

# Nutrition-related claims on children's cereals: what do they mean to parents and do they influence willingness to buy?

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## Abstract

*Objective:* To examine parents' beliefs about the meaning of common front-of-package nutrition-related claims on children's cereals and determine whether the claims would make them more willing to buy the cereals.

*Design:* Parents viewed images of box fronts for children's cereals of below-average nutritional quality, as assessed by a validated nutrient profiling model. These boxes featured various nutrition-related claims including 'supports your child's immunity', 'whole grain', 'fibre', 'calcium and vitamin D' and 'organic'. Participants were provided possible meanings for these claims and asked to select any that applied with the option to write in additional meanings. They also indicated how the claim would affect their willingness to buy the product.

*Setting:* Online survey.

*Subjects:* Parents with children between the ages of 2 and 11 years ( $n$  306) recruited through an online panel.

*Results:* The majority of parents misinterpreted the meaning of claims commonly used on children's cereals. They inferred that cereals with claims were more nutritious overall and might provide specific health-related benefits for their children; and these beliefs predicted greater willingness to buy the cereals.

*Conclusions:* These findings indicate that common front-of-package nutrition-related claims are potentially misleading, especially when placed on products with high levels of nutrients to limit (e.g. sugar, sodium) and low levels of other nutrients to encourage (e.g. fibre, protein). Additional regulation is needed to protect consumers in the USA.

**Keywords**  
Health claims  
Front-of-package labels  
Food marketing  
Child health

Selling nutrition is big business. In the USA, sales of foods with nutrition claims totalled more than \$US 100 billion in 2009<sup>(1)</sup>, yet many of these products are of questionable overall nutritional quality. For example, 95% of cereals marketed to children in the USA feature at least one nutrition-related message and average 3.1 such messages per box<sup>(2)</sup>. These messages typically describe beneficial nutrients contained in the cereal (e.g. calcium, whole grains and vitamins). However, the average children's cereal also consists of 35% added sugar by weight and 553 mg Na/100 g<sup>(2)</sup>. In fact, these cereals contain 85% more sugar, 60% more Na and 65% less fibre than those marketed to adults.

In the USA, the Food and Drug Administration (FDA) is responsible for regulating claims on food packaging<sup>(3)</sup>. The majority of claims on food labels in grocery stores are classified by the FDA as 'nutrient content claims'<sup>(4)</sup>. These claims describe beneficial levels of a nutrient in the food (e.g. 'good source', 'low in'), compare the level of a nutrient to levels in other foods (e.g. 'more', 'light'), or describe the food as 'healthy'. An additional 10% of claims are classified as either 'structure/function claims'

or 'health claims' by the FDA. Structure/function claims describe a nutrient's effect on a bodily structure or function (e.g. bones, digestion), and health claims directly present 'a relationship between a substance and a disease or health-related condition' (e.g. 'diets low in sodium may reduce the risk of high blood pressure')<sup>(3)</sup>. The FDA has established different recommendations and requirements for each of these types of claim<sup>(3)</sup>. Recommendations for nutrient content claims indicate the minimum level of a beneficial nutrient and the maximum level of a nutrient to limit to support specific claims. The FDA does not provide specific recommendations for structure/function claims but requires that they not be false or misleading<sup>(4)</sup>. Health claims face the most rigorous requirements, including significant scientific evidence to support the health outcomes claimed and approval by the FDA.

Nutrition experts express concern that the proliferation of nutrition-related claims on product packaging is confusing to consumers, makes it difficult to accurately assess overall nutritional quality, and can be misleading<sup>(4-9)</sup>. Nutrient content claims that comply with FDA guidelines

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may also implicitly convey product benefits that are not directly stated, including overall product nutrition and health-related outcomes from consuming the product. For example, a product that contains at least 10% of the 'referenced amount customarily consumed' (RACC) of B-vitamins may feature a claim that it is a 'good source of B-vitamins'. This same product could also contain high levels of nutrients to limit (e.g. added sugar, sodium) and low levels of other beneficial nutrients (e.g. protein, fibre); however, closer scrutiny of the nutrition facts panel is required to obtain this information and accurately assess the overall nutritional quality of the product. As a result, although the claim refers only to the amount of B-vitamins contained in the product, consumers might incorrectly infer that the product is nutritious, more nutritious than other similar products, and/or conveys specific health benefits (e.g. boosts energy). Prior research shows that nutrition-related claims do increase perceived overall healthfulness of foods<sup>(8)</sup>. In addition, marketing messages such as these that indirectly convey product benefits through inferences made by consumers about message meaning can be more persuasive than direct communication of product benefits<sup>(10)</sup>. Therefore, consumers may be even more likely to buy a cereal with a claim that merely implies nutritional quality and/or health benefits (i.e. 'good source of B-vitamins') than if it explicitly states that the product is nutritious or boosts one's energy.

