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Naturally Overused: An Analysis of Health Claims On "Healthy" Supermarket Food Products with an Emphasis On The "Natural" Angle

A Final Year Project
PPC- Research

Presented to the Wee Kim Wee School of Communication and Information
In Partial Fulfilment of the Requirements
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Abstract

This study examined the use of healthful claims on food packaging in view of the new trend of marketing food as natural. A content analysis of 328 food products in Singapore revealed the prevalent use of the natural claim as well as visual communication images that evoke the same connotations of naturalness. A closer check revealed that a great number of products with natural claims were found to contain additives. Study 2 followed with an online experiment to examine whether extrinsic cues such as the claim “All Natural” and an external seal can effectively influence consumers’ perception of the product’s nutritional attributes. Results showed that the “All Natural” claim does effectively influence consumers’ perception of the product and that this claim also interacts with the seal. This suggests that consumers commonly use such extrinsic cues for healthful decision-making. Implications of the findings are discussed.
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Introduction

Background

With today’s consumers becoming more health conscious (Yu-Hua, 2008), a new marketing trend has emerged with marketers marketing foods and beverages as natural (Demetrakakes, 2007). Natural was found to be the top claim used on food and drinks launches in 2008 (Mintel Global New Products Database, 2009). The use of natural claims is beginning to become so prevalent that two petitions have been filed for the United States’ Food Development Agency (FDA) directed towards the regulation of the term natural (Gutierrez, 2008). The main rationale behind the petitions is due to the fact that consumers lack the knowledge about food ingredients, technology and terminology, as well as the marketing claims used, which places them at a disadvantage when trying to evaluate whether a product or ingredient is natural (Heller, 2006).

Adams (2007) highlighted that while many food products are labelled as natural to increase sales, many actually contain some sort of food additive, and unsuspecting consumers can easily be deceived. Advocacy groups like the Centre for Science in the Public Interest (CSPI) have taken it upon themselves to threaten lawsuits to major food companies who have used natural claims despite having artificial additives, such as against Ben & Jerry’s Homemade Holdings Inc. and Cadbury for misusing the claim for Schweppes, Dr. Pepper and Seven UP (Homel Food Corporation Research and Development, 2006).
Study Objectives

Despite the potential misuse of natural claims, most food regulatory bodies in various countries have little or no guidelines for the use of this claim (Table 1). In Singapore, the use of natural claims is vaguely defined by the Agri-Food and Veterinary Authority of Singapore (2005). Hence the focal point of our study is to investigate the prevalence of natural claims amongst supermarket food products in Singapore and the consumer responses to this form of claims.

As consumers are purportedly susceptible to being deceived by natural claims (Heller, 2006; Adams, 2007), we are interested in how natural claims are perceived by consumers and how this perception may be further manipulated by extrinsic cues relating to the product.

To summarise, the objectives of this study are:

1. To explore the prevalence of natural claims among supermarket food products in Singapore.
2. To investigate the percentage of food products in the market with natural claims which contain food additives.
3. To examine the influence of natural claims on consumers’ perception of the purity and wellness/healthfulness of a food product.
4. To examine whether external seals can moderate the relationship proposed in objective 3.
Significance of Research

This research will examine a new trend in health food marketing that is becoming increasingly prevalent. We hope this research will shed light on how prevalent this utilization is and its influence on consumers. We also hope to enrich the current literature on nutrition labelling and to provide insights to health agencies and regulatory authorities.

Definition of Terms

For this study, we have defined three types of claims that are commonly used based on previous studies [eg. Parker (2003)]. Firstly, specific nutrient content claims pertain to the “level of a particular nutrient found in foods”, such as “fat-free” and “an excellent source of calcium” (Parker, 2003, p. 48). Secondly, general nutrient content claims refer to ambiguous claims that simply state that the product benefits a consumer's general health, such as “healthy”, “nutritious” and “wholesome”. The third type is functional nutrient claims that describe how a product “affects the structure or function of the body” (Parker, 2003, p. 48-49). For the purpose of this study, we have defined a natural claim as one that uses terms such as “natural”, “pure”, “100%” or “real”.

Literature Review

The Regulatory Framework

In Singapore, the Health Promotion Board (HPB) has set strict guidelines to the use of claims (Health Promotion Board, 2002). The guidelines are directed towards specific nutrient content claims and functional nutrient claims. The Agri-Food & Veterinary Authority of Singapore’s (AVA) handbook states that “no written, pictorial or other descriptive matter appearing on or attached to, or supplied or displayed with any food shall include the word ‘pure’ or any word of the same significance unless the food is free from other added substances or is of the composition, strength and quality required under these Regulations” (Agri-Food and Veterinary Authority of Singapore, 2005, p. 13). But apart from that, there are no other specific guidelines for food products that utilise the claim natural.

In the United States there are definitions and requirements for the use of nutrient content claims, health claims, qualified health claims and structure function claims (U.S. Food and Drug Administration, 2008). However, under the U.S. Code of Federal Regulations, the usage of the term natural for food labelling is only defined within the context of flavour and flavouring (Foods; labeling of spices, flavorings, colorings and chemical preservatives, 2008) and there are no existing guidelines regarding when natural is used specifically as a product claim. Currently in the U.S., only beauty products undergo a standard verification process before being given seals of approval by the Natural Products Association (NPA) certifying that they are natural. This is to address the issue of consumer confusion when it comes to purchasing products that claim to be natural (Alexander, 2008).
Whereas Singapore and the United States do not have specific regulations on when a food product qualifies as natural, the Canadian Food Inspection Agency (CFIA) actually has regulations regarding the usage of the term natural as a claim:

“1) A natural food or ingredient of a food is not expected to contain, or to ever have contained, an added vitamin, mineral nutrient, artificial flavouring agent or food additive.

2) A natural food or ingredient of a food does not have any constituent or fraction thereof removed or significantly changed, except the removal of water” (Canadian Food Inspection Agency, 2009).

As seen in Table 1 there are many different variations of how natural can be used as a product claim across various countries. However, there is no concise definition of what exactly constitutes to a natural food product (with the exception of Canada).
Table 1

Brief Overview by Country of the Definitions of Natural

<table>
<thead>
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<th>Country</th>
<th>Definition of Natural</th>
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| USA         | ● Use of the term *natural flavour* or *natural flavouring* refers to the essence of flavours that has been extracted from plants, poultry or dairy.  
            | ● The term is more applicable to flavour and taste rather than nutritional benefits (Foods; labeling of spices, flavorings, colorings and chemical preservatives, 2008). |
| Singapore   | ● Agri-Food & Veterinary Authority of Singapore (2005) states there should be no graphics, text or descriptive items that includes the word ‘pure’ or any words that are similar to its meaning. |
| Canada      | ● Food or ingredients labelled *natural*, should not contain food additives, artificial colouring, mineral nutrient or added vitamin.  
            | ● It must not go through significant change processes or have anything removed from the food product (Canadian Food Inspection Agency, 2008). |
| Hong Kong   | ● *100% Organic/Natural/Fresh* is not considered a nutrient claim (Centre for Food Safety, 2008).  
            | ● Definition of “Organic” refers to plants that refrain from the usage of pesticides, fertilisers and meat and poultry products that do not use antibiotics, growth hormones and other additives, and the food products have gone through minimal processing (Centre for Food Safety, 2009). |
| Europe      | ● Term *natural* or *naturally* must be paired with a nutrient claim which is a claim that suggests, states or implies that the food product has a nutritional benefits (Eg. Natural Source of Protein)  
            | ● Health claims suggests, states or implies that there is a relationship between food or one of its constituents and health (European Union Regulations on Health Claim, 2006). |
Current Petitions for Changing the Regulatory Framework for Natural Claims

The Food and Drug Administration (FDA) has received a number of petitions for better regulation and definition of the claim *natural* (U.S Food and Drug Administration, 2007). The most recent petitions are from the Sugar Association which hopes to have FDA backing for claiming that sugar is a natural sweetener, and from food manufacturer Sara Lee, who wanted a formal definition to provide consistency for manufacturers and consumers (Gutierrez, 2008).

Hormel Foods Corporation’s Research and Development sent in a petition to the FDA (2006, p. 4), arguing that “agencies and citizens alike have long recognized the necessity of a clear definition of the word *natural*”, and cites the instances throughout nearly 20 years where the Federal Trade Commission (FTC) and the FDA have proposed to define the term *natural*. In 1987, the FDA actually expressed that the meaning and use of the term *natural* are confusing and misleading for consumers, and concluded that they would define the term due to consumer interest and widespread use of the term (Homel Foods Corporation Research and Development, 2006). However in 1993, the FDA cited resource limitations and other priorities, hence they did not carry through with their efforts to define the term *natural* (Homel Foods Corporation Research and Development, 2006; Heller 2006).

Consumer Perception of Nutrition Claims

According to Euromonitor (1990), “healthy” foods are food products that are “healthier” than their regular counterparts, such as low-fat milk being healthier than regular milk, while “health” foods were defined as foods that have been specially manufactured to improve health through added supplements. Darrall’s (1992) study
found that the various definitions for “healthy food” are no longer distinct. Many products that are considered health foods, such as yoghurt and mueslis, are actually arbitrates of what actual health foods are supposed to be (Darrall, 1992). Kozup, Creyer & Burton (2003) also found that consumers have more favourable attitudes towards products that have favourable nutritional information or health claims. Other studies have also proved promoting a food product as healthy generates a more favourable attitude in consumers (Andrews, Burton & Netemeyer, 2000; Provencher, Polivy & Herman, 2008).

Yet for hedonic foods considered “fun” or “bad”, like candy and other snack foods, consumers consider nutrition much less (Kozup et al., 2003). Other studies like the recent research by Provencher et al. (2008) have shown that when such snack foods are manipulated to seem healthy, consumers then think that consuming them in large intakes are fine. Even so-called restrained eaters were not exempt from increasing snack food intake due to perceived healthiness of a snack food.

Consumer Perception of Natural Claims

From a consumers' standpoint, many related natural foods, organic foods and foods that are not processed or contain additives as being healthy and they were seen as an important part of their diet (Roininen, Lahteenmaki & Tuorila, 1999). Cooper (2007) also noted that consumers may have an inherent belief that foods labelled as natural are seen to be of better quality and hence are healthier.

A 2002 study by the U.S. consumer advocacy group, the National Consumers League (NCL), found that many Americans associated natural with “safe”, “pure”, “wholesome” and beneficial to overall health, with many assuming that as long as a
product has a natural claim, it is indeed natural (p. 4). Other studies too have supported the ambiguity consumers experience regarding natural claims, with many consumers associating natural with “healthy” [eg. (Roninen et al., 1999)]. As the NCL (2002) study found, many consumers were unfamiliar with how the term natural is regulated, with focus group participants “unanimously” agreeing that there should be greater regulation for the term natural in regards to labelling, advertising and industry standards (National Consumers League, 2002, p.4). Even farmers, companies and retailers that play a part in the creation and eventual sale of food products all associated “health food” with naturalness, pureness and not containing any artificial additives (Darrall, 1992).

