



# Effects on consumer behaviour of fat-free nutrition content claims on high-sugar foods

## Rapid evidence assessment

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## Executive summary

Food Standards Australia New Zealand has been asked to consider whether fat-free and % fat-free nutrition content claims (“fat-free claims”) on high sugar foods are misleading consumers and adversely affecting purchasing and/or consumption behaviour.

To support this work, the Authority sought an assessment of the existing evidence as it relates to

- The specific question of whether fat-free claims on high sugar foods (e.g. confectionary) are likely to mislead consumers to the extent that they distort consumption behaviour and potentially increase the risk of adverse health outcomes.
- Various options for responding to the postulated problem of distortion of consumers’ purchase and consumption decisions.

A rapid evidence assessment was conducted to answer the following questions for foods that are high in sugar:

- What effect(s) on consumers’ nutrition and health perceptions do fat-free claims have?
- What effect(s) on consumers’ purchase behaviour do fat-free claims have?
- What effect(s) on consumers’ consumption behaviour do fat-free claims have?
- What effect(s) on consumer’s nutrition and diet outcomes do fat-free claims have?
- What effect(s) on perceptions, purchase and consumption behaviours do education campaigns have, when used in combination with fat-free claims?
- What effect(s) on perceptions, purchase and consumption behaviours do disclaimers have, when used in combination with fat-free claims?
- What effect(s) on perceptions, purchase and consumption behaviours do prohibitions against fat-free claims on high sugar foods have, when the claims were previously legal?

Results and conclusions of the rapid evidence assessment are as follows:

- 1.1 A review of the peer-reviewed literature revealed very few studies directly relevant to any of the research questions.
- 1.2 The literature reviewed was broadened to include, where appropriate, references to “low fat” as well as “fat free”, to labels as well as claims, and to unspecified foods as well as high-sugar foods.
- 1.3 Findings of the review support the conclusion that percent fat-free claims and low-fat labels are capable of influencing consumers’ perceptions of the healthiness or energy content of products, appropriate serving sizes, and amount consumed on a given occasion.
  - 1.3.1 Survey data from New Zealand indicated that 46% of a sample of supermarket shoppers surveyed interpreted a “97% fat free claim” as denoting that a food was healthy.
  - 1.3.2 Experimental data from the USA indicated that confectionary and granola labelled “low fat” were consumed in larger quantities and attracted lower estimates of calorie content, higher estimates of appropriate serving size (by a margin of 25%), and lower ratings of anticipated guilt on consumption that when labelled “regular”. The effects of a “low-fat” label on amount of confectionary consumed and the underestimation of calorie content were greater in overweight than normal-weight participants.

- 1.3.3 Focus group accounts from Australia, although not referring specifically to high-sugar foods, support the conclusion that low-fat claims can influence purchase decisions, be interpreted as a licence to consume more, and lead to increased consumption.
- 1.4 It is concluded that the use of a low-fat label on a sweet food may lead to a lowering of both psychological and behavioural inhibitions towards consumption of that food.
- 1.5 The effects reported are consistent with current knowledge of human decision processes, whether described in terms of halo effects, theories of cognitive economy, or dual-process models of decision making. These explanatory frameworks acknowledge the high reliance of human decision making on superficial cues and rapid processing, guided by affective associations or decision-making short-cuts (heuristics).
- 1.6 Although no study examined the effects of fat-free and associated claims on purchase decisions in relation to high-sugar foods, the lowering of inhibitions towards consumption can be expected to apply to purchase decisions, all other things (e.g., cost) being equal. This is in accord with Australian focus group accounts of the influence of low-fat claims on purchases of foods in general.
- 1.7 The evidence for education campaigns is insufficiently strong and that for disclaimers insufficiently general to warrant serious consideration of these options. In addition, education campaigns and disclaimers are not considered psychologically viable strategies to combat the ability of fat-free claims to mislead. Reasons include
- 1.7.1 The greater demand on cognitive resources involved in conditionally resisting as opposed to spontaneously accepting a claim puts the intervention at a disadvantage relative to the problem.
- 1.7.2 Encouraging consumers to question or dismiss some claims is inconsistent with the capacity of regulation to promote confidence in higher-level claims.
- 1.8 The effects on perceptions, purchase, or consumption of prohibiting a claim that was previously legal can be considered in terms of both 1) the incidence of behaviours in the community and 2) the behaviours of individuals previously influenced. A question for the Authority to consider is whether limiting the opportunity for people to be influenced is a valid aim in its own right irrespective of whether people who were previously influenced subsequently modify their behaviours.

