each of listed attributes.' For the *multigrain cereal* vs *chocolate chip cookie* comparison, respondents evaluated the claimed fibre and calorie levels; for the *grilled chicken* vs *fried chicken* match-up, they evaluated the claimed protein and fat levels. Seven-point bipolar scales were used to measure the evaluations (1 = much lower than regular product; 4 = same as regular product; 7 = much more than regular product).

Perceived benefit, risk and healthiness were measured following ad stimuli exposure. Perceived benefit and risk question items were modified from previous studies (Alhakami & Slovic 1994; Choi & Springston in press). The respondents were asked: 'In general, how risky (beneficial) do you consider the above advertised products to be to your health as a whole?' The scale values ranged from (1) not at all risky (beneficial) to (7) very risky (beneficial). They were also asked to evaluate the perceived healthiness of each food product on 7-point bipolar scales (perceived healthiness: 1 = not very nutritious/not very healthy, 7 = very nutritious/very healthy). The two perceived healthiness items were taken from previous studies (Guthrie *et al.* 1995; Andrews *et al.* 1998; Choi *et al.* 2012; Choi & Springston in press) and exhibited strong internal consistency (inter-item correlation = 0.93).

Results of Experiment 1

Manipulation check

One-sample T-tests revealed that the benefit-seeking and risk-avoidance appeal manipulations were successful. Compared to regular products (mid-point '4'), the ad stimuli with benefit-seeking appeals were perceived as having higher healthy-nutrient content (M protein for fried chicken = 5.14, $t(27) = 4.77, p < 0.001$; M protein for grilled chicken = 5.12, $t(33) = 5.12, p < 0.001$; M fibre for multigrain granola bar = 5.19, $t(30) = 4.67, p < 0.001$; M fibre for chocolate chip cookie = 5.37, $t(37) = 7.06, p < 0.001$), and the ad stimuli with risk-avoidance appeals were perceived as having lower unhealthy nutrient content (M fat for fried chicken = 2.69, $t(35) = -6.33, p < 0.001$; M fat for grilled chicken = 2.91, $t(33) = -5.86, p < 0.001$; M calorie for multigrain granola bar = 2.84, $t(30) = -5.45, p < 0.001$; M calorie for chocolate chip cookie = 2.63, $t(39) = -7.05, p < 0.001$).