Generalization Effects On Consumers’ Perception

The various positive associations regarding natural claims may be explained by how consumers may over-generalize certain claims (Ippolito & Mathios, 1991; Garretson & Burton, 2000; Kozup et al, 2003). In the Andrews, Netemeyer and Burton (1998) study, consumers were shown to over-generalize the word “no cholesterol” into thinking that the product with such a claim is perceived to be considerably “healthier”. The Activation Theory (Collins and Loffus, 1975) gives a framework of how this generalization may work, where the more similar the properties of two concepts are, the more links there are between the two and the more closely related they appear to be; hence if one node is primed, it will activate and spread to another node related to it and the further it travels down the network, the weaker is. Hence, this could possibly explain why past studies have found that consumers tend to associate natural claims with healthiness (Darrall, 1992; Roninent et al., 1999; National Consumers League, 2006; Cooper, 2007).
Extrinsic Cues Effects On Consumers’ Decision Making

In order for consumers to make purchase choices, consumers would then rely on external information that has been provided on the product in order to lower the perceived risk of the product. Peter and Tarpey (1975) identified perceived risk as one of the ways in which consumers make decisions. Perceived risk is defined as the feeling of uncertainty consumers may feel when contemplating a product (Roselius, 1971; Dowling & Staelin, 1994). Perceived return and net perceived return are the two other ways that were identified. Their study found that consumers consider both the “positive and negative utility” in brand preference decisions.

One way in which consumers seek to lower the sense of perceived risk is through the use of both extrinsic and intrinsic cues to form perceptions about a particular product, and this includes extrinsic cues such as packaging and labels (Richardson, Dick & Jain, 1994; Miyazaki, Grewal & Goodstein, 2005). Extrinsic cues are “product-related qualities” such as price and packaging while intrinsic cues refer to “product-related attributes” such as taste and ingredients.

Since consumers are faced with various alternatives when shopping for food, they will rely on the extrinsic information given in product labels to assess the product quality (Nelson, 1970; Slovic & Lichtenstein, 1971; Bettman, 1984; Richardson, Dick & Jain, 1994). These information are cues which serve as a risk reduction strategy to help decide which product to purchase (Bettman, 1984). Most judgments and choices are based on a number of attributes (Slovic & Lichtenstein, 1971), this means every element on the packaging has a part to play in shaping the consumer’s perception of the product’s quality (Rao & Monroe, 1988; Richardson et al, 1994) and may interact with one another. A study by Aqueveque (2006) showed
that the display of expert opinion as an extrinsic cue on packaging was a good way to reduce perceived risk and has a direct effect on consumers' intentions to purchase the product.

**Seals as Extrinsic Cues Affecting Consumer Decision Making**

The various certification marks that were meant to provide consumers with more information were identified in a study by Laric and Sarel (1981). Third-party seals can be defined as factual certification, evaluative certification and warranty certification. Factual certification refer to seals that provide factual information about the product, evaluative certification refers to seals that deal with the brand and its attributes, such as a brand that is endorsed by a certified organisation, and warranty certifications are seals that delivers promises about the product.

Parkinson (1975) who carried out one of the earlier studies on seals, indicated that seals of approval were rated highly on credibility, and products bearing such seals were also perceived as being superior, even in the case of a fictitious symbol. However, his study also revealed that consumers tend to attribute more meaning to the seals than was true. For example, the seals that granted a refund in the case of dissatisfaction or that the product was laboratory tested – all of which are not true. Finally, his study found that many consumers actually do not fully understand the meaning of most seals (Parkinson, 1975).

A more current study by Beltramini and Stafford’s (1993) reinforces Parkinson’s results. Their study showed that subjects surveyed expressed a preference for the product with a fictitious seal than one that did not have any seal. Furthermore, those surveyed credited factual, evaluative and warranty meanings to the fictitious
seal, which were far from true. This suggests that consumers do not understand what different seals of approval represent. Similarly, Bennett and McCrohan (1993) states that consumers’ lack of knowledge on how to interpret complicated terms when it comes to evaluating nutritional values leads them to believe that seals of approvals are trustworthy and credible sources of information.

Food Packaging as an Extrinsic Cue Influencing Consumer Perception

Just as a claim is an element built into part of the whole packaging to communicate a message, so are other design elements of a packaging like the visuals. Hence the two categories of design elements are “visual” and “informational” (Prendergast and Pitt, 1996). MacInnis and Price (1987) further elaborate on how imagery can be conceptualized into a mode of processing information, which relies on stored knowledge to affect the evocation and vividness of an image. So for example, seeing images of strawberries will probably evoke a sense of naturalness, as we know that strawberries come from nature. Due to the fact that pictures are extremely vivid stimuli which makes it quicker and easier for consumers to process in a low involvement situation such as choosing a food item, these images on the package may lead the consumers to spontaneously imagine aspect of how a product taste, looks, smells or sounds, and thereby leading them to infer the message in a less than accurate way (Underwood, Klein & Burke, 2001).
Conceptual Framework and Hypothesis

Study 1 – Study on the Prevalence of Health-Related Claims, Natural Claims and Utilization of Extrinsic Cues (Third Party Seals, Logos and Credentials) on Supermarket Food Products

Based on our literature review, we embark on an exploratory study to examine the use of natural claims in Singapore. As mentioned, industry trends in food marketing point towards a tendency towards using health-related claims for packaged consumer goods (Demetrakakes, 2007) and increasingly, in using natural claims as well (Mintel Global New Products Database, 2009). The few studies done on natural claims used on food products tend to focus only on the verbalized natural claims (National Consumers League, 2002). While we will also study the prevalence of natural claims among food products available in Singapore, Study 1 additionally aims to take an exploratory look at the non-verbalized, extrinsic cues in product packaging as well.

We examine the prevalence of extrinsic cues, specifically third-party seals and logos of certification, as well as verbalized claims incorporated into a graphical form which may look very much like seals and logos (Parkinson, 1975; Beltramini & Stafford). We also assess how natural is being communicated through the use of explicit images of natural ingredients on the product packaging that may evoke a sense of naturalness in consumers (MacInnis & Price, 1987; Underwood et al., 2001, National Consumers League, 2002). Finally, we also assess the prevalence of the misuse of the natural claim via cases where the product claims to be natural yet still contains food additives. For this research, we will be following the standards set by the Canadian Food Inspection Agency as most other countries have yet to define what
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qualifies as a *natural* product worthy of using a natural claim (Figure 2.1). To qualify as being *natural*, products should not contain any food additive, artificial flavouring agent or even added supplements (Canadian Food Inspection Agency, 2008). Hence Study 1 will be based around the following research questions:

**RQ1:** How prevalent is the use of the natural claim in food products (verbal and visual)?

**RQ2:** How prevalent is the misuse of the natural claim in food products (verbal and visual)?

**RQ3:** How prevalent is the use of extrinsic cues, specifically third-party seals, logos and credentials, as well as claims incorporated into a graphical form?

**Study 2 – Effects of the Natural Claim and a Seal on Consumers’ Perception**

Health claims are often used on food products have shown to influence consumers’ perception of the product (Andrews, Netemeyer & Burton, 1998; Kozup et al, 2003, Wansink & Chandon, 2006). The use of *natural* claims on food and beverages have seen an increase since 2007 (FastCasual.com, 2009) and no official definition of *natural* as a claim on food packaging has been given except from the Canadian Food Inspection Agency (CFIA). Consumers often use multiple cues to help them access product quality (Nelson, 1970; Slovic & Lichtenstein, 1971; Bettman, 1984). Hence, even though consumers often associate *natural* with “healthy” (Roininen et al., 1999) and of higher quality, they do not have a unanimous definition of *natural* (Cooper, 2007). Therefore, Study 2 will examine the effects of the *natural* claim on consumers and the interaction between the *natural* claim and the seal as extrinsic cues in shaping consumers’ perception.
Effects of the natural claim on consumers. Consumers have shown to over-generalize claims (Garretson & Burton, 2000; Ippolito & Mathios, 1991; Kozup et al, 2003). For example, “no cholesterol” has been shown to be over-generalized as “low in fat” (Andrews et al, 1998), a “high fibre” claim can lead to an overall improvement in the perception of a cereal’s characteristics (Ippolito & Mathios, 1991). The activation theory provides a conceptual framework for how such effects occur. This theory by Collins and Loftus (1975) explains conceptual semantic network, whereby the more similar two concepts are, or the more properties they share in common, the more closely related they are. Hence when one of these concepts is primed, it will activate the other. For example, “vehicle” will prime other types of vehicles like “fire engine” which will in turn prime “bus” or “truck”. The word association is strongest when they are in the same category, where the network is tighter. Similarly, accordingly to Andrews et al (1998), “no cholesterol” primed “low in fat” and “healthy”, hence it led to a more favourable perception of a product’s attributes. Therefore, applying this theory, we hypothesize that:

H1: Compared to when a natural claim is not used, the use of a natural claim will be more effective in influencing:

a) the product’s perceived purity,
b) the product’s perceived wellness,
c) the product’s perceived brand benefits
d) the product’s perceived healthiness, and
e) the product’s perceived value for money

Interaction effects of the extrinsic cues of a seal and natural claim. Consumers often rely on cues to make their assessment of a product (Nelson, 1970; Slovic &
Lichtenstein, 1971; Bettman, 1984; Richardson, Dick & Jain, 1994). Lower level cues like extrinsic cues are ones that cannot be changed, like packaging, price, brand or even name (Szybillo & Jacoby, 1974) but play a major role in consumers’ decision-making when assessing a low-involvement product (Grossman & Wisenblit, 1999). This is all the more so when intrinsic cues are scarce. These information are extrinsic cues which serve as a risk reduction strategy to help decide which product to purchase (Bettman, 1979). Most judgements and choices are based on a number of attributes (Slovic & Lichtenstein, 1971), this means every element on the packaging has a part to play in shaping the consumer’s perception of the product’s quality (Roa & Monroe, 1988; Richardson et al, 1994). Previous studies have analyzed how different cues like price, brand, and country of origin interact with one another to enhance perception of products (Chao, 1989; Brucks, Zeithaml & Naylor, 2000). Others have done studies of a third-party seal as an extrinsic cue in aiding consumer decision-making (Parkinson, 1975; Laric & Sarel, 1981; Beltramini & Stafford, 1993; Miyazaki & Krishnamurthy, 2002; Lwin, 2006). However, there are no studies that exclusively explore the extrinsic cue of having a claim in the form of a seal. Hence, this study examines the interaction effects of a fictitious, non third-party accredited seal and a natural claim. Based on consumers’ use of extrinsic cues for product assessment, we hypothesize that:

\[ H2: \text{The two extrinsic cues (seal and natural claim) will interact in such a way that the product with the seal will be more effective in influencing:} \]

\[ \text{a) product’s perceived purity,} \]

\[ \text{b) product’s perceived wellness, and} \]
c) product’s perceived brand benefit

d) the product’s perceived healthiness, and

e) the product’s perceived value for money

when a claim is present.
Methodology

The methodology will cover the descriptions of the methodological process of data collections for the two parts of this study. According to Stempel (2003, p. 209), “communication research can reach its full potential only if it can relate content to communicator, audience and effects”. Hence Study 1 uses content analysis to examine the prevalence of health-related claims, natural claims and the extrinsic cues (specifically seals and logos of certification) on the packaging of supermarket food products in Singapore. Study 2 uses an online experiment to investigate whether displaying a natural claim and/or a seal on food products affects consumers’ perceptions on the products attributes of healthiness and health benefits. The research instruments, independent and dependant measures and research procedures are detailed in this section.