# 1 Introduction

## 1.1 Background

The Authority has been asked to consider whether fat-free and % fat-free nutrition content claims (“fat-free claims”) on high sugar foods, are misleading consumers and adversely affecting purchasing and/or consumption behaviour.

To support this work, the Authority sought an assessment of the existing evidence as it relates to the specific question of whether fat-free claims on high sugar foods (e.g. confectionary) are likely to mislead consumers to the extent that they distort consumption behaviour and potentially increase the risk of adverse health outcomes.

In addition, the Authority sought an evidence-based assessment of various options for responding to the postulated problem of distortion of consumers’ purchase and consumption decisions. In particular, the Authority is interested in evidence on whether any of the identified regulatory options will result in a reduction in consumers who have been misled, and thereby a reduction in any negative health outcomes associated with misinformed food choices.

## 1.2 Brief

To conduct a Rapid Evidence Assessment (REA) that will help form the evidence base for the Authority’s decision on the best option(s) to pursue for fat-free claims. The REA must draw on the relevant evidence, including both evidence relating to high sugar foods and fat free claims and other evidence that may inform the assessment. The REA must seek to answer the following questions for foods that are high in sugar:

- What effect(s) on consumers’ nutrition and health perceptions do fat-free claims have?
- What effect(s) on consumers’ purchase behaviour do fat-free claims have?
- What effect(s) on consumers’ consumption behaviour do fat-free claims have?
- What effect(s) on consumer’s nutrition and diet outcomes do fat-free claims have?
- What effect(s) on perceptions, purchase and consumption behaviours do education campaigns have, when used in combination with fat-free claims?
- What effect(s) on perceptions, purchase and consumption behaviours do disclaimers have, when used in combination with fat-free claims?
- What effect(s) on perceptions, purchase and consumption behaviours do prohibitions against fat-free claims on high sugar foods have, when the claims were previously legal?

## 2 Search procedure

Searches were conducted with all databases of the Web of Knowledge, and the results indexed with Endnote referencing software. Subsequently, the key searches that included the term “fat” were repeated with the PsychInfo and Medline databases. This process yielded a number of additional references.

### 2.1 Fat-free claims and high-sugar foods

Because each research question refers specifically to fat-free claims, the primary search focus was on claims and labels signifying freedom from fat and various approximations of freedom from fat. Preliminary searches revealed a low incidence of references to “fat-free” in the context of claims and labels, and search terms were therefore extended to include “no fat” and notions of reductions in fat. Because of the specific interest in high-sugar foods, these searches were further supplemented by a second wave of searches with the focus on sweetened foods, especially snacks and confectionary. Together, these searches provided the core literature base for the research questions; this was further supplemented by references identified through secondary sources.

### 2.2 Inclusion and exclusion criteria

In Web of Knowledge and Medline searches, subject area filters were employed to reduce the proportion of overtly physiological, biomedical, chemical, food technology, and other out-of scope fields such as the nutritional substantiation of claims. Only refereed articles and review papers were included.

This process yielded a corpus of approximately 575 references, including duplications. These references were manually filtered on the basis of title and abstract to eliminate studies that were unambiguously out of scope.

The 63 surviving references were reviewed for relevance. In this process, regard was had both to a study’s primary research aims and any secondary or peripheral analyses undertaken. Additional references were identified from the reference lists of articles reviewed. Papers were considered potentially relevant if they related either directly or contextually to a research question, irrespective of whether or not they referred to sweet foods. Given the large number of research questions, the final elimination of references was undertaken for each research question separately rather than on the basis of a priori criteria derived literally from the research questions. This was done to guard against the premature elimination of references and to accommodate considerations that might emerge in the course of the review.

Thus, for example, three references were identified as potentially relevant to Research Question 3, which addresses the effects of fat-free claims on consumption of high-sugar foods. Two of the studies identified examined effects of claims on choice or preference of cookies – considered contextually relevant – but were subsequently eliminated because the comparison labels used were deemed inappropriate to the present research question. Engell et al. (1998) compared a “low fat” label with a “high fat” label [1], and Hrovat et al. (1994) compared a “low fat” label with a “no saturated fat” label [2]. Both comparisons are uninterpretable from the perspective of the research question, thus justifying their deletion.