Hypotheses tests

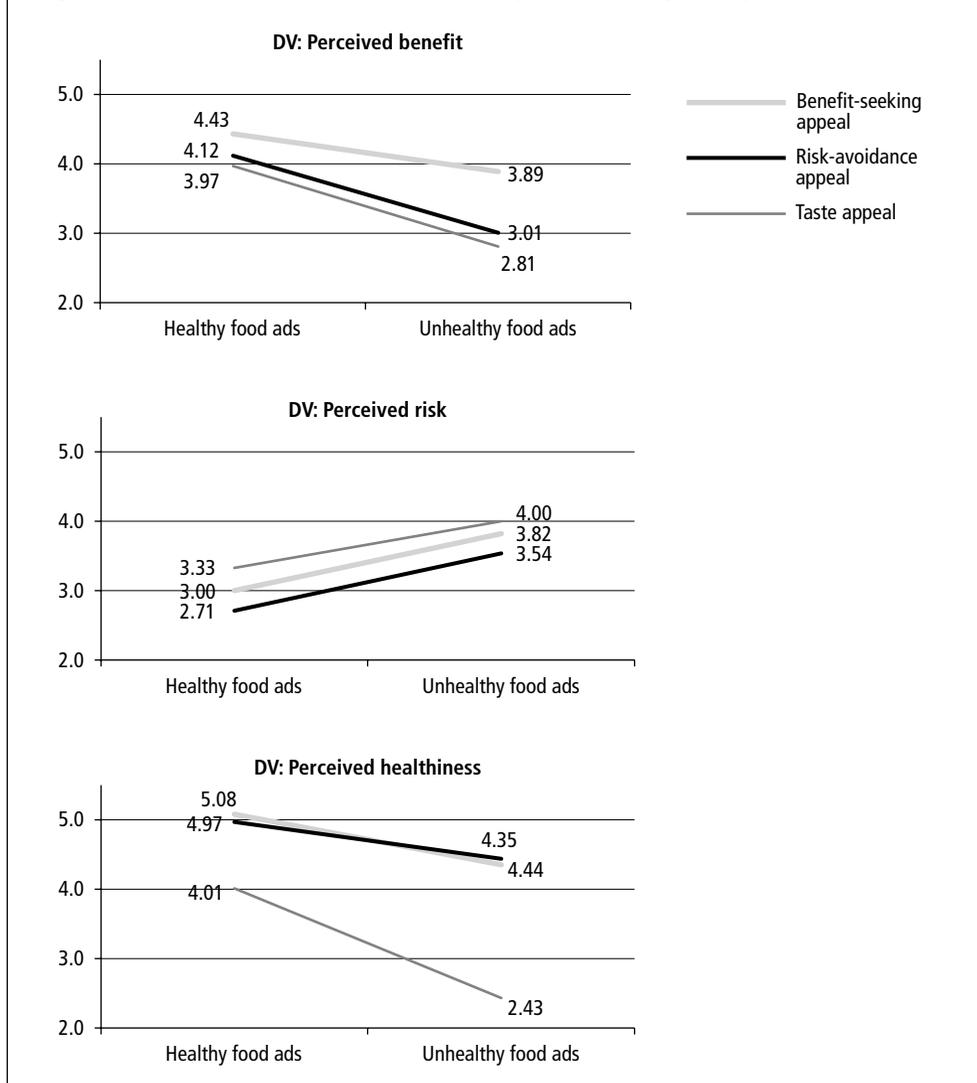
For hypotheses testing, 2 (healthy vs unhealthy products) \times 3 (benefit-seeking vs risk-avoidance vs taste appeals) ANOVAs were conducted (see Figure 2).

For perceived benefit, appeal type had a significant main effect ($F(2, 401) = 14.96, p < 0.001$). Post hoc tests revealed that the ads with benefit-seeking appeals resulted in significantly higher perceived benefit than the ads with taste appeals for both product categories (for healthy product category: M benefit-seeking = 4.43 versus M taste = 3.97, $t(123) = 2.30, p < 0.05$; for unhealthy product category: M benefit-seeking = 3.89 versus M taste = 2.81, $t(138.08) = 5.16, p < 0.001$). For perceived risk, the results were consistent. The

Table 4: Mean differences and univariate F -values between product and appeal types

Product type	Appeal type	N	Mean (SD)		
			Perceived benefit	Perceived risk	Perceived healthiness
Unhealthy foods	Benefit seeking	66	3.89 (1.11)	3.82 (1.02)	4.35 (1.27)
	Risk avoidance	76	3.01 (1.27)	3.54 (1.24)	4.44 (1.43)
	Taste	75	2.81 (1.37)	4.01 (1.62)	2.43 (1.26)
Healthy foods	Benefit seeking	65	4.43 (1.15)	3.00 (1.30)	5.08 (1.10)
	Risk avoidance	65	4.12 (1.14)	2.71 (1.30)	4.97 (1.31)
	Taste	60	3.97 (1.10)	3.33 (1.54)	4.01 (1.35)
			Univariate F -value		
Factors			Perceived benefit	Perceived risk	Perceived healthiness
Product type			60.91***	33.46***	54.01***
Appeal type			14.96***	5.68**	59.34***
Product type \times appeal type			2.72	0.13	6.31**