Study I – Content Analysis

Sample. The selection of data points of supermarket food items included a wide selection of cereal products, dairy products and juices which are commonly seen by consumers as being “healthy” (Van Kleef et al., 2005). The products are readily available from the larger supermarket chains in Singapore, of which 54.3% of our sample were from Giant, 28.4% from NTUC Fairprice and 17.4% from Cold Storage. These supermarket chains have stores island-wide and are commonly frequented by many Singaporeans. The expansive product offerings we obtained from these supermarkets ensure that this study is comprehensive in scope. In all, a total of 328 products were purchased for coding.
Variables. Fifty variables were recorded for each product based on a detailed coding guide that was drawn up from consultation of nutrition labelling literature, experts and consumers (See Appendix B). These include general information such as brand, food category, brand name, country of manufacture and origin. The selected food were then coded for the a) various claims used by food marketers such as natural claims, health claims, nutrient claims and functional nutrient claims b) types of food products and categories that contain such claims, c) the presence of third-party certification and seals of approval d) design elements in packaging and the e) types of food additives present.

Coding procedure. The products were divided amongst two coders based on the food categories. Each independent coder was given a data collection form as well as a list of guidelines stipulating the coding rules (Appendix A & B). As this content analysis attempts to code design elements that may be inherently subjective, measures were taken to ensure high inter-coder reliability. The prominence of graphical design elements were captured based on its size in relation to the overall frontal design of the product as the scale of a visual element is usually used for emphasis and to attract attention (White, 2002). For determining which extrinsic cues are in a seal or logo format, only claims incorporated into a more sophisticated graphical design that were made to resemble seals or other iconic graphical designs were coded. Claims that were merely inserted into a border or a simple shape were not classified as being in a graphical format.

Inter-coder reliability. Prior to the actual coding, 42 products were randomly picked and coded. Inter-coder reliability was then determined using Perreault and Leigh’s (1989) inter-coder reliability index. Inter-coder reliability between the two
Naturally Overused

coders was met, with reliability scores ranging from 0.9 to 1.0 for all variables (Table 2). Any discrepancies in coding were resolved through discussions among the coders.

Table 2

*Inter-coder Reliability*

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<thead>
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<th>Category</th>
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<tbody>
<tr>
<td>Product category</td>
<td>1.000</td>
</tr>
<tr>
<td>Country of Manufacture</td>
<td>1.000</td>
</tr>
<tr>
<td>Extrinsic Cues</td>
<td></td>
</tr>
<tr>
<td>Presence of Health Promotion Board Seal on product</td>
<td>1.000</td>
</tr>
<tr>
<td>Presence of external credentials or endorsements from a third party organisation</td>
<td>1.000</td>
</tr>
<tr>
<td>Size of natural images on the product packaging</td>
<td>1.000</td>
</tr>
<tr>
<td>Presence of Claim</td>
<td></td>
</tr>
<tr>
<td>Pureness, naturalness or freshness</td>
<td>0.946</td>
</tr>
<tr>
<td>Vitamins, antioxidants and/or other minerals present</td>
<td>1.000</td>
</tr>
<tr>
<td>Contains no added sugar or is low in sugar</td>
<td>1.000</td>
</tr>
<tr>
<td>Contains no preservatives</td>
<td>1.000</td>
</tr>
<tr>
<td>Contains no artificial colourings</td>
<td>1.000</td>
</tr>
<tr>
<td>Contains no artificial flavours</td>
<td>1.000</td>
</tr>
<tr>
<td>Not from a concentrate</td>
<td>1.000</td>
</tr>
<tr>
<td>Low in fat, contains less fat, or is fat free</td>
<td>0.946</td>
</tr>
<tr>
<td>Contains, is a source for, or is high in protein</td>
<td>1.000</td>
</tr>
<tr>
<td>Contains, is a source for, or is high in calcium</td>
<td>1.000</td>
</tr>
<tr>
<td>Low in trans-fat/saturated fat or no trans-fat/saturated fat</td>
<td>1.000</td>
</tr>
<tr>
<td>Low in calories</td>
<td>1.000</td>
</tr>
<tr>
<td>Contains, is a source for, or is high in fibre</td>
<td>0.909</td>
</tr>
<tr>
<td>Low in cholesterol or is cholesterol free</td>
<td>1.000</td>
</tr>
<tr>
<td>Low in sodium or sodium free</td>
<td>1.000</td>
</tr>
<tr>
<td>Contains Omega 3 fatty acids</td>
<td>1.000</td>
</tr>
<tr>
<td>Contains pre-biotic or active live cultures</td>
<td>0.946</td>
</tr>
<tr>
<td>Functional nutrient claim</td>
<td>0.982</td>
</tr>
<tr>
<td>Other claims</td>
<td>1.000</td>
</tr>
</tbody>
</table>

Ir is the inter-coder reliability index as found in Perreault and Leigh (1989, p.141, formula (7))
Study 2 – Online Experiment

The experiment was designed to investigate whether displaying the natural claim on food products when utilized with a fictitious seal will affect perceptions of the product’s attributes of healthiness and health benefits. To examine these effects, a 2 by 2 factorial design between-subjects design was employed where a claim (natural claim vs. no claim) was crossed with seal labelling (Seal vs. no Seal).

Sample. Subjects were 200 undergraduates from a local university. They were aged between 16 to 25, 66% are females, 34% are males. They are 86% Chinese, 5.5% Malays, 4% Indians, 1.5% Eurasians and 3% consist of other races not in the list. The subject sample was recruited from different schools within the university and assigned randomly to the experimental treatment groups. This age group was deemed suitable because demographic studies shows that it represent the biggest group for the consumption of snacks (Health Promotion Board, Singapore, 2004), such student samples were also used in various successful studies of similar nature (Purohit & Srivastava, 2001; Aqueveque, 2006).

Stimulus Materials. A mock-up of a packet of snacks (potato chips) was created for all four conditions as shown in Table 3. Each condition utilised the same mock-ups picture with only the front labelling manipulated. The manipulated variables were a fictitious seal similar to Parkinson’s (1975) study and a claim with the word “All Natural”. There was no nutrition back labelling present in all the conditions. The size, placement and colour of labels were exactly the same (Full details of images used shown in Appendix C1).
Table 3

Four Conditions Used for Experiment

<table>
<thead>
<tr>
<th></th>
<th>Without Seal</th>
<th>With Seal</th>
</tr>
</thead>
<tbody>
<tr>
<td>With Natural Claim</td>
<td>Group A (n=50)</td>
<td>Group B (n=50)</td>
</tr>
<tr>
<td>Without Natural Claim</td>
<td>Group C (n=50)</td>
<td>Group D (n=50)</td>
</tr>
</tbody>
</table>

Procedure. Subjects were randomly divided into four groups for each of the four different conditions manipulated in a 2x2 between-subject factorial design seen in Table 3: Seal (present, absent) X Natural Claim (present, absent). For each group shown in Table 3, 50 subjects invited to go to their respective links online, where they were given a scenario where they were to imagine they were shopping at a supermarket for groceries. After that, they saw a picture of a bag of potato chips and were then asked to answer a set of questions consisting of a list of opinion-statements that measures perceptions and attitude towards the bag of potato chips (Appendix C2).

The natural claim manipulation was presented in a text format, with the words “All Natural” on the package of potato chips. In group A’s condition shown in Table 3, the words “All Natural” was shown, in group B’s condition, the words “All Natural” was presented in text and in a seal. Group C’s conditions contained no labelling of any kind, and group D’s condition only had the presence of a seal manipulation.
**Measurement.** The following components of the perception measurements were examined in the questionnaire: Perceived Purity, Perceived Wellness, Perceived Brand Benefits, Perceived Healthiness and Perceived Value for Money. These dependent measures created were mainly adopted from various studies relating to food labeling and claims like Wansink, Park, Sonka, & Morganosky’s (2000) study and Kozup et al.’s (2003) study and were further modified and rephrased to suit the context of this experiment. Existing findings on perception of products with regards to food claims and labelling (Andrews et al, 1998; Andrews et al, 2000) were also taken into consideration.

Perceived purity was used to measure the respondents’ perception of the purity of product, where it measured how respondents perceived the likelihood of the omission of additives, artificial colouring, added salt and preservatives

The scale for Perceived Wellness consisted of 2 items modified from Andrews et al.’s (2000) study and was used to measure the respondents’ perceived functional health benefits like slimming or digestion.

Perceived Brand Benefits used 4 items collected from various sources (Wansink et al, 2000; Kozup et al, 2003) and was used to measure respondents’ perception with regards to the preference of appearance, texture, taste, and perceived feelings of consuming it.

We adopted single items to measure perceived healthiness (Andrew et al, 1998) and value for money (Richardson et al, 1994). All measures were assessed using a 7-point Likert scale ranging from 1 (Strongly Disagree) to 7 (Strongly Agree). All multi-item measures were summed and divided by the number of scale
items and the means were then used in the analysis. A factor analysis was done to confirm the groupings of variables.

The scale measurement used is shown in Table 4 and the reliability scores of the measurement was as follow: $\alpha=.912$ for Perceived Purity (4 items), $\alpha=.847$ for Perceived Wellness (2 items) and $\alpha=.890$ (4 items) for Perceived Brand Benefits. The Cronbach’s alpha derived from the scales used exhibited relatively high reliability.

Table 4

*Scale Items and Alphas for Measurements*

<table>
<thead>
<tr>
<th>Perceived Purity</th>
<th>Cronbach’s alpha</th>
</tr>
</thead>
<tbody>
<tr>
<td>I think this product contains no artificial colouring</td>
<td></td>
</tr>
<tr>
<td>I think this product contains no additives.</td>
<td></td>
</tr>
<tr>
<td>I think this product contains no preservatives.</td>
<td>0.912</td>
</tr>
<tr>
<td>I think this product contains no added salt</td>
<td></td>
</tr>
</tbody>
</table>

| Perceived Wellness                                                             |                  |
|--------------------------------------------------------------------------------|                  |
| I think this product is good for digestion                                     |                  |
| I think this product helps me with slimming.                                   | 0.847            |

| Perceived Brand Benefits                                                       |                  |
|--------------------------------------------------------------------------------|                  |
| I like the texture and consistency of this product.                            |                  |
| I like the appearance of this product.                                         | 0.890            |
| I feel good eating this product                                                |                  |
| I am likely to purchase this product.                                          |                  |
Results

5.1 Study 1 – Content Analysis

**RQ1: How prevalent is the use of the natural claim in food products (verbal and visual)?** Table 5 shows that the most commonly used claim was the natural claim, with over half (52.7%) of all products sampled utilizing such a claim. The other commonly utilized claims were functional nutrient claims (37.2%), vitamin claims (32.3%) and no or low fat claims (28.4%). Our findings confirmed that the natural claim was most prevalent, which is in lieu with the literature indicating a trend towards using this claims (Demetrakakes, 2007; Mintel Global New Products Database, 2009).