A total of 4 references were considered relevant and are reported.

## 2.3 Search terms

Fat free claim  
Percent fat + claim/label  
Reduced fat + claim/label  
Low fat claim  
Low fat label + perception/choice/behaviour/consumer  
Fat + education  
Sweet snack + claim/label  
Candy + claim/label  
Confection  
Confectionary  
Sweet confection

## 2.4 Nutrition content claims in general

For broader reference, literature searches were conducted for references to nutrition content claims and associated notions and a second literature base assembled. These searches were filtered by subject area to eliminate overtly physiological, biomedical, chemical, food technology, and other out-of scope fields. No further systematic manual sorting was conducted. Search terms in this case were nutrition content claim, food content claim, and front-of-pack. Removal of duplicate records resulted in an unsorted bibliography of more 700 papers, which was selectively interrogated for supplementary or background information to the main search.

## 3 Assessment of research evidence by research question

### 3.1 Effect(s) of fat-free claims on consumers' nutrition and health perceptions of high-sugar foods

No evidence was found specific to high-sugar foods.

The evidence found relates to percent fat free claims on unspecified foods.

Gorton et al. (2010) reported a New Zealand survey of supermarket shoppers' (N = 1525) understanding and interpretation of a "97% fat free claim" on a representation of a food package [3]. They reported that, when asked, 46% of surveyed shoppers interpreted the claim as indicating that the food in question was definitely healthy. The proportions were substantially higher among people from Maori (66%), Asian (75%), and Pacific (55%) ethnic groups; among the group described as New Zealand European and Others, the figure was 36%. There was no effect of education level, except for a significant difference between people with a tertiary education (20%) and those with no secondary school qualification (36%). It should be noted that the data do not permit any conclusions about whether or not the effects for education level and ethnicity were related or independent. Paradoxically, the ethnic group with the highest prevalence of tertiary qualifications (Asians: 73%) was the worst performed on the healthiness perception task. The possibility that language played a part here cannot be ruled out. Other than that, there do not appear to be persuasive alternative explanations for the high prevalence of incorrect responses to the question whether a 97% fat free claim meant that a food was definitely healthy.

Study quality is judged to be moderate.

Conclusion: The findings provide evidence that a percent fat-free claim on a food package may be perceived by a substantial proportion of consumers to indicate that a food is healthy.

### 3.2 Effect(s) of fat-free claims on consumers' purchase behaviour in relation to high-sugar foods

No evidence was found specific to fat-free claims.

No evidence was found specific to high-sugar foods.

The evidence reported below refers to diverse fat-content claims in relation to unspecified food products.

Chan et al. (2005) reported a focus group study of 26 female and ten male participants recruited from the Illawarra region of New South Wales [4]. The authors acknowledge the limited generalisability in light of the self-selected participants' probable above-average interest in nutrition. In addition, the study had an overt focus on healthy eating. Products carrying the following fat claims were provided to participants for consideration: fat free, no fat, low fat, low in fat, lite, extra lite, 97% fat free, 92% fat free, 50% less fat and (presumably for comparison) the Heart Foundation Tick. Although most participants reported not believing

that fat claims were always truthful, some reported still relying upon such claims when shopping without checking against nutrition information panels.

Study quality is judged to be moderate. Although the focus group method can be considered particularly prone to eliciting socially desirable responses, greater credibility attaches to disclosures that are unlikely to be considered socially desirable. This adds some weight to participants' admissions about the possibly inappropriate use of fat-related claims.

Conclusion. The results of this study support the assumption that fat-related claims are used by some people in food purchasing decisions without reference to other information. No information specific to high-sugar foods is available.

### 3.3 Effect(s) of fat-free claims on consumers' consumption behaviour in relation to high-sugar foods

No evidence was found specific to fat-free claims.

The evidence reported relates to low-fat claims and high-sugar foods.

The research paper by Wansink & Chandon (2006) comprised a series of 3 experiments [5]. Study 1 reported that participants (N = 269) ate more (by a margin of 28%) of a novel-coloured sweet snack food (M&Ms) and underestimated its calorie content more (by a margin of 51 calories) when it was labelled "low fat" than when it was labelled "regular". The differences were more pronounced for overweight participants, who ate 47% more M&Ms when they were labelled low fat, than for normal-weight participants (16%). Some important aspects of the method are not described in sufficient detail and deserve comment. Participants attended in family groups and were assigned in those groups to one of two labelled gallon-sized bowls of M&Ms, from which they were invited to help themselves.