Notes: Univariate $df = 1/401$ for product type, $2/401$ for appeal type; * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Figure 2: Mean differences between healthy vs unhealthy food products

main effect of appeal type was significant ($F(2, 401) = 5.68, p < 0.01$), and post hoc tests showed that the ads with risk-avoidance appeals resulted in significantly lower perceived risk than those with taste appeals for both product categories (for healthy product category: M risk-avoidance = 2.71 versus M taste = 3.33, $t(123) = -2.47, p < 0.05$; for unhealthy product category: M risk-avoidance = 3.54 versus M taste = 4.01, $t(149) = -2.03, p < 0.05$). For perceived healthiness, enhanced benefit and reduced risk had a significant main effect on perceived healthiness ($F(2, 401) = 59.34, p < 0.001$). Post-hoc tests found benefit-seeking appeals were perceived as significantly healthier than taste appeals across the product

categories (for healthy product category: M benefit-seeking = 5.08 versus M taste = 4.01, $t(123) = 4.87, p < 0.001$; for unhealthy product category: M benefit-seeking = 4.35 versus M taste = 2.43, $t(139) = 8.98, p < 0.001$). Risk-avoidance appeals were also perceived as significantly healthier than taste appeals for both product categories (for healthy product category: M risk-avoidance = 4.97 versus M taste = 4.01, $t(123) = 4.04, p < 0.001$; for unhealthy product category: M risk-avoidance = 4.44 versus M taste = 2.43, $t(149) = 9.16, p < 0.001$). Additionally, a significant interaction effect was observed between appeal types and product categories ($F(2, 401) = 6.31, p < 0.01$), indicating that perceived healthiness was enhanced more in unhealthy product categories than in healthy product categories.

The experimental results support H2 and H3, and indicate theoretical validity of the health halo effect in the context of female consumer judgements of food advertising. It would seem that benefit-seeking and risk-avoidance appeals function as health halo-associated cognitive biases to enhance perceived benefit and reduce perceived risk to establish cognitive consistency. These enhanced benefit or risk reduction perceptions apparently are associated with increased perceived healthiness of advertised products.

Experiment 2

Given that risk-avoidance appeals were dominant in our content analysis, though both benefit-seeking and risk-avoidance appeals had equally significant health halo effects, we conducted a second experiment to test consumer preference between the two appeal types across food categories – that is, if risk-avoidance appeals are more frequently used than benefit-seeking appeals, despite the equivalent health halo effects, it is assumed that consumers might prefer one appeal type to the other. Regarding this issue, Choi and his colleagues (2012) found that nutrient content claims are more appropriate for use with perceivably healthy foods than perceivably unhealthy foods. However, the researchers did not examine consumer preferences between benefit-seeking and risk-avoidance appeals by food categories. Therefore, given that other researchers have questioned the appropriateness of the use of risk-avoidance appeals in advertisements for unhealthy foods (Burton & Creyer 2004; Wansink & Chandon 2006; Chandon & Wansink 2007), the following research question regarding female consumer preference for both benefit-seeking and risk-avoidance appeals type by healthy and unhealthy foods is proposed:

RQ3: Between benefit-seeking and risk-avoidance appeals, which appeal type is more preferred by female consumers across food product categories?

Experiment 2 methodology

A 2 (healthy vs unhealthy product categories) \times 2 (benefit-seeking vs risk-avoidance appeals) mixed-factorial experimental design was used to determine whether risk-avoidance appeals are preferred to benefit-seeking appeals, regardless of advertised food product (healthy vs unhealthy). Product type was a between-subject variable and appeal type was within-subject variable. One-hundred and forty-six (146) female

respondents participated in the experiment. The age of the respondents ranged from 20 to 32 ($M = 24.06$, $SD = 2.71$).

Ad stimuli were the same as those used in the first experiment. However, two ad stimuli with different appeals were shown to the participants simultaneously, which allowed comparative judgements of preference between benefit-seeking and risk-avoidance appeals. The judgements were measured by seven items from Brunel and Nelson (2000, p. 19): 'Overall, which ad do you think is better?'; 'Which one appeals to you more?'; 'Which ad do you think would be more successful?'; 'Which ad do you think will stick in people's minds more?'; 'For products of this type, which ad do you think is more typical of the way this product is sold?'; 'Which ad would be more likely to convince you to purchase?'; 'Which ad do you think would create a more favourable image of the company?' An 'I don't know' response was added to the Brunel and Nelson scales and treated as missing values.