The US General Accountability Office (GAO) concludes that consumers do not understand the distinctions between the types of claim specified by the FDA nor the requirements for different types of claim<sup>(4)</sup>. In particular, the GAO noted that structure/function claims may be especially appealing to consumers and suggest similar benefits as health claims, but they do not require the rigorous scientific proof needed to make the specific health claim inferred by consumers. Most consumers, however, are unlikely to understand that structure/function claims are not regulated by the government in the same way as health claims.

As a result, the common practice of featuring nutrition-related claims on cereals, especially on children's cereals that also contain high levels of sugar and/or sodium, raises public health concerns. These claims might lead consumers to believe that the products are nutritious breakfast options and/or healthier than other similar products. We hypothesized that nutrition-related claims that commonly appear on children's cereals would also: (i) lead parents to infer additional health-related product benefits for their children; and (ii) make them more willing to buy these products.

## Methods

Participants were recruited online through Survey Sampling International (SSI), a market research company that maintains a representative panel of US adults who have

agreed to participate in survey research<sup>(11)</sup>. Panel members receive small rewards for being on the panel, but do not receive compensation for completing individual surveys. SSI invited qualified panel members (i.e. parents with children aged 2–11 years) to participate by sending an email with a link to the online survey. Interested panellists agreed to participate by clicking on the link and providing informed consent. All procedures were approved by Yale University's Human Subjects Committee. In the survey, participants viewed images of box fronts from existing children's cereals that featured nutrition-related claims. These claims were chosen from those that appeared frequently on children's cereals in 2009, including a claim that the cereal 'supports your child's immunity' due to antioxidants and vitamins, as well as 'whole grain', 'fibre', 'calcium and vitamin D' and 'organic' claims. The specific cereals were chosen to represent the least nutritious products that utilized these claims. In prior research, the nutritional quality of the products was assessed using a nutrient profiling model that has been validated to reflect the judgement of nutrition professionals and is currently used to identify nutritious foods that are appropriate to advertise to children on television in the UK<sup>(2)</sup>. The selected cereals ranked in the bottom half of all cereals according to the nutrient profiling model due primarily to high levels of sugar; some also contained high levels of sodium and/or low levels of fibre.

Participants viewed several possible statements (presented in random order) to describe potential meanings for each claim, including meanings about nutrient content, potential effects of the nutrient on their children's health and overall cereal nutritional quality. Potential meanings included those identified in previous research<sup>(4–8)</sup>, as well as suggestions from the research team and other researchers who study food marketing and nutrition. Participants were asked to select any meanings that applied, with the option to write in additional meanings. Participants also indicated whether the claim would increase, decrease or have no effect on their willingness to buy the cereal. Additionally, parents provided demographic information and indicated on a 7-point scale how much they trust front-of-package labels. Participants evaluated three of five cereals selected randomly. We utilized binary logistic regression models to assess the relationship between parents' beliefs about claim meanings and whether they indicated that the claim made them more willing to buy the cereal, controlling for demographics and for trusting front-of-package labels. This analysis was performed using the SPSS statistical software package version 17.0 (SPSS Inc., an IBM Company, Chicago, IL, USA).

## Results

A total of 306 parents completed the survey; 67% had at least one child of pre-school age (2–5 years) and 81% had

at least one child of primary school age (6–11 years). The sample was predominantly white (83%). Approximately one-third (30%) held a 4-year college degree or higher; 48% had completed some college or held a 2-year college degree; and 21% held a high-school degree or equivalent. Parents reported moderate levels of trust in front-of-package labels (mean 3.7, SD 1.6). Table 1 presents nutrition information about individual cereals and participants' agreement with possible label meanings. Parents were most likely to believe that nutrition-related claims meant 'it's important for children to eat enough [nutrient]' (average 59% agreement for all claims) and the cereal 'contains higher levels of [nutrient] than other brands of children's cereal' (44% agreement). Beliefs about possible effects on child health outcomes were generally lower, although 80% indicated that the 'calcium and vitamin D' claim meant the cereal might help their child grow strong bones and 74% believed that the 'antioxidants and vitamins' (i.e. immunity) claim meant it might keep their child from getting sick. For all claims but organic, approximately half of participants indicated the claim would make them more willing to buy the cereal. Only the organic claim would make a sizeable number of parents less willing to buy; as explanation, 30% wrote in that organic cereals are too expensive.