The findings of Study 1 are compromised by methodological issues. First, random assignment of individuals to experimental condition was clearly precluded, and there is no mention of any attempt at randomisation in the assignment of family groups. In addition, the fact that individuals were nested in family groups was not controlled for in the statistical analyses. This situation introduces the possibility of bias of the kind that randomisation procedures are designed to guard against; although there is no reason to expect it necessarily to bias results in a specific direction, it has to reduce confidence in findings. Indeed, one might ask whether this study would have been published had the findings gone against hypothesis. The sizes of the differences observed between groups and the consistency of results with those of Studies 2 and 3 provide some grounds for confidence in the robustness of findings. These factors, together with the psychological plausibility of the findings, add to the credibility of Study 1.

Study quality is judged to be low to moderate on the information provided.

In Study 2, research participants (N = 74) rated 10 oz. of M&Ms and 10 oz. of granola, both labelled either 'low fat' or 'regular'. Within the 2 groups, the sequence of ratings of the foods was "systematically rotated ...to avoid an order bias". As in Study 1, there is no mention of random assignment. The 'low fat' labels attracted lower estimates of calorie content (by a margin of 260 calories), higher estimates of appropriate serving size (by a margin of 25%), and lower ratings of anticipated guilt on consumption of a 2 oz. portion. The researchers concluded "(1) Low-fat labels decrease the perception of calorie density, (2) low-fat labels increase the perception of the appropriate serving size, and (3) low-fat labels make people feel less guilty about how much they eat" (p.610). Given that participants did not eat the foods, point 3 is not justified: participants rated anticipated guilt only. Study quality is judged to be moderate.

Study 3 reported that a "low fat" (vs. "regular") label increased the amount of granola consumed (by a margin of approximately 48% or 74 calories) by university staff and students (N = 210) attending a mock movie-judging in a theatre. In a 2 x 3 design, an accompanying serving-size label stating "contains 2

servings” reduced the amount consumed relative to no label and a label stating “contains 1 serving”, essentially nullifying the effect of a “low-fat” label in normal-weight but not overweight participants. The findings for the low-fat label support those of Study 1 with a different snack under different sampling conditions and with less public scrutiny. Importantly, the use of labelled packaging makes these findings more directly relevant as a guide to reactions to manufacturers’ nutrition claims. The study had no obvious deficiencies, though again there was no mention of random assignment. Again, more methodological detail would have been useful, if only to indicate what measures were taken to guard against possible contamination effects in a study that ran for many weeks in a university community.

Study quality is judged to be moderate.

Conclusion: The research reported by Wansink & Chandon (2006) provides evidence that a “low-fat” claim on a sweet food, in comparison to a “regular” label, may encourage increased consumption and perceptions supportive of increased consumption: namely, that energy content is lower, permissible serving sizes are greater, and guilt associated with consumption is less [5]. The perceptual data should be interpreted as part of a pattern of responding and not as revealing the mental processes underlying increased consumption.

Taken together, the findings provide evidence that a “low fat” label on a sweet food may trigger a lowering of psychological inhibitions towards consumption and an increase in the amount consumed.

### 3.4 Effect(s) of fat-free claims on consumers’ nutrition and diet outcomes in relation to high-sugar foods

No evidence was found specific to fat-free claims.

As noted above, Wansink & Chandon (2006) reported that

- attendees at a university induction ate more M&Ms to the tune of 54 calories overall – 90 calories in the case of overweight people – when they were labelled “low fat”
- participants given a “low-fat” labelled bag of granola consumed an average of 74 more calories in the course of a 75-minute screening in a cinema [5].

No determinations can be made about longer-term nutritional outcomes.

Conclusion: The findings provide evidence that, relative to a “regular” label, a “low-fat” label on a sweet food may lead to an increase in the amount of energy consumed.

### 3.5 Effect(s) of education campaigns, when used in combination with fat-free claims, on perceptions, purchase and consumption behaviours in relation to high-sugar foods

No evidence was found specific to fat-free claims.

No evidence was found specific to high-sugar foods.