The items exhibited high internal reliability (Cronbach's alpha = 0.92). For each respondent, a summative Ad Preference Index was calculated by assigning a score of 0 when a risk-avoidance appeal ad was selected and a 1 when a benefit-seeking appeal ad was chosen. Thus, an index of 7 indicated strong preference for the benefit-seeking appeal, whereas an index of 0 indicated strong preference for the risk-avoidance appeal. When there were missing values, the index was adjusted to be consistent with the 7-point scale.

Results of Experiment 2

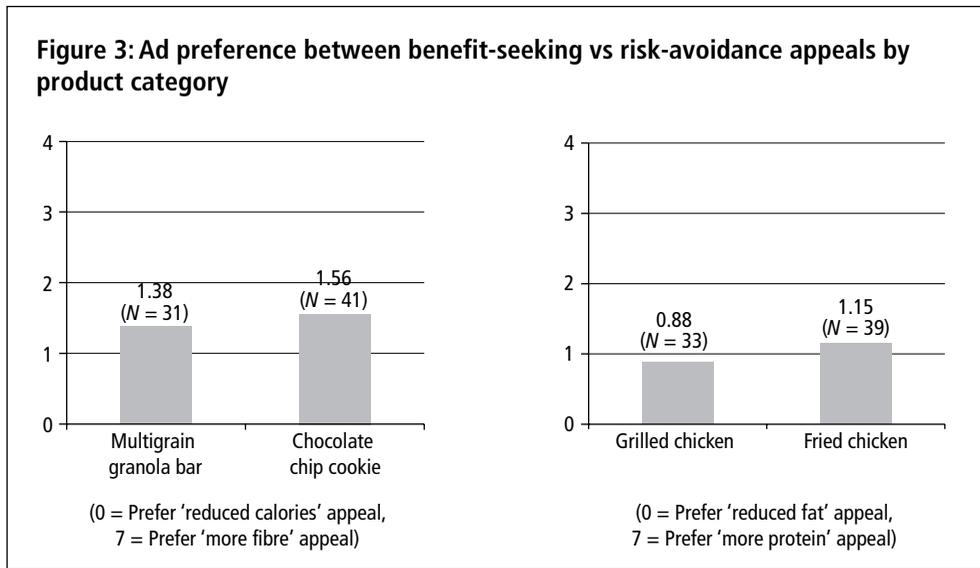
Manipulation check

The same manipulation check questions asked in the first experiment were repeated in Experiment 2. One-sample T-tests revealed that the benefit-seeking and risk-avoidance appeal manipulations were successful. Compared to regular products (mid-point '4'), the ad stimuli with benefit-seeking appeals were perceived as having higher healthy-nutrient content (M protein for fried chicken = 5.11, $t(36) = 5.15$, $p < 0.001$; M protein for grilled chicken = 5.06, $t(32) = 4.88$, $p < 0.001$; M fibre for multigrain granola bar = 5.16, $t(31) = 4.62$, $p < 0.001$; M fibre for chocolate chip cookie = 5.40, $t(41) = 7.92$, $p < 0.001$); the ad stimuli with risk-avoidance appeals were perceived as having lower unhealthy nutrient content (M fat for fried chicken = 2.91, $t(40) = -5.33$, $p < 0.001$; M fat for grilled chicken = 2.91, $t(34) = -6.02$, $p < 0.001$; M calorie for multigrain granola bar = 2.80, $t(30) = -5.54$, $p < 0.001$; M calorie for chocolate chip cookie = 2.67, $t(41) = -7.07$, $p < 0.001$).