Table 5

**Presence of Various Claims across All Products**

<table>
<thead>
<tr>
<th>Presence of Claim</th>
<th>Format of Claim</th>
<th>Prevalence of Claim</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Graphic n</td>
<td>Text n</td>
</tr>
<tr>
<td>Natural Claim</td>
<td>7</td>
<td>166</td>
</tr>
<tr>
<td>Functional Nutrient Claim</td>
<td>2</td>
<td>120</td>
</tr>
<tr>
<td>Vitamin Claim</td>
<td>30</td>
<td>76</td>
</tr>
<tr>
<td>No/Low Fat Claim</td>
<td>5</td>
<td>88</td>
</tr>
<tr>
<td>No Preservative Claim</td>
<td>4</td>
<td>70</td>
</tr>
<tr>
<td>Calcium Claim</td>
<td>10</td>
<td>55</td>
</tr>
<tr>
<td>No/Low Sugar Claim</td>
<td>4</td>
<td>51</td>
</tr>
<tr>
<td>Other Claims</td>
<td>19</td>
<td>34</td>
</tr>
<tr>
<td>Pre-biotic Claim</td>
<td>20</td>
<td>25</td>
</tr>
<tr>
<td>No Artificial Colours Claim</td>
<td>0</td>
<td>38</td>
</tr>
<tr>
<td>Fibre Claim</td>
<td>0</td>
<td>37</td>
</tr>
<tr>
<td>No/Low Cholesterol Claim</td>
<td>0</td>
<td>29</td>
</tr>
<tr>
<td>Protein Claim</td>
<td>8</td>
<td>11</td>
</tr>
</tbody>
</table>

(Continued)
The use of the natural claim was found to be most prevalent within the product category of juices, with 35.3% of such claims coming from that category (Appendix Table D1). As an additional exploration, we compared the prevalence of natural claims usage by Singapore-made products against products manufactured in other regions as seen in Table 6. Among the different country regions that the products were manufactured in, our findings indicated that European-made products were most likely to utilize a natural claim, with 82.8% of all European-made products carrying such a claim. The region that utilized the least amount of natural claims was the United States (37.3%). Of the Singapore-made products, 60.5% utilized a natural claim, which ranks the country just behind Europe in terms of the most number of products with this claim.

Table 6

Presence of Natural Claim by Regions

<table>
<thead>
<tr>
<th>Region of Manufacture</th>
<th>Presence of Natural Claim</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Natural Claim</td>
<td>No Claim</td>
<td></td>
</tr>
<tr>
<td>Australia &amp; New Zealand</td>
<td>52.7</td>
<td>47.3</td>
<td></td>
</tr>
<tr>
<td>Asia</td>
<td>47.1</td>
<td>52.9</td>
<td></td>
</tr>
<tr>
<td>Europe</td>
<td>82.8</td>
<td>17.2</td>
<td></td>
</tr>
<tr>
<td>USA</td>
<td>37.3</td>
<td>62.7</td>
<td></td>
</tr>
<tr>
<td>South Africa</td>
<td>100.0</td>
<td>0.0</td>
<td></td>
</tr>
<tr>
<td>Singapore</td>
<td>60.5</td>
<td>39.5</td>
<td></td>
</tr>
<tr>
<td>Total (n = 326)</td>
<td>52.7</td>
<td>47.3</td>
<td></td>
</tr>
</tbody>
</table>
ChiSq = 25.135, 5 d.f., *** \( p < .001 \)

Aside from the verbalized natural claims, our study also sought to examine the non-verbal design-based means in which the natural angle may be brought out. We found that out of the products sampled, 71.3% also had natural images present on its packaging (Appendix Table D2). Image prominence for natural images, which was judged based on the image having a scale of 3 or more, saw 62.6% being classified as prominent, as can be seen in Table 7. Among these products that featured prominent images of natural ingredients, 37.7% had no verbalized natural claims. This indicates the possibility that such natural images may be used to evoke a sense of naturalness for the product in consumers without even having to verbally make a natural claim due to its prominence (MacInnis & Price, 1987; Underwood et al., 2001).

Table 7

Prominence of Natural Images versus Presence of Verbalized Natural Claims

<table>
<thead>
<tr>
<th>Natural Images</th>
<th>Presence of Verbalized Natural Claim</th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Natural Claim</td>
<td>No Claim</td>
<td>Total</td>
<td>Natural Claim</td>
<td>No Claim</td>
</tr>
<tr>
<td></td>
<td>n</td>
<td>Percent</td>
<td>n</td>
<td>Percent</td>
<td>n</td>
</tr>
<tr>
<td>Prominent</td>
<td>127</td>
<td>62.3</td>
<td>77</td>
<td>37.7</td>
<td>204</td>
</tr>
<tr>
<td>% of Total</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Not Prominent</td>
<td>12</td>
<td>42.9</td>
<td>16</td>
<td>57.1</td>
<td>28</td>
</tr>
<tr>
<td>% of Total</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>No Image</td>
<td>34</td>
<td>36.2</td>
<td>60</td>
<td>63.8</td>
<td>94</td>
</tr>
<tr>
<td>% of Total</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>173</td>
<td>53.1</td>
<td>153</td>
<td>46.9</td>
<td>326</td>
</tr>
</tbody>
</table>

ChiSq = 18.626, 2 d.f., *** \( p < .001 \)
RQ2: How prevalent is the misuse of the natural claim in food products (verbal and visual)? To measure the prevalence of the misuse of the claim natural, we examined the frequency of products with natural claims that still contain additives of some sort. The results indicated that of the 173 products that contained a natural claim, 75.7% also contained a food additive present that would cause them to not adhere to the standards of naturalness set by the Canadian Food Inspection Agency (2009) (Appendix Table D3). A closer examination in Table 8 indicated that out of all products with a natural claim, 50.3% had added supplements, 51.4% had added flavourings, 47.4% had added preservatives, 46.2% had added sugar and 28.3% had added colourings. Furthermore, the presence of other additives that include stabilizers, emulsifiers and other general-purpose additives (Agri-Food and Veterinary Authority of Singapore, 2005) was apparent in 54.9% of products with a natural claim. If we adhere to the Canadian Food Inspection’s Agency of what natural should be, then our findings show that a great number of products that claim to be natural are actually far from being natural.
Table 8

*Presence of Natural Claim versus Additives Present in Products*

<table>
<thead>
<tr>
<th>Additives Present</th>
<th>Presence of Natural Claim</th>
<th>Chi Square</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Natural Claim (n = 173)</td>
<td>No Claim (n = 153)</td>
</tr>
<tr>
<td>Added Sugar Present</td>
<td>46.2%</td>
<td>42.5%</td>
</tr>
<tr>
<td>Additional/Artificial Colouring Present</td>
<td>28.3%</td>
<td>22.9%</td>
</tr>
<tr>
<td>Additional/Artificial Flavourings Present</td>
<td>51.4%</td>
<td>64.7%</td>
</tr>
<tr>
<td>Additional/Artificial Preservatives Present</td>
<td>47.4%</td>
<td>35.3%</td>
</tr>
<tr>
<td>Added Supplements Present</td>
<td>50.3%</td>
<td>72.5%</td>
</tr>
<tr>
<td>Other Additives Present</td>
<td>54.9%</td>
<td>46.4%</td>
</tr>
</tbody>
</table>

*p<.05, **p<.01, ***p<.001

We also attempted to find out the instances of products that merely look natural due to its packaging design, but contain food additives of some sort. For products that contained prominent images of natural ingredients but no natural claim, 98.7% of such products had additives present (Table 9). This indicates that an overwhelming number of products which may look natural due to its packaging design are in fact, not natural at all.
Table 9

Prominent Images of Natural Ingredients versus Presence of Additives in Products with No Natural Claim

<table>
<thead>
<tr>
<th>Additive Present</th>
<th>No Natural Claim</th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>n</td>
<td>Percent</td>
<td>n</td>
<td>Percent</td>
</tr>
<tr>
<td>Natural Images</td>
<td>1</td>
<td>1.3</td>
<td>76</td>
<td>98.7</td>
</tr>
<tr>
<td>No Image</td>
<td>16</td>
<td>26.7</td>
<td>44</td>
<td>73.3</td>
</tr>
<tr>
<td>Not Prominent</td>
<td>3</td>
<td>18.8</td>
<td>13</td>
<td>81.3</td>
</tr>
<tr>
<td>Total</td>
<td>20</td>
<td>13.1</td>
<td>133</td>
<td>86.9</td>
</tr>
</tbody>
</table>

ChiSq = 19.605, 2 d.f., ***p<.001

RQ3: How prevalent is the use of extrinsic cues, specifically third-party seals, logos and credentials, as well as claims incorporated into a graphical form? Our results in Table 10 shows that 22.0% of products sampled had the Health Promotion Board’s Healthier Choice logo on the packaging. The Healthier Choice logo is awarded to food products that meet certain nutritional standards set by the Singapore Ministry of Health’s Health Promotion Board and it aims to educate the public on healthy eating (Health Promotion Board, 2002). A similar percentage of products (23.2%) also bore a third-party organisation seal, logo or credential of certification from non-governmental health organisations and companies. Furthermore, 24.1% of products had a claim incorporated into a graphical format (Appendix Table D4). Of these, the specific claims which recorded the higher instances of claims in a graphical format were pre-biotic claims (42.1%), protein claims (42.1%), not from concentrate claims and vitamin claims (28.3%), as seen in Table 5

Table 10
**Presence of HPB Seal and External Organisation Credential**

<table>
<thead>
<tr>
<th>Type of Credential</th>
<th>n</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Presence of HPB Seal</td>
<td>72</td>
<td>22.0</td>
</tr>
<tr>
<td>Presence of External Organisation Credential</td>
<td>76</td>
<td>23.2</td>
</tr>
</tbody>
</table>

**Summary of content analysis findings.** Of all the health-related claims recorded for RQ1, the prevalence of *natural* claims among supermarket food products reflects the current trend in food marketing (Mintel Global New Products Database, 2009). Not only were there a large number of products bearing a *natural* claim, many products look *natural* without even having to claim so due to the prominence of *natural* images used as part of the package design. In addition, we found that the use of *natural* claims is prevalent even in products across different regions of manufacture.

However as shown in RQ 2, such *natural* foods are far from being natural, if we follow the guidelines set by the Canadian Food Inspection Agency. Many foods with verbalized natural claims on their package still contain food additives and an extremely high number of products that merely look natural were found to contain food additives as well.