The only evidence found for use of an education campaign or related promotion in conjunction with labelling was a study by Neiderdeppe & Frosch (2009) [6]. This documented how media coverage of trans fats was associated with a greater reduction in sales of 2 of 7 monitored products containing trans fats following the introduction of legislation requiring these products to be labelled. The study was limited by data availability, raising questions of the representativeness of the products and sources monitored and the possibility of undetected shifts in consumption between products. Whereas this study may indicate the potential of a media campaign in conjunction with a simple labelling scheme to influence consumer behaviour in the short term, its relevance to the present question should not be assumed. Alerting consumers to the need to avoid trans fats involves a much simpler message than that assumed by the present research question.

This study is mainly of value as an illustration of the difficulties involved in evaluating the combined effects of publicity and a complementary mandatory labelling scheme, which is likely to present a simpler challenge than evaluating an education campaign advocating the conditional disregarding of a permitted nutrient content claim for certain products.

Conclusion: No evidence was found for the effects of education campaigns under the conditions described in the research question, and evidence of that kind would be difficult to establish.

### 3.6 Effect(s) of disclaimers, when used in combination with fat-free claims, on perceptions, purchase and consumption behaviours in relation to high-sugar foods

No evidence was found specific to fat-free claims.

The study by Wansink & Chandon (2006) found that an accompanying serving-size label stating “contains 2 servings” was able to reduce the effect of a “low-fat” label on the amount of granola consumed relative to no label and one stating “contains 1 serving”. The reduction was less in overweight than normal-weight participants [5].

Conclusions: The findings provide evidence that serving-size information may reduce the effect of a “low-fat” label on the amount consumed of a packaged sweet food.

### 3.7 Effect(s) of prohibitions against fat-free claims on perceptions, purchase and consumption of high sugar foods when the claims were previously legal

No evidence was found specific to fat-free claims.

No evidence was found specific to high-sugar foods.

Conclusions: No evidence was found for the effects of prohibitions under the conditions described in the research question

## 4 Discussion

### 4.1 Terminology, assumptions, and interpretation

A review of the peer-reviewed literature revealed very few studies directly relevant to the research questions. Only one study examined reactions to claims including the term “fat free” specifically and in isolation. Some aspects of the research reported require consideration of the implications of differences in research manipulations and associated terminology.

#### 4.1.1 FAT FREE AND LOW FAT

The only experimental evidence in relation to consumption and perceptions relates to low fat labels. Despite the difference in terminology, “low fat” was considered functionally equivalent to “percent fat free”. Like the latter, it signifies the substantial absence of fat without drawing particular attention to the amount of fat remaining. To the extent that a low-fat claim is likely to be weaker in connoting healthiness than a fat-free claim [7], any effects are likely to be underestimated relative to the latter.

#### 4.1.2 COMPARISON CONDITIONS

An important consideration also was the comparison condition used. “High fat” was deemed an inappropriate comparison for reasons of both external and internal validity, but “regular” was considered acceptable as it is both a commonly-used descriptor (external validity) and, in denoting a default state, likely to be innocuous in its influence on responses (internal validity).

#### 4.1.3 CLAIMS AND LABELS

Results are reported for both claims and labels. The term “claim” is used when it is clear from the report of a study that the nutrition content information was incorporated into actual or simulated commercial packaging; “label” is used in all other cases. “Claims” and “labels” are assumed to be functionally equivalent.

#### 4.1.4 A NOTE ON THE INTERPRETATION OF SOCIAL RESEARCH

The incompleteness of reporting identified in the review of Wansink & Chandon (2006) reflects a common failing of the peer review system in relation to social and behavioural research published in nutrition, public health, and marketing journals. There is considerable further scope for misinterpretation of research data, largely as a consequence of the way in which research results are summarised. A common problem is statements of the kind “consumers are sceptical about industry claims” where a qualified reference to “some consumers” would be more accurate. In the absence of the qualifier “some”, these statements are often interpreted uncritically as statements of universal fact. From there, it is a small inferential step to assumptions of the kind “industry claims cannot really mislead because consumers are sceptical”. Similarly, data identifying factors like taste and cost as barriers to the purchase of low-fat foods [4, 8] quickly become evidence that taste and cost are “more important” than low fat and misread as evidence against the ability of low-fat and associated claims to influence purchase or consumption decisions. Such exaggerations and

errors of logic are endemic in consumer and health research. The interpretations in this review are based on an assessment of the data and may not accord in all cases with the researchers' or other authors' interpretations of what the data mean.