Research question test

ANOVA was used to test RQ3. As shown in Figure 3, risk-avoidance appeals were preferred to benefit-seeking appeals. The preference was consistent regardless of product categories.

For the match-up of *multigrain granola bar* vs *chocolate chip cookie*, there was no significant main effect for product category on Ad Preference ($F(1, 140) = 0.22$, $p > 0.05$). However, one-sample T-tests performed using the mid-point '4' as a reference value, revealed that the 'reduced calories' appeal was selected significantly more often than the 'more fibre' appeal for both *multigrain granola bar* ($t(81) = -9.79$, $p < 0.001$) and *chocolate*



chip cookie ($t(61) = -9.84, p < 0.001$) ads. For the *grilled chicken* vs *fried chicken* ad-match the results were also consistent. Although there was no significant main effect for product category on Ad Preference ($F(1, 140) = 0.77, p > 0.05$), one-sample T-tests revealed that the 'reduced fat' appeal was selected significantly more often than the 'more protein' appeal for both *grilled chicken* ($t(65) = -15.28, p < 0.001$) and *fried chicken* ($t(77) = -12.37, p < 0.001$) ads.

Consequently, the results reveal a preference for risk-avoidance over benefit-seeking appeals in food advertisements, for both healthy and unhealthy product categories selected in the experiment.

Summary of experimental results

The results of the two experiments indicate that benefit-seeking appeals increased female respondents' perceived healthy benefit while risk-avoidance appeals decreased perceived unhealthy risk of advertised foods. Both appeals enhanced female respondents' perceived healthiness of advertised foods, and such enhancement was more effective for unhealthy food products. Furthermore, risk-avoidance appeals were more preferred than benefit-seeking appeals, regardless of food category.

General discussion

Research and theoretical implications

The results of this multi-method study contribute to research on HNR claims and food advertising effects in important ways. Consistent with past content analytic research (e.g.

Parker 2003), this study suggests nutrient content claims are the most prominent HNR claim type in food advertisements appearing in women-orientated magazines, and that these claims are made often in ads for less nutritious foods (e.g. fats/sweets). Moreover, the analysis indicates that risk-avoidance appeals are more prominent than benefit-seeking appeals, and especially concentrated in ads for less nutritious foods (e.g. fats/sweet breads/candy/sweets/cookies, pre-prepared food/frozen meals). As noted below, the dominant presence of nutrient content claims paired with the two appeal types in ads for unhealthy foods seen by women is especially troublesome given policy concerns about the potential of the claim type to lead to erroneous evaluations of food healthiness.

The theoretical contributions of the experiments are especially important because they advance understanding of food advertising effects. First, the reported experimental results empirically indicate that the health halos of benefit-seeking and risk-avoidance appeals apparently work among female consumers, regardless of a food product's healthiness. The research found that, while benefit-seeking appeals significantly increased females' perceived healthy benefit compared to taste appeal, the benefit-seeking appeals also tended to reduce unhealthy risk perceptions. Conversely, risk-avoidance appeals significantly decreased females' perceived unhealthy risk while the appeals also tended to increase healthy benefit perceptions.