Finally RQ3 revealed a number of products that bear the Healthier Choice logo (from the Singapore Ministry of Health’s Health Promotion Board) and other third-party credentials from non-governmental health organisations and companies. Likewise, a number of products also utilize claims incorporated into a graphical format which bear a resemblance to seals or logos.
In conclusion, Study 1 shows how prevalent the use of natural claims is among healthy food products in Singapore. This led us to wonder if the natural claim will then work on products, which consumers should know, are unhealthy. Would the natural claim make even an unhealthy food seem healthy? And would presenting a natural claim in a seal or logo resembling third-party certifications further project this image of healthiness on an unhealthy product? Hence, we formulated an online experiment to further examine these issues.

Study 2 – Online Experiment

Following the experiment design discussed in our methodology, we found participants to take part in the experiment. At the end of it, after responding to the questionnaire of the manipulated stimulus, participants are required to evaluate the image given. Data collected was put into SPSS and Table 11 shows the results of a 2-Way ANOVA.

Manipulation checks. In Table 11, results show that the manipulation checks of the “All Natural” claim indicate significant main effects of the claim (F=26.867, \( p <0.001 \)) but no significant main effect of seal on the natural claim. Similarly, the manipulation check of the seal reveals a significant main effect of the seal (F= 83.859, \( p <0.001 \)) and no significant main effect of the natural claim on the seal. Thus the natural claim and seal manipulations were deemed successful.
Table 11

Manipulation Checks: Presence of Seal and Claim

<table>
<thead>
<tr>
<th>Source of Variation</th>
<th>Sum of Squares</th>
<th>df</th>
<th>Mean Square</th>
<th>F</th>
</tr>
</thead>
<tbody>
<tr>
<td>This chips is natural</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Seal</td>
<td>0.98</td>
<td>1</td>
<td>0.98</td>
<td>0.527</td>
</tr>
<tr>
<td>Claim</td>
<td>50</td>
<td>1</td>
<td>50</td>
<td>26.867***</td>
</tr>
<tr>
<td>Seal X Claim</td>
<td>6.48</td>
<td>1</td>
<td>6.48</td>
<td>3.482</td>
</tr>
<tr>
<td>This chip has a seal that guarantees authenticity</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Seal</td>
<td>186.245</td>
<td>1</td>
<td>186.245</td>
<td>83.859***</td>
</tr>
<tr>
<td>Claim</td>
<td>0.005</td>
<td>1</td>
<td>0.005</td>
<td>0.002</td>
</tr>
<tr>
<td>Seal X Claim</td>
<td>2.645</td>
<td>1</td>
<td>2.645</td>
<td>1.191</td>
</tr>
</tbody>
</table>

*** p < .001

Effect of “All Natural” claim. In H1, we predicted that compared to when a natural claim is not used, the use of a natural claim will be more effective in influencing consumer’s perception of the products’ (a) perceived purity, (b) perceived wellness, (c) perceived brand benefits (d) perceived healthiness, and (e) perceived value for money. To test this hypothesis, a two-way ANOVA was run.

Results from Table 12’s two-way ANOVA show that there are main effects of the natural claim for perceived purity (F=25.561, p < 0.001), wellness (F=17.636, p < 0.001), brand benefits (F=6.447, p < 0.05), healthiness (F=11.525, p < 0.01) and value for money (F=8.208, p < 0.01). This shows the presence of natural claim leads participants to have improved perception of the purity, wellness, brand benefits, healthiness of the potato chips as well as the perception that it is value for money, hence providing support for H1a, H1b, H1c, H1d and H1e. H2 states that the two extrinsic cues (seal and natural claim) will interact in such a way that the product with
the seal will be more effective in influencing (a) perceived purity, (b) perceived wellness, (c) perceived brand benefits (d) perceived healthiness, and (e) perceived value for money than when a claim is present. Hence although the main effect of using the seal is non-significant, there are significant interactions between the presence of seal and claim for perceived purity (F=3.923, \( p < 0.05 \)), perceived wellness (F=4.348, \( p < 0.05 \)) and perceived brand benefits (F=13.360, \( p < 0.001 \)) of potato chips.

Table 12

Summary of ANOVA, Seal and Natural Claim on Perception of Perceived Purity, Perceived Wellness, Perceived Benefits, Perceive Healthiness, Perceived Value For Money

<table>
<thead>
<tr>
<th>Source of Variation</th>
<th>Sum of Squares</th>
<th>df</th>
<th>Mean Square</th>
<th>F</th>
</tr>
</thead>
<tbody>
<tr>
<td>Perceived Purity (Scale)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Claim</td>
<td>41.633</td>
<td>1</td>
<td>41.633</td>
<td>25.561***</td>
</tr>
<tr>
<td>Seal</td>
<td>1.853</td>
<td>1</td>
<td>1.853</td>
<td>1.138</td>
</tr>
<tr>
<td>Claim X Seal</td>
<td>6.39</td>
<td>1</td>
<td>6.39</td>
<td>3.923*</td>
</tr>
<tr>
<td>Perceived Wellness (Scale)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Claim</td>
<td>25.561</td>
<td>1</td>
<td>25.561</td>
<td>17.636***</td>
</tr>
<tr>
<td>Seal</td>
<td>0.101</td>
<td>1</td>
<td>0.101</td>
<td>0.07</td>
</tr>
<tr>
<td>Claim X Seal</td>
<td>6.301</td>
<td>1</td>
<td>6.301</td>
<td>4.348*</td>
</tr>
<tr>
<td>Perceived Brand Benefits (Scale)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Claim</td>
<td>10.351</td>
<td>1</td>
<td>10.351</td>
<td>6.447*</td>
</tr>
<tr>
<td>Seal</td>
<td>4.961</td>
<td>1</td>
<td>4.961</td>
<td>3.09</td>
</tr>
<tr>
<td>Claim X Seal</td>
<td>21.451</td>
<td>1</td>
<td>21.451</td>
<td>13.360***</td>
</tr>
<tr>
<td>I think this bag of chips is healthy. (Single item)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Claim</td>
<td>28.125</td>
<td>1</td>
<td>28.125</td>
<td>11.525*</td>
</tr>
<tr>
<td>Seal</td>
<td>2.205</td>
<td>1</td>
<td>2.205</td>
<td>0.904</td>
</tr>
<tr>
<td>Claim X Seal</td>
<td>6.125</td>
<td>1</td>
<td>6.125</td>
<td>2.51</td>
</tr>
<tr>
<td>I think this bag of chips is value for money. (Single item)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Claim</td>
<td>13.52</td>
<td>1</td>
<td>13.52</td>
<td>8.208**</td>
</tr>
<tr>
<td>Seal</td>
<td>4.5</td>
<td>1</td>
<td>4.5</td>
<td>2.732</td>
</tr>
<tr>
<td>Claim X Seal</td>
<td>0.02</td>
<td>1</td>
<td>0.02</td>
<td>0.012</td>
</tr>
</tbody>
</table>

\( * p < .05; \quad *** p < .01; \quad *** p < .001 \)
Interaction effect of “All Natural” claim and seal. Figure 1 and Table 13.1 shows that there was a significant interaction between the seal and claim (F=3.923, p <0.05). When there is a seal, the presence of a natural claim produced a higher perceived purity (X = 4.15) in the potato chips than when there is no natural claim present. (X = 2.88, p <0.001). When there is no seal, the presence of a natural claim also led to a higher perceived purity (X = 3.60) than where there is no natural claim (X = 3.045, p >0.05), though less significant as when there is a seal. Hence, results support H2a.

Table 13.1

Means, Standard Deviation, and t-Tests for Perceived Purity

<table>
<thead>
<tr>
<th></th>
<th>With &quot;Natural&quot; Claim</th>
<th>Without Claim</th>
<th>t</th>
<th>df</th>
</tr>
</thead>
<tbody>
<tr>
<td>Perceived Purity</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>With Seal</td>
<td>4.15 (1.479)a</td>
<td>2.888 (.960)</td>
<td>5.107***</td>
<td>83.666</td>
</tr>
<tr>
<td>n=50</td>
<td></td>
<td>n=50</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Without Seal</td>
<td>3.60 (1.381)</td>
<td>3.045 (1.231)</td>
<td>2.121*</td>
<td>98</td>
</tr>
<tr>
<td>n=50</td>
<td></td>
<td>n=50</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

aStandard deviation in parentheses; *p < .05; ***p < .001
Table 13.2 and Figure 2 shows results for perceived wellness, where an interaction between the seal and claim was found to be significant ($F=4.348$, $p<0.05$). Where there is a seal, consumer have a higher perception of the product’s wellness qualities ($\bar{X}=3.09$) when a natural claim is present than when a natural claim is not ($\bar{X}=2.02$, $p<0.001$). When there is no seal present, perception of the product’s wellness ($\bar{X}=2.69$) has no significant difference whether the claim is present or absent ($\bar{X}=2.33$, $p>0.05$). These lend support to H2b.
Table 13.2

Means, Standard Deviation, and t-Tests for Perceived Wellness

<table>
<thead>
<tr>
<th></th>
<th>With &quot;Natural&quot; Claim</th>
<th>Without Claim</th>
<th>t</th>
<th>df</th>
</tr>
</thead>
<tbody>
<tr>
<td>Perceived Wellness</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>With Seal</td>
<td>3.090 (1.511)^a</td>
<td>2.020 (0.995)</td>
<td>4.183***</td>
<td>84.76</td>
</tr>
<tr>
<td></td>
<td>n=50</td>
<td>n=50</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Without Seal</td>
<td>2.690 (1.293)</td>
<td>2.330 (0.9237)</td>
<td>1.602</td>
<td>88.671</td>
</tr>
<tr>
<td></td>
<td>n=50</td>
<td>n=50</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

aStandard deviation in parentheses; *** p < .001

Figure 2 Interaction Effect (Claim X Seal) on Perceived Wellness in chips

Finally, in Table 13.3 Figure 3, this experiment also found that a significant interaction between the seal and the claim for perceived brand benefits was present. (F=13.360, p <0.001). When the seal is present, the presence of a natural claim (X
=4.085) produced a higher perception of brand benefits of the potato chips than when a natural claim is absent ($\bar{X} = 2.975$, $p < 0.001$). However, when there is no seal present, the perception of the product’s brand benefit appears to be lower ($\bar{X} = 3.745$) when there is a natural claim than when there is no natural claim even though there is non-significant ($\bar{X} = 3.945$, $p > 0.05$). This provides support for H2c.