## 4.2 Effect(s) of fat-free claims on consumers' nutrition and health perceptions, purchase and consumption behaviours, and nutritional outcomes in relation to high-sugar foods

### 4.2.1 PERCEPTIONS AND CONSUMPTION

Findings of the review support the conclusion that percent fat-free claims and low-fat labels are capable of influencing consumers' perceptions of the healthiness or energy content of products. Data from New Zealand indicated that substantial proportions – ranging from 36% to 75% according to ethnicity – of a sample of supermarket shoppers surveyed interpreted a “97% fat free claim” as denoting that a food was healthy [3]. Data from the USA indicated that confectionary and granola labelled “low fat” attracted lower estimates of calorie content (by a margin of 260 calories), higher estimates of appropriate serving size (by a margin of 25%), and lower ratings of anticipated guilt on consumption that when labelled “regular”. In a related study, research participants who were offered confectionary (M&Ms) labelled “low fat” consumed substantially more (28% or 54 calories) than those offered the same confectionary labelled “regular”. The effects of a “low-fat” label on both the amount consumed and the underestimation of calorie content were more pronounced in overweight than normal-weight participants. In a third study involving a sweet “utilitarian” food, participants given granola labelled “low fat” consumed almost 50% more (90 calories) than those whose granola was labelled “regular”[5].

The conclusion from this part of the review is that a claim signifying the substantial absence of fat is likely to

- be perceived by some – possibly many – consumers as indicating that the food is healthy
- encourage increased consumption and perceptions supportive of increased consumption: namely, that energy content is lower, permissible serving sizes are greater, and guilt associated with consumption is less.

Taken together, the findings provide evidence that a low fat label on a sweet food may trigger a lowering of psychological inhibitions towards consumption, including an increase in the amount consumed. Note that the perceptual effects should be interpreted as part of a pattern of responding and not as revealing the mental processes underlying increased consumption. That is, it should not be concluded that perceptions of energy content, permissible serving size, and anticipated guilt precede and are the reason for increased consumption. Nor should it be presumed that challenging these perceptions is what is needed to reduce the likelihood of increased consumption.

The effects reported for perceptions and consumption are consistent with current knowledge of human decision processes, whether described in terms of halo effects [9], theories of cognitive economy [10], or dual-process models of decision making [11]. These explanatory frameworks all acknowledge the high reliance of human decision making on superficial cues and rapid processing, guided by affective associations [12, 13] or decision-making short-cuts (heuristics) [14]. The commonsense representation of humans as fundamentally logical information-processors is not consistent with psychological evidence.

## **4.2.2 PURCHASE DECISIONS**

Although no study examined the effects of fat-free and associated claims on purchase decisions in relation to high-sugar foods, such decisions must be considered to be subsumed by the evidence for consumption. In other words, financial resources permitting, the lowering of inhibitions towards consumption can be expected to apply to purchase decisions. Accounts from Australian focus group participants, although not referring specifically to high-sugar foods, support the conclusion that low-fat claims can influence purchase decisions, be interpreted as a licence to consume more, and indeed lead to increased consumption [4].

Research conducted by Food Standards Australia New Zealand reports the acknowledgement amongst consumers of the influence of nutrition claims on purchase decisions [15] and identifies fat content as a salient issue in the accounts of food purchasing decisions provided by many consumers in Australia and New Zealand [15, 16], including a purchase preference for the lower-fat option when two products are of equal price [17]. This influence was not evident in subsequent experimental research commissioned by FSANZ, in which participants responded, via telephone survey, to questions about convincing mock-ups of food packages previously posted to them [18]. Claims of “reduced fat” and “low in saturated fat” on a sweet biscuits package and “97% fat free” on a breakfast cereal package did not significantly influence ratings of intention to purchase. Although the packaging used as stimulus in this FSANZ study was arguably more lifelike than those in the other studies reviewed, the more protracted procedure and its associated lack of spontaneity cast doubt on the relevance of these findings to everyday food purchases.

## **4.2.3 NUTRITIONAL OUTCOMES**

Nutritional outcomes can be considered from a number of perspectives. One possible question is whether increases in consumption of high-sugar foods in response to a fat content claim are likely to be significant or sustained.