The results of Experiment 1 are consistent with previous research in that the halo effect of the stronger side leads to cognitive bias on the weaker side to establish cognitive consistency (Alhakami & Slovic 1994; Choi & Springston in press). Simply put, benefit-seeking and risk-avoidance appeals exhibit strong health halo-associated cognitive biases, and they enhance perceived benefit and reduce perceived risk to maintain cognitive consistency. The findings suggest that resulting cognitive biases associated with benefit-seeking and risk-avoidance appeals enhance perceived healthiness of advertised products among female consumers. Of particular significance, the findings speak more comprehensively to how perceived healthiness is enhanced by benefit-seeking and risk-avoidance appeals when used in association with nutrient content claims in food advertisements than previous studies (Andrews *et al.* 1998, 2000; Choi *et al.* 2012; Choi & Springston in press). The experimental results also indicate that benefit-seeking and risk-avoidance appeals are especially effective in increasing females' perceived healthiness of unhealthy food products. While previous research examined the positive relationship between HNR claims and perceived healthiness (Andrews *et al.* 1998, 2000; Choi *et al.* 2012), these findings suggest that the relative effects of benefit-seeking and risk-avoidance appeals vary as a function of food products advertised. A potential explanation for the interaction effects on perceived healthiness may be the 'ceiling effect' – that is, healthy products may be judged initially as having high perceived healthiness (see Andrews *et al.* 2000 for a similar interpretation). Taken together, our findings suggest that, when female consumers are exposed to benefit-seeking and risk-avoidance appeals in nutrient content claim-based food ads, they are more likely to experience greater enhancement of perceived healthiness for unhealthy products than for healthy products.

The results of Experiment 2 revealed a clear preference for risk-avoidance appeals over benefit-seeking appeals among female consumers, across both perceivably healthy

food (multigrain granola bar, grilled chicken) and unhealthy food categories (chocolate chip cookie, fried chicken) evaluated in the experiment. Though not considered earlier, this preference might be explained by regulatory focus theory (Higgins 1999). There is the possibility that US female consumers' dietary behaviour and food choice may be motivated more by a prevention orientation (the avoidance of unhealthy risk) than a promotion orientation (the enhancement of healthy benefits). Regulatory focus theory (Higgins 1999) contends that promotion-focused people are particularly sensitive to potential gains/benefits, whereas prevention-focused people are particularly sensitive to potential losses/risks (see also Lee & Aaker 2004). Linking this theorising to food choice and preference, it is reasonable to hypothesise that our findings might be driven more by a prevention orientation than a promotion orientation in the messaging. Considering that individuals' regulatory focus can be formulated by their chronic environment (Semin *et al.* 2005), females have long been concerned about weight and obesity problems, and have experienced more social pressure regarding thinness than males (Garner *et al.* 1980; Hesse-Biber *et al.* 2006). Consequently, risk-avoidance appeals might be more attractive to female consumers because their perceptions (right or wrong) about the appeal type might be associated with weight loss, weight maintenance and other eating issues.

The above is speculation at this point. However, the interpretation does suggest that individuals' regulatory focus could be an important moderator in food advertising research, in addition to the halo effect of HNR claim types. Researchers explain that individuals' regulatory focus is chronically formulated (Lee *et al.* 2000; Semin *et al.* 2005) but also can be easily manipulated temporarily (Zhou & Pham 2004). Thus, developed from the current study examining only the message effect of HNR claims, many eating situations and conditions could be manipulated in future research to examine how such manipulations might influence consumers' regulatory focus and the evaluation of HNR claimed advertising in sequence (see Sengupta & Zhou 2007).

Practical implications

The findings of the study offer several practical implications. Both the content analysis and subsequent experiments support the empirical assertion that the prevalence of nutrient content claims for energy-dense and less nutritious food categories is indeed problematic relative to potential audience deception – that is, putting the spotlight on certain nutrient/ingredients in food product advertisements results in the cognitive bias of health halos, which may enhance the female consumer's perceived healthiness of advertised products, especially for unhealthy product categories. This condition occurs even when unhealthy foods have many unhealthy ingredients present before nutrient content is added (Burton & Creyer 2004; Wansink & Chandon 2006). Given that hidden unhealthy ingredients (e.g. still high calorie, fat, sugar, sodium) tend to operate under health halos of risk-avoidance appeals, such food advertisement content might be harmful to female consumers' health status in the long term in light of the suspected problem of the tendency of HNR claims to mislead (Nestle 2007). In particular, our findings support the view