Table 13.3

Means, Standard Deviation, and t-Tests for Perceived Brand Benefits

<table>
<thead>
<tr>
<th>Perceived Brand Benefits</th>
<th>With “Natural” Claim</th>
<th>Without Claim</th>
<th>t</th>
<th>df</th>
</tr>
</thead>
<tbody>
<tr>
<td>With Seal</td>
<td>4.085 (1.266)</td>
<td>2.915 (1.254)</td>
<td>4.404***</td>
<td>98</td>
</tr>
<tr>
<td></td>
<td>n=50</td>
<td>n=50</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Without Seal</td>
<td>3.745 (1.368)</td>
<td>3.945 (1.173)</td>
<td>-0.785</td>
<td>98</td>
</tr>
<tr>
<td></td>
<td>n=50</td>
<td>n=50</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*aStandard deviation in parentheses; ***p < .001
Figure 3 Interaction Effect (Claim X Seal) on Perceived Brand Benefits in chips

Referring back to Table 12, for Perceived Healthiness and Perceived Value for money, no interactions between the seal and natural claim was found. Hence H2d and H2e were not supported.

Summary of experiment findings. Study 2 found out that there are main effects of natural claim where the claim significantly influenced respondents’ Perceived Purity, Perceived Wellness, Perceived Brand Benefits, Perceived Healthiness and Perceived Value for Money of the product and hence supports H1a, H1b, H1c, H1d and H1e. Results also show interaction between the natural claim and seal for H2a, H2b and H2c where in the presence of a seal, the natural claim is shown to enhance perception of Perceived Purity, Perceived Wellness, Perceived Brand Benefits of the product in consumers. However, no interaction between the seal and natural claim
was found for Perceived Healthiness and Perceived Value for Money of the product, hence H2d and H2e are not supported.
Discussion

Key Findings and General Discussion

The first objective of this research was to explore the prevalence of the *natural* claim amongst supermarket food products in Singapore. Our content analysis found that there was a high prevalence of using *natural* claims among many such products, reflecting current industry trends (Mintel Global New Products Database, 2009). Even when products do not utilize a *natural* claim, a large number were found to have natural visual images on the packaging evoking naturalness (MacInnis & Price, 1987).

The second objective was to investigate the percentage of food products with *natural* claims that contain food additives. Results indicated that an alarming number of such products that look or claim to be *natural* actually contain various additives. In order to communicate information to the consumer, it is the norm for product packaging to contain images and other design elements. One example is by including the images of strawberries to indicate that the milk is strawberry flavoured (Prendergast & Pitt, 1996). As such, these images have a great potential to mislead when consumers construe natural images to mean that the product is truly natural.

As Singapore and other countries whose food get imported here do not have specific definitions and regulations on the claim *natural* (Table 1), it is likely there is much rampant unregulated misuse of this claim and hence, our results suggest that the relevant authorities need to regulate it (to be discussed in *Implications for Health Labelling and Policy*). Furthermore, the misuse of *natural* claims could prove detrimental for food marketers themselves as consumers may develop negative
feelings towards the product and brand if they realise that they have been misled after reading the listed ingredients (Burton et al., 2000).

In Study 1, we found that a number of products with third-party certifications with a similar number actually utilized claims in a graphical format. Such graphical claims could be an attempt to emulate seals and logos of certification that have already been proven to elicit more positive responses in consumers (Parkinson, 1975; Beltramini & Stafford, 1993). Therefore it is hardly surprising that a number of food products would utilise such claims in a graphical format.

In order to fulfil our third objective, an experiment was carried out to find out the effect of labelling an “All Natural” claim on unhealthy products such has potato chips, and to examine the interaction between the usages of a seal with an “All Natural” claim. As hypothesized, results indicated that the presence of the “All Natural” claim significantly improves consumers’ perception of the product’s perceived purity, wellness, brand benefits, healthiness and value for money.

From these results, it suggests that when the “All Natural” claim is present, the words “All Natural” is primed and appears to activate other perceptions such has “no additives”, “no artificial colouring”, “no preservatives” and “no added salt” hence leading to a higher perception of perceived purity. The activation also appears to work for perceived wellness, brand benefits, healthiness and these gives support to the Activation Theory (Collins and Loftus, 1975) where the claim “All Natural” may have caused subjects to over-generalize it to mean “healthy”, hence associating naturalness with healthiness, supporting Cooper ‘s (2007) suggested view of consumer’s perception towards natural claims.
The written claim of “All Natural” also led to a higher perception of the potato chips’ perceived value for money. This could be due to the perception of the other four items (perceived purity, wellness, brand benefits and healthiness), which signify that the product contains more “goodness” than the ones without such a claim and hence appears to be more value for money.

Finally in view of the fourth research objective, the findings show that the seal and the “All Natural” claim interact with one another, where the presence of a natural claim complements and enhances the positive effects of the seal. This gives further support to the multiple cues effect from Purohit & Srivastava’s (2001) study where consumers make decisions based on many different cues interwoven together. This interaction could also be due to the authoritative image of endorsement from the visual cue of a seal (Parkinson, 1975) where it is closely associated with guarantees and “government-tested” seals on packages, thereby signalling product quality (Roselius, 1986). This is especially so when used with a claim such as “All Natural”, which suggests better nutritional aspects of the product (H1a & H1b), hence leading to a higher perception of the product’s perceived purity, wellness and brand benefits. This extends Parkinson’s (1975) findings where the seal can be misinterpreted by respondents to have greater meaning than it was justified. This is so as our results show that the seal further adds credence to mean better nutrients (Perceived Purity), functional health benefits (Perceived Wellness) and the intrinsic values of the product such as taste and appearance (Perceived Brand Benefits).

Consumers often look for information provided on the product packaging to make a decision in order to assess the product’s quality. Such information serves as extrinsic cues that serve as a risk reduction strategy to help decide which product to
purchase (Nelson, 1970; Bettman, 1979). The more a cue reduces uncertainty in consumers, the more positive the evaluation of the product. With these findings, it suggests that consumers may be using the seal and a natural claim as an extrinsic cue for a risk relief, thereby reducing the uncertainty when evaluating the product. The seal could signal the positive utility of the product with regards to the omission of “unhealthy” nutrients (such as additives, colouring, preservatives and added salt) and the added bonus of functional health benefits of wellness in the potato chips, leading them to have a more favourable perception of them. This is especially so since food like potato chips are low-involvement products that require a higher usage of such cues in product assessment (Grossman & Wisenblit, 1999). This may explain why respondents have a significantly better perception of the products’ attributes when such labelling is present.

For perceived healthiness and value for money, we found there was no significant interaction between the presence of a seal and the “All Natural” claim. In the presence of a seal, the natural claim made no difference in the perception of healthiness and value for money of the product. This appears to suggest that, in the presence of a seal, the claim works better in influencing perceptions which are more specific such as purity, wellness and brand benefits than perceptions which are more general such as healthy and value. Respondents may have given more meaning to the seal when it comes to specific nutrients or benefits than when general perceptions are concerned.

**Implications for Health Labelling and Policy**

In Singapore, there are currently no specific definitions for usage of the word natural as a claim from neither the HPB nor the AVA. In the U.S., despite petitions to
the FDA to come up with a definition of *natural*, such appeals have been dismissed. Other countries have fared no better, with many giving vague definitions alluding to *natural* claims. With the only definition available from Canadian Food Inspection Agency (CFIA), it is no surprise that *natural* claims are widely utilised for a vast majority of food packaging. It appears that most food regulatory bodies, like the United States’ FDA, do not regard this misuse of *natural* as being sufficiently harmful to warrant a policy change.

However, we propose that even if such a practice is not deemed harmful to consumers, there is still a potential for misinterpretation that may amount to advertising deception. While policy makers have noted the difficulty of defining what a natural product is as one of the reasons why the FDA chose not to heed the petitions (Homel Foods Corporation Research and Development, 2006; Heller 2006), the CFIA shows that a definition is possible and should be utilised as a case example of how to regulate this issue.

Our study also further highlights how even if verbal claims can be regulated, the overall package design can evoke images in consumers that may be misleading as well. However, we understand that this aspect is difficult to regulate and to do so would also eliminate the creativity and vibrancy of product packaging design. Therefore, efforts should be made by the various health agencies and food regulatory bodies, such as the HPB and AVA in Singapore to educate consumers thoroughly on how to read and interpret the nutrition labels and ingredients. For example, they can leverage on media outlets such as newspapers and magazines to provide information to consumers. This way, consumers can make a more informed examination of whether a product is natural or not.
Alternatively, those in this industry of food manufacturing and marketing can self-regulate by setting industry-wide standards for the *natural* claim. In addition, a clear definition of *natural* would boost the credibility of the usage of *natural* claims, especially so for products which are truly natural. At the same time it also provides an incentive for companies to produce products that are truly natural by definition.

*Limitations & Directions for Future Research*

One potential limitation of our content analysis is that while efforts have been made to purchase as many of the available products on the market to be coded, budgetary constraints meant that only 328 products could be purchased. Hence, future studies should include a larger inventory of products spanning a wider range of product categories. Also, Study 1 captured the current use of *natural* claims among food products that serve as a platform for future studies that may attempt to chart the usage of the *natural* claim across the years.

For the online experiment, the generalizability of the results is restricted to students. The study could be expanded to include different segments of the consumer population as they may give different responses. It is possible that misleading claims will be even more salient in affecting less educated consumer segments. Furthermore, Study 2 was not carried out in a real purchasing context. As we only measured the perceived purchasing intent, further studies could extend this to examine how the seal and *natural* claim may affect real purchasing behaviour.

In conclusion, our study took a pioneering approach to examine the issue of *natural* claims. Our findings provide empirical evidence for the widespread use and misuse of the natural positioning of products, as well as the consumer tendency to
equate this claim with product purity and healthfulness. We hope that this study will highlight the prevalence and misuse of *natural* claims as well as its effect on consumers, hence giving credence to the various calls for better regulation of the term *natural*. 
APPENDICES

Appendix A

Coding Guidelines

Please read these guidelines before filling up the Coding Sheet.

1. In filling up the Coding Sheet, tick only one option unless specifically given instructions to do otherwise. Certain questions will require a written name or statement, denoted by having a blank line for writing.

2. “Country of Manufacture” refers to the country which the product was made. “Country of Origin” refers to where the product/brand originated from.

3. For “Image on Product Packaging”, judge the scale of the image based on its relative size on the frontal packaging of the product. The scale is based on the percentage of which the image makes up the frontal packaging. So if the image seems to make up half of the packaging, it would be seen as having a scale of 50%.

4. For the “Colour Scheme of Product Packaging”, the Colour Value represents the overall softness or saturation of the background colours. For the Background and Foreground Colours, only the prominent colours should be picked for coding.

5. For determining the “Presence of Health Related Claims”, a graphical claim is one where the claim is incorporated into a graphical format, specifically in a seal or logo form. If the claim is merely inserted into a border or simple shape, they are not considered to be a graphical claim.

6. The “Emphasis of Claim” is determined by aggregating what all the claims on the product packaging seem to be emphasising on the most.