### **4.2.3.1 Single-occasion increases in consumption**

The single-occasion increases in consumption reported by Wansink & Chandon are clearly not trivial [5]. This might not be important, of course, if it could be assumed that participants adjusted their subsequent intake to compensate for any overconsumption. Research comparing the effects of low-fat- and high-fat-labelled preloads on how much a sample of women subsequently ate, though not directly relevant, does not support this assumption [19]. Although it cannot be established whether the effect observed was due to increased subsequent consumption among those who thought their preload was low-fat, reduced subsequent consumption among those who thought their preload was high-fat, or both, the findings are indicative of the power of people’s perceptions of how much they have already eaten to influence how much more they eat. There are no grounds to assume that an increase in energy intake in response to a low-fat claim will be offset by a corresponding reduction in subsequent energy intake.

### **4.2.3.2 Cumulative effects of increased consumption**

Consideration of nutritional outcomes might also refer to the cumulative effects of increased consumption as a result of exposure to misleading claims. Although there is evidence from longitudinal research associating relatively small differences in diet with differences in weight gain over the course of several years [20], establishing a direct association between misleading labels and measurable long-term health or dietary consequences is beyond the reasonable scope of epidemiological methods.

### **4.2.3.3 Effects on dietary choices**

Whereas public health initiatives devote much attention to promoting healthy dietary choices, it is clear from the studies reviewed that low-fat labels can promote poor dietary choices. Dietary behaviour is the product of continual decision processes, and arguments for mandated front-of-pack labelling schemes to assist people to make healthy choices are equally relevant to the case for addressing systematic

impediments to such choices. The evidence for the effects of low-fat labels on single-occasion consumption is relevant here.

### 4.3 Effect(s) of education campaigns and disclaimers, in combination with fat-free claims, on perceptions, purchase and consumption behaviours in relation to high-sugar foods

The direct evidence for education campaigns is insufficiently strong and that for disclaimers insufficiently general to warrant serious consideration of these options in this case. Wansink & Chandon (2006) found that serving size information moderated the tendency for a low-fat label to be associated with increased consumption [5]. The use of serving-size information as a disclaimer cannot be recommended as a general strategy, however, because it addresses recommended consumption levels but not product choice. Moreover, serving-size information should not be expected to influence consumption of products consumed in the absence of the packaging. In other words, the relevance of a disclaimer of this kind to a nutrition content claim is difficult to justify in principle.

Secondly, a disclaimer of any kind adds to the cognitive load for consumers. This applies to education campaigns designed to make consumers question nutrition claims under specified conditions as well as to on-pack information with the same aim. Whereas a nutrition content claim can cater to humans' reliance on relatively superficial cues and simple heuristics involving little cognitive processing, disclaimers and education campaigns require a more analytical form of processing that is more demanding on cognitive resources. This is a distinction between a rapid, relatively spontaneous approach to choosing foods and a slower, more considered approach. Addressing the perceived potential of a nutrition content claim to mislead consumers by requiring them to engage a more effortful processing style is to put the intervention at a disadvantage relative to the problem. Moreover, encouraging consumers to question or dismiss some claims is inconsistent with the capacity of regulation to promote confidence in higher-level claims. In short, education campaigns and disclaimers cannot be recommended as responses to the potential for consumers to be misled by nutrition content claims on sweet foods.

### 4.4 Effect(s) of prohibitions against fat-free claims on perceptions, purchase and consumption of high sugar foods when the claims were previously legal

Although no evidence was found for the effects of prohibitions, this question is worth discussing in more detail. This is because the question whether the removal of a claim previously allowed would result in a change in perceptions and behaviour has different implications depending on whether it is considered at the individual level or the community level.

#### 4.4.1 CHANGING BEHAVIOURS PREVIOUSLY INFLUENCED

At the intra-individual level, the thrust of the question is whether perceptual and behaviour patterns previously influenced by a claim might prove resistant to change if the claim ceased to exist. In other words, will a consumer who has been influenced by a claim continue to react to a product in the same way

if the claim is no longer present? This is a question to which an answer is unlikely to be readily available in the absence of an expensive longitudinal study, though a qualitative study might provide some insight.

#### **4.4.2 REDUCING COMMUNITY INCIDENCE**

At the community level, the primary focus might shift away from that of changing the behaviours of previously influenced individuals onto achieving behaviour change in the community, such as might be reflected in sales data before and after a change in labelling laws. This focus is in line with preventative public health approaches where reducing the incidence of a behaviour may be the aim rather than individual behaviour change.