that more legal action is needed to protect female consumers from potentially misleading claim-based food advertisements. As suggested by several researchers, public policy officials should be mindful of the need to provide exact nutrition information in food advertisements. For instance, since the Nutrition Fact Panels in food products are usually less inspected than the HNR claims in food advertisements (Roe *et al.* 1999; Wansink *et al.* 2004), it would be worthwhile to require the disclosure of nutrition information (i.e. including accurate serving sizes and caloric information) in food advertisements in an effort to induce and facilitate further information processing about HNR claimed products among female consumers (also see Wansink & Chandon 2006). Public policy officials might also consider tightening the regulation of nutrient content claims themselves. As previously mentioned, the biggest legal loophole of current HNR claim regulatory policy is the inappropriate use of nutrient content claims in advertisements for unhealthy food products. As a result, increasing the threshold to authorise nutrient content claims would be a good solution (Wansink & Chandon 2006) to the loophole problem. At present, the legal threshold of 'low fat' or 'low calories' claims is at least 25% fewer than referenced regular food product (NLEA 1994). Thus, increasing the percentage threshold could help consumers to reduce the total intake of unhealthy ingredients in the long term (Wansink & Chandon 2006). In line with this, another possible solution is to prohibit nutrient content claims when the advertised food products have high levels of unhealthy ingredients. The Dietary Guidelines for Americans and the American Heart Association recommend daily allowances of fats, sugars, sodium and calories (Bruso 2013). Based on the recommendations, policy officials might consider revising the NLEA, not allowing nutrient content claims (especially for risk-avoidance appeals) when the advertised products contain more than certain thresholds of the unhealthy ingredients per serving size.

From the standpoint of consumer education, this study also suggests that consumer advocates need to continue educating consumers to eat foods that offer multiple and natural benefits, rather than eating single nutrient-manipulated foods. Recommended healthy dietary behaviours should be emphasised, including portion-controlled eating from diverse foods, and the avoidance of foods emphasising low-fat or low-caloric content. As noted by Nestle (2007, p. 355), eating diverse and healthy foods can overcome the detrimental effects of diets that are full of unhealthy foods. In this sense, the recent trend towards nutrient content claim-based food advertising makes it even more difficult for the American public to make good food choices that will help them achieve and maintain healthy lifestyles. Particularly for those who struggle with overweight and obesity problems, nutrient content claims with risk-avoidance appeals might constitute sufficient decision justification to eat a food product having unhealthy qualities. Hence, consumer education needs to work to accomplish two basic things: (1) help consumers understand that the absorption of nutrients from variety of foods is much better than that from most foods that make nutrient content ad claims; and (2) encourage consumers to find and understand the Nutrition Fact Panel information before they purchase food products. Both actions might help diminish consumers' false sense of dietary security associated nutrient content claim-based food advertising (Nestle 2007).

Limitations and suggestions for future research

Like most research, this study has limitations that should be noted. First, the content analysis sample was restricted to food advertisements from 2007–2009 issues of popular women-orientated magazines. Thus, the generalisability of our results is restricted. Future study is needed that examines HNR claims and appeal types in food advertisements from other time periods and other media viewed not just by female consumers, but also consumers from other population segments.

The second limitation is that the food products and ad appeals selected for the experiments do not reflect a full array of product and HNR claim types. Future research needs to examine other types of food products and HNR claims (structure/function and health claims) in association with benefit-seeking and risk-avoidance appeals, to replicate these findings.

Third, subjects in the experiments were young females (18 to 32) and thus do not reflect entire age range of the female population. Thus, more replication studies are needed to observe whether the health halos of benefit-seeking and risk-avoidance appeals consistently enhance perceived healthiness for the population groups.

Fourth, the two experiments were conducted in an online environment. Online experiments are problematic because internal validity is negatively affected by low controllability (Reips 2000). Future research is recommended in non-electronic settings and under controlled conditions, such as in real or staged grocery store locations.

Despite the aforementioned limitations, the reported results advance knowledge on the content and effects of food advertising. As such, they inform the public debate on HNR claim-based food advertising and provide an empirical foundation for future research.

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