7. To determine the “Presence of Additive” and “Types of Additive Present”, refer to “Guidelines for Identifying Additives” section of this guide,
GUIDELINES FOR IDENTIFYING ADDITIVES

SYNTHETIC ORGANIC COLOURS

allura red AC Colour Index 16035
Amaranth Colour Index 16185
Carmoisine Colour Index 14720
Erythrosine Colour Index 45430
ponceau 4R Colour Index 16255

2. Yellow shade:
quinoline yellow Colour Index 47005
sunset yellow FCF Colour Index 15985
tartrazine Colour Index 19140

3. Green shade:
chlorophyll-copper complex and sodium and potassium salts of chlorophyllin copper complex
Colour Index 75810
fast green FCF Colour Index 42053
green S Colour Index 44090

4. Blue Shade:
brilliant blue FCF Colour Index 42090
indigo carmine Colour Index 73015

5. Brown shade:
chocolate brown HT Colour Index 20285

6. Black shade:
brilliant black PN Colour Index 28440

OTHER COLOURS

1. Caramel and the colour obtained from cochineal.
2. The following colouring matter of vegetable origin:
   any colouring matter natural to edible fruits and vegetables, any colouring matter from flowers, leaves, roots and other plant parts which are customarily used in the preparation of food, including alkannet, annatto, carotene, chlorophyll, curcumin, flavine, indigo, orchid, osage orange, persian berry, safflower, saffron, sandalwood, turmeric; or their pure-colouring principles whether isolated from such natural colours or produced synthetically.
3. Bole or iron oxide, carbon black (prepared from vegetable sources only), titanium dioxide, ultramarine and solely for the external colouring of dragees and the decoration of sugar-coated flour confectionery, silver or aluminium in leaf or powder form.
4. The aluminium or calcium salts (lakes) of any of the scheduled water-soluble colours

PERMITTED EMULSIFIERS AND PERMITTED STABILISERS

Acetylated mono-glycerides; lactated mono-diglycerides; tartaric acid glycerides; diacetyl tartaric acid glycerides; citric acid glycerides;

Agar;

Alginic acid; ammonium alginate; calcium alginate; potassium alginate; sodium alginate;

Carrageenan;

Caseinate, sodium and calcium;

Cellulose, methyl, ethyl, methyl ethyl, hydroxy propyl and hydroxy propyl methyl derivatives of; carboxy methyl cellulose; croscarmellose sodium;

Dioctyl sodium sulphosuccinate;

Furcelleran;

Gums, acacia, carob, gellan, ghatti, guar, karaya, tragacanth, and xanthan;

Konjac flour;

Lecithin;

Mono and diglycerides of fatty acids;

Pectin, calcium pectate; sodium pectate;

Polyglycerol esters of fatty acids;

Polyoxyethylene (20) sorbitan monolaurate (polysorbate 20);

Polyoxyethylene (20) sorbitan mono-palmitate (polysorbate 40);

Polyoxyethylene (20) sorbitan monostearate (polysorbate 60);

Polyoxyethylene (20) sorbitan mono-oleate (polysorbate 80);

Polyoxyethylene (20) sorbitan tristearate (polysorbate 65);

Propylene glycol esters of fatty acids; propylene glycol alginate;

Quillaia (only in soft drinks, not exceeding 200 parts per million);
Starches, bleached (with chlorite, hypochlorite, hydrogen peroxide, or peracetic acid) and hypochlorite-oxidised; di-starch phosphate prepared using sodium triphosphate, di-starch phosphate prepared using phosphorus oxychloride; phosphated di-starch phosphate; starch acetates; acetylated di-starch glycerol; acetylated di-starch adipate; acetylated di-starch phosphate, starches octenyl succinic anhydride modified; hydroxypropyl distarch phosphate;

Stearoyl-2-lactylic acid and its sodium and calcium salts; Stearyl tartrate;

Sorbitan monostearate; sorbitan tristearate; sorbitan mono-palmitate; sorbitan monolaurate; sorbitan mono-oleate.

**PERMITTED NUTRIENT SUPPLEMENT**

Ascorbic acid;
Biotin;
Calcium carbonate;
Calcium citrate;
Calcium glycerophosphate;
Calcium oxide;
Calcium pantothenate;
Calcium phosphate (mono-, di- and tri-basic);
Calcium pyrophosphate;
Calcium sulphate;
Beta-carotene;
Choline bitartrate;
Choline chloride;
Ferric ammonium citrate;
Ferric phosphate;
Ferric pyrophosphate;
Ferrous gluconate;
Ferrous lactate;
Inositol;
Iron citrate;
Isoleucine;
Leucine;
Lysine;
Methionine;
Niacin;
Niacinamide;
Nicotinic acid;
Nicotinamide;
D-pantothenic acid;
D-pantothenyl alcohol;
Phenylalanine;
Potassium iodide;
Pyridoxine;
Pyridoxine hydrochloride;
Pyridoxal;
Pyridoxamine;
Riboflavin;
Riboflavin-5-phosphate;
Sodium pantothenate;
Sodium phosphate (mono-, di- and tri-basic);
Thiamine;
Thiamine hydrochloride;
Thiamine mononitrate;
Threonine;
Tocopherols;
Alpha-tocopherol acetate;
Tryptophan;
Valine;
Vitamin A;
Vitamin A acetate;
Vitamin A alcohol;
Vitamin A palmitate;
Vitamin B12;
Vitamin D2;
Vitamin D3;
Zinc gluconate;
Zinc sulphate.

PERMITTED GENERAL PURPOSE FOOD ADDITIVES

Acetic acid;
Acetone;
Adipic acid;
Alpha-acetolactate decarboxylase (from a genetically modified strain of Bacillus subtilis);
Alpha-amylase (endo-amylase from a genetically modified strain of Bacillus licheniformis);
Ammonium bicarbonate;
Ammonium hydroxide;
Ammonium phosphate (mono- and di-basic);
Ammonium sulphate;
Aspartame;
Beeswax;
Beta-glucanase (endo-glucanase from Bacillus subtilis);
Beta-glucanase (endo-glucanase from Hunicola insolens);
Calcium carbonate;
Calcium chloride;
Calcium citrate;
Calcium gluconate;
Calcium hydroxide;
Calcium lactate;
Calcium phosphate (mono-, di-and tri-basic);
Calcium sulphate;
Candelilla wax;
Carbon dioxide;
Carnauba wax;
Chymosin (produced by *Escherichia coli*);
Citric acid;
Endo-protease (metallo protease from *Bacillus amyloliquefaciens*);
Erythritol;
Fumaric acid;
Glucono delta-lactone;
Glycerin or Glycerol;
Glycerol esters of citric, lactic and tartaric acids;
Helium;
High fructose syrup;
Hydrochloric acid;
Hydrogen peroxide;
Hydrogenated glucose syrup (maltitol and maltitol-based products);
Isomalt;
Lactic acid;
Lactitol;
Magnesium carbonate;
Magnesium chloride;
Magnesium oxide;
Magnesium hydroxide;
Magnesium stearate;
Magnesium sulphate;
Malic acid;
Maltogenic amylase (amylase from a genetically modified strain of *Bacillus subtilis*);
Mannitol;
Nitrogen;
Nitrous oxide;
Oligofructose (from chicory root);
Papain;
Pentosanase (xylanase or hemicellulase from a genetically modified strain of *Aspergillus oryzae*);
Peracetic acid;
Phosphoric acid;
Polydextrose;
Potassium acid tartrate;
Potassium bicarbonate;
Potassium carbonate;
Potassium chloride;
Potassium citrate;
Potassium hydroxide;
Potassium sulphate;
Propylene glycol;
Shellac;
Silica aerogel;
Sodium acetate;
Sodium chloride;
Sodium aluminium phosphate;
Sodium bicarbonate;
Sodium carbonate;
Sodium citrate;
Sodium hydroxide;
Sodium phosphate (mono-, di-and tri-basic);
Sodium potassium tartrate;
Sodium pyrophosphate;
Sodium sesquicarbonate;
Sodium sulphate;
Sodium tartrate;
Sorbitol;
Succinic acid;
Sucrose esters of fatty acids;
Sulphuric acid;
Sulphurous acid;
Tartaric acid;
Thaumatin;
Transglutaminase (transferase prepared from *Streptoverticillium* mobaraense variant);
Trehalose;
Xylitol.
Appendix B
Coding Sheet

General Information

Q 1. Product Category:

1) Milk [ ]
2) Yoghurt [ ]
3) Yoghurt Drinks [ ]
4) Juice [ ]
5) Cereal [ ]
6) Cereal bars [ ]

Q2. Product Brand:

________________________________________

Q3. Product Name:

________________________________________

Q4. Supermarket Name:

________________________________________

Q5. Supermarket Aisle:

1) Cold Beverage [ ]
2) UHT Milk [ ]
3) UHT Juice [ ]
4) Cereal [ ]

Q6. Shelf level:

1) High [ ]
2) Medium [ ]
3) Low [ ]

Q7. Country of Manufacture:

________________________________________

Q8. Country of Origin:

________________________________________
**Presence of Seals and External Credentials**

Q9. Presence of HPB Seal:

1) Yes [ ]

2) No [ ]

Q10. Presence of Halal Seal:

1) Yes [ ]

2) No [ ]

Q11. Presence of external credential:

1) Yes [ ]

2) No [ ]

**Image on Product Packaging**

Please circle the value that best represents the scale of the image in relation to the frontal packaging (with “0” being “No Image – 0%” and “10” being “Image Covers Whole Frontal Packaging – 100%”).

Q12. Image of Product:

| 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |

Q13. Natural Images:

| 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |

Q14. Healthy Activities:

| 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
Q15. Cartoon Illustrations:

| 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |

Q16. Children's activities and children:

| 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |

Q17. Stationary Human Figure:

| 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |

Q18. Text:

| 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |

Q19. Geometrical Shapes:

| 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |

Q20. See-through Packaging:

| 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |

Q21. Others (For Packaging):

| 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
**Colour Scheme of Product Packaging**

Please circle the value that best represents the colour value of the background (with “1” being low value and “5” being “high value”).

Q22. Colour Value:

<p>| | | | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
</tbody>
</table>

Please tick up to 2 dominant **background** colours. Use the colour bar below as a guide in coding the colours.

Q23. Background Colour:

1) Background Colour – White  [  ]
2) Background Colour – Grey  [  ]
3) Background Colour – Black  [  ]
4) Background Colour – Yellow  [  ]
5) Background Colour – Orange  [  ]
6) Background Colour - Red  [  ]
7) Background Colour - Pink  [  ]
8) Background Colour – Purple  [  ]
9) Background Colour – Dark Blue  [  ]
10) Background Colour – Light Blue  [  ]
11) Background Colour – Dark Green  [  ]
12) Background Colour – Light Green  [  ]
13) Background Colour – Brown  [  ]
14) Background Colour – Beige  [  ]

Please tick up to 3 dominant **foreground** colours. Use the colour bar below as a guide in coding the colours.