In short, interventions to change existing behaviours should not be confused with interventions with the aim of reducing the incidence of a behaviour. Where there is a concern that fat-free claims inappropriately influence some consumers' purchase or consumption decisions in relation to high-sugar foods, a question for the Authority to consider is whether limiting the opportunity for people to be influenced is a valid aim in its own right.

When the question is framed in terms of limiting the scope for inappropriate influence, the findings of Gorton et al. in relation to perceptions [3] and Wansink & Chandon in relation to consumption [5] become relevant. They indicate that "percent fat-free" claims are prone to misinterpretation as cues to healthiness and the labelling of sweet foods as low in fat encourages an unjustified lowering of inhibitions towards consumption. The possibility that some or even all individuals who were previously influenced may not subsequently modify their behaviours is a separate question to which the answer is not readily apparent.

## References

1. Engell, D., et al., Effects of information about fat content on food preferences in pre-adolescent children. *Appetite*, 1998. 30(3): p. 269-282.
2. Hrovat, K.B., et al., The new food label, type of fat, and consumer choice. A pilot study. *Archives of family medicine*, 1994. 3(8): p. 690-5.
3. Gorton, D., et al., Interpretation of two nutrition content claims: a New Zealand survey. *Australian and New Zealand Journal of Public Health*, 2010. 34(1): p. 57-62.
4. Chan, C., C. Patch, and P. Williams, Australian consumers are sceptical about but influenced by claims about fat on food labels. *European Journal of Clinical Nutrition*, 2005. 59(1): p. 148-151.
5. Wansink, B. and P. Chandon, Can "Low-Fat" nutrition labels lead to obesity? *Journal of Marketing Research*, 2006. 43(4): p. 605-617.
6. Niederdeppe, J. and D.L. Frosch, News coverage and sales of products with trans fat: effects before and after changes in federal labeling policy. *American Journal of Preventive Medicine*, 2009. 36(5): p. 395-401.
7. Drewnowski, A., et al., Testing consumer perception of nutrient content claims using conjoint analysis. *Public Health Nutrition*, 2010. 13(5): p. 688-694.
8. Food Labelling Issues: A Qualitative Consumer Study Related to Nutrient Content Claims on Food Labels, 2001.
9. Cooper, W.H., Ubiquitous halo. *Psychological Bulletin*, 1981. 90(2): p. 218-244.
10. Cacioppo, J.T. and R.E. Petty, The need for cognition. *Journal of Personality and Social Psychology*, 1982. 42(1): p. 116-131.
11. Epstein, S., et al., Individual differences in intuitive-experiential and analytical-rational thinking styles. *Journal of Personality and Social Psychology*, 1996. 71(2): p. 390-405.
12. Slovic, P., et al., Risk as analysis and risk as feelings: Some thoughts about affect, reason, risk, and rationality. *Risk Analysis*, 2004. 24(2): p. 311-322.
13. Zajonc, R.B., Feeling and thinking: Preferences need no inferences. *American Psychologist*, 1980. 35: p. 151-175.
14. Kahneman, D., P. Slovic, and A. Tversky, *Judgment under uncertainty: Heuristics and biases*, 1982.
15. Australia New Zealand Food Authority, *Food Labelling Issues - Consumer Qualitative Research*. 2001.
16. Food Standards Australia New Zealand, *Consumer Attitudes Survey 2007: A Benchmark Survey of Consumers' Attitudes to Food Issues*, 2008.
17. Food Standards Australia New Zealand, *Food Labelling Issues: A Qualitative Consumer Study Related to Nutrient Content Claims on Food Labels*, 2003.
18. Roy Morgan Research, *An investigation into the impact of nutrition content claims on packaging in relation to consumer purchase intention, nutrition attitude and health benefits*, 2008.
19. Shide, D.J. and B.J. Rolls, INFORMATION ABOUT THE FAT-CONTENT OF PRELOADS INFLUENCES ENERGY-INTAKE IN HEALTHY WOMEN. *Journal of the American Dietetic Association*, 1995. 95(9): p. 993-998.
20. French, S.A., et al., Pricing and promotion effects on low-fat vending snack purchases: The CHIPS study. *American Journal of Public Health*, 2001. 91(1): p. 112-117.

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