<p>| | | | | | | | | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>White</td>
<td>Grey</td>
<td>Black</td>
<td>Brown</td>
<td>Beige</td>
<td>Yellow</td>
<td>Orange</td>
<td>Red</td>
<td>Pink</td>
<td>Purple</td>
</tr>
</tbody>
</table>
Q24. Foreground Colour:

1) Foreground Colour – White [ ]
2) Foreground Colour – Grey [ ]
3) Foreground Colour – Black [ ]
4) Foreground Colour – Yellow [ ]
5) Foreground Colour – Orange [ ]
6) Foreground Colour - Red [ ]
7) Foreground Colour - Pink [ ]
8) Foreground Colour – Purple [ ]
9) Foreground Colour – Dark Blue [ ]
10) Foreground Colour – Light Blue [ ]
11) Foreground Colour – Dark Green [ ]
12) Foreground Colour – Light Green [ ]
13) Foreground Colour – Brown [ ]
14) Foreground Colour – Beige [ ]

Fonts Used

Please tick all the fonts which apply.

Q25. Font of Product Name:

1) Font of Product Name – Display [ ]
2) Font of Product Name – Script [ ]
3) Font of Product Name – Serif [ ]
4) Font of Product Name- Handwriting [ ]
5) Font of Product Name- Sans Serif [ ]

Q26. Font of Product Claim:

1) Font of Product Claim – Display [ ]
2) Font of Product Claim – Script [ ]
3) Font of Product Claim- Serif [ ]
4) Font of Product Claim- Handwriting [ ]
5) Font of Product Claim- Sans Serif [ ]

Form of Packaging

Please tick only the one that applies.

Q26. Packaging Type:

1) Carton [ ]
2) Tub [ ]
3) Packet [ ]
4) Bottle [ ]
5) Can [ ]
6) Box [ ]

Q27. Packaging Shape:
1) Rectangular [ ]
2) Structural [ ]
3) Cylindrical [ ]
4) Organic [ ]

**Presence of Health Related Claims**

Please tick all the types of claims present.

Q28. 100%, pure, fresh, natural, real ingredients etc.:
1) In Graphic [ ]
2) In Text [ ]
3) No Claim [ ]

Q29. Presence of Vitamins, Minerals:
1) In Graphic [ ]
2) In Text [ ]
3) No Claim [ ]

Q30. No Added Sugar, Low Sugar, Less than XX% sugar:
1) In Graphic [ ]
2) In Text [ ]
3) No Claim [ ]

Q31. No Preservatives:
1) In Graphic [ ]
2) In Text [ ]
3) No Claim [ ]

Q32. No Artificial Colours:
1) In Graphic [ ]
2) In Text [ ]
3) No Claim   [  ]

Q33. No Artificial Flavours:
   1) In Graphic   [  ]
   2) In Text      [  ]
   3) No Claim     [  ]

Q34. Not from Concentrate:
   1) In Graphic   [  ]
   2) In Text      [  ]
   3) No Claim     [  ]

Q35. Low Fat/Fat Free, etc.:
   1) In Graphic   [  ]
   2) In Text      [  ]
   3) No Claim     [  ]

Q36. High in Protein/Source of Protein, etc.:
   1) In Graphic   [  ]
   2) In Text      [  ]
   3) No Claim     [  ]

Q37. High in Calcium/Source of Calcium, etc.:
   1) In Graphic   [  ]
   2) In Text      [  ]
   3) No Claim     [  ]

Q38. No/Low Trans Fat or Saturated Fat etc.:
   1) In Graphic   [  ]
   2) In Text      [  ]
   3) No Claim     [  ]

Q39. Low in Calories/Lower than XX Calories:
   1) In Graphic   [  ]
   2) In Text      [  ]
   3) No Claim     [  ]
Q40. High/Good Source of Fibre:
1) In Graphic [ ]
2) In Text [ ]
3) No Claim [ ]

Q41. Cholesterol Free:
1) In Graphic [ ]
2) In Text [ ]
3) No Claim [ ]

Q42. Sodium Free:
1) In Graphic [ ]
2) In Text [ ]
3) No Claim [ ]

Q43. Presence of Omega-3DH:
1) In Graphic [ ]
2) In Text [ ]
3) No Claim [ ]

Q44. Pre-biotic/Active Live Cultures:
1) In Graphic [ ]
2) In Text [ ]
3) No Claim [ ]

Q45. Functional Nutrient Claim:
1) In Graphic [ ]
2) In Text [ ]
3) No Claim [ ]

Q46. Others (Claims):
1) In Graphic [ ]
2) In Text [ ]
3) No Claim [ ]
Emphasis of Claim

Please tick only one.

Q47. Emphasis of Claim:

1) Nutrition [ ]
2) Natural Ingredients [ ]
3) Taste [ ]
4) Fun [ ]
5) Lifestyle [ ]
6) Others [ ]
7) No Claim [ ]

Placement of Claim on Product

Please tick all that applies for all claims present.

Q48. Placement of Claim:

1) Front [ ]
2) Back [ ]
3) Side [ ]
4) Top [ ]

Presence of Additives

Q49. Additive Present:

1) Yes [ ]
2) No [ ]

Please tick all the additives present.

Q50. Types of Additives Present:

1) Presence of Added Sugar [ ]
2) Presence of Colouring [ ]
3) Presence of Additional Flavourings (Enhancers and Agents) [ ]
4) Presence of Preservatives [ ]
5) Presence of Added Antioxidants, Vitamins and Minerals [ ]
6) Presence of Other Additives [ ]
Appendix C

Online Experiment

Appendix C1

Manipulated Images Used for Experiment.

Group A

![Image of manipulated image for Group A]

Group B

![Image of manipulated image for Group B]
Group C

Group D
Appendix C2

Questionnaire for Experiment

Imagine that you are shopping for groceries at a Supermarket, and come across the following product:

Section A
Assess this packet of All Natural chips as seen below:
Please Circle your rating. '1' being 'Strongly Disagree' and '7' being 'Strongly Agree'.

<p>| | | | | | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>I think this product tastes good.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>2</td>
<td>I think this product is healthy</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>3</td>
<td>I think this product contains no artificial colouring</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>4</td>
<td>I think product contains no additives.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>5</td>
<td>I think this product contains no preservatives.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>6</td>
<td>I think this product contains no added sugar.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>7</td>
<td>I think this product is good for digestion.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>8</td>
<td>I think this product is value for money.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>9</td>
<td>I think this product helps me with slimming</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>10</td>
<td>I like the texture and consistency</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>11</td>
<td>It is expensive</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>12</td>
<td>I like the appearance</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>13</td>
<td>I feel good eating it.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>14</td>
<td>I am likely to purchase it.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
</tbody>
</table>
**Section B**

1. Please Circle your rating of these sentences. ‘1’ being ‘Strongly Disagree’ and ‘7’ being ‘Strongly Agree’.

<table>
<thead>
<tr>
<th>I think this product is natural</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
</tr>
</thead>
<tbody>
<tr>
<td>This product has a seal which guarantees authenticity</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
<td>7</td>
</tr>
</tbody>
</table>

2. When shopping for food and snacks how important are the following to you: 1 being “Not Important”, 7 being “Very Important”.

<table>
<thead>
<tr>
<th>(a) Health</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
</tr>
</thead>
<tbody>
<tr>
<td>(b) Taste</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
<td>7</td>
</tr>
</tbody>
</table>
4. Gender:
   (a) Male
   (b) Female

5. Age:
   (a) 16 to 25
   (b) 26 to 35
   (c) 36 to 45
   (d) 46 to 55
   (e) 56 and above

6. Occupation:
   (a) Student
   (b) Home-maker
   (c) White Collar worker
   (d) Blue Collar worker
   (e) Service Sector
   (f) Unemployed
   (g) Others: __________

8. Race:
   (a) Chinese
   (b) Malay
   (c) Indian
   (d) Eurasian
   (e) Others: ________
**Appendix D**

**Content Analysis Tables**

**Appendix Table D1**

Presence of natural claim within product categories

<table>
<thead>
<tr>
<th>Presence of Natural Claim</th>
<th>Milk</th>
<th>Yogurt</th>
<th>Yogurt Drinks</th>
<th>Juice</th>
<th>Cereal</th>
<th>Cereal Bars</th>
<th>Total (n=328)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Natural Claim % of Total</td>
<td>12.7%</td>
<td>16.8%</td>
<td>9.8%</td>
<td>35.3%</td>
<td>15.6%</td>
<td>9.8%</td>
<td>100.0%</td>
</tr>
<tr>
<td>No Claim % of Total</td>
<td>25.5%</td>
<td>7.8%</td>
<td>4.6%</td>
<td>25.5%</td>
<td>21.6%</td>
<td>15.0%</td>
<td>100.0%</td>
</tr>
<tr>
<td>Total</td>
<td>18.7%</td>
<td>12.6%</td>
<td>7.4%</td>
<td>30.7%</td>
<td>18.4%</td>
<td>12.3%</td>
<td>100.0%</td>
</tr>
</tbody>
</table>

ChiSq= 21.146, 5 d.f., **p<.01**

**Appendix Table D2**

Types of images present on packaging

<table>
<thead>
<tr>
<th>Image Present on Packaging</th>
<th>Percent of Cases (n = 328)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Image of Product Present</td>
<td>55.8%</td>
</tr>
<tr>
<td>Image of Natural Ingredients Present</td>
<td>71.3%</td>
</tr>
<tr>
<td>Image of Healthy Activities Present</td>
<td>3.4%</td>
</tr>
<tr>
<td>Image of Cartoon Illustrations Present</td>
<td>10.4%</td>
</tr>
<tr>
<td>Image of Children's Activities Present</td>
<td>0.6%</td>
</tr>
<tr>
<td>Image of Stationary Adults Present</td>
<td>5.5%</td>
</tr>
<tr>
<td>Text as a Design/Graphical Element Present</td>
<td>25.6%</td>
</tr>
<tr>
<td>Image of Geometrical Shapes Present</td>
<td>1.8%</td>
</tr>
<tr>
<td>See-through Packaging Present</td>
<td>10.7%</td>
</tr>
<tr>
<td>Other Images Present</td>
<td>0.9%</td>
</tr>
</tbody>
</table>
### Appendix Table D3
Presence of natural claim versus presence of additive

<table>
<thead>
<tr>
<th>Presence of Natural Claim</th>
<th>Additive Present</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>No</td>
<td>Yes</td>
</tr>
<tr>
<td>Natural Claim</td>
<td>24.3%</td>
<td>75.7%</td>
</tr>
<tr>
<td></td>
<td>12.9%</td>
<td>40.2%</td>
</tr>
<tr>
<td>No Claim</td>
<td>13.1%</td>
<td>86.9%</td>
</tr>
<tr>
<td></td>
<td>6.1%</td>
<td>40.8%</td>
</tr>
<tr>
<td>Total (n = 326)</td>
<td>19.0%</td>
<td>81.0%</td>
</tr>
</tbody>
</table>

ChiSq = 6.620, 1 d.f., *p<.05

### Appendix Table D4
Prevalence of Graphical Claims

<table>
<thead>
<tr>
<th>Presence of Graphical Claims</th>
<th>Frequency</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>No</td>
<td>249</td>
<td>75.9</td>
</tr>
<tr>
<td>Yes</td>
<td>79</td>
<td>24.1</td>
</tr>
<tr>
<td>Total</td>
<td>328</td>
<td>100</td>
</tr>
</tbody>
</table>
References