Parents who indicated that the claims increased their willingness to buy the cereals were significantly more trusting of front-of-package labels ( $P < 0.001$  for all claims except organic). After controlling for trust in labels, self-reported greater willingness to buy the cereal was significantly related to beliefs about health-related outcomes and/or overall nutritional quality meanings for all claims (Table 2). Greater willingness to buy was related to three or more such beliefs each for the cereals with immunity, calcium/vitamin D and organic claims. Beliefs about nutrient and other non-health-related claim meanings also predicted greater willingness to buy. However, for most claims, greater willingness to buy was related to more inferred beliefs about health-related benefits and overall nutritional quality than to beliefs about nutrient content or other benefits.

## Discussion

Our results indicate that nutrition-related claims do have the potential to mislead a significant proportion of consumers in two ways: (i) consumers inferred that the products presented were more nutritious than other cereals, even though these products were below average in overall nutritional quality according to the nutrient profiling model; and (ii) they inferred that claims had broader meanings than their literal interpretation. These potentially inaccurate inferences, including that the cereals might improve health-related outcomes and are more nutritious choices, appear to be especially persuasive.

Belief in these inferred meanings tended to predict greater willingness to buy more often than beliefs about specific nutrient content. Consumers indicate that they do not always believe nutrition claims<sup>(12)</sup>; however, we found little scepticism about the specific claims examined in the present study, and only the organic claim would make consumers less willing to buy the product.

These results highlight the high degree of consumer confusion about the meaning of different types of claim as defined by the FDA. For example, General Mills' nutrient content claim, 'good source of calcium and vitamin D', was widely interpreted as a structure/function claim ('grows strong bones'). Similarly, Kellogg has argued that 'immunity' is a structure/function claim; but most consumers interpreted it as a health claim (i.e. 'keeps my child from getting sick'). In addition, half of respondents believed that General Mills' 'whole grain guaranteed' claim meant that the cereal contains more whole grains than other brands of children's cereals (i.e. a nutrient content claim). However, 'guaranteed' is not considered a nutrient content claim according to the FDA<sup>(3)</sup>. Of note, General Mills had requested approval from the FDA to make a specific nutrient content claim about the level of whole grains in their products, but the request was denied<sup>(13)</sup>.

A limitation of the present study is that participants might have held pre-existing attitudes about the cereals' benefits that influenced their responses. However, we used the least nutritious products that featured claims to minimize the influence of existing beliefs that the products are generally nutritious. In addition, this design increases ecological validity of the findings as parents might encounter these actual cereals with these claims in the supermarket. Future research could examine whether familiarity with products and their perceived benefits, in the absence of claims, affect perceived claim meaning. Another limitation is that we did not measure actual purchasing behaviours and thus cannot determine whether participants' stated greater willingness to buy cereals with nutrition-related claims would increase their actual purchases of the products. Experimental studies that measure differences in cereal purchases for products with and without the claims are needed to determine causal effects of such claims on product sales. However, the main purpose of the study was to assess consumers' interpretation of the meanings of these claims and not to measure effects on product sales. Finally, the use of an online survey panel may limit the generalizability of these findings to individuals who have Internet access and have chosen to participate in the panel; as a result, participants were disproportionately white and well-educated. However, previous research has shown that education level does not predict understanding of front-of-pack labels; perceived nutritional knowledge (which is not associated with educational level) is more important<sup>(14)</sup>.

These findings highlight the need for increased regulation of all nutrition-related claims on product packaging in

**Table 1** Children's cereals with nutrition-related claims, perceived meaning of claims, and stated effect of claims on willingness to buy the cereal

|                                                                                                                                                                      | Immunity‡<br>(n 187)<br>% | Whole grain§<br>(n 214)<br>% | Fibre  <br>(n 200)<br>% | Calcium/vitamin D¶<br>(n 202)<br>% | Organic††<br>(n 208)<br>% |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------|------------------------------|-------------------------|------------------------------------|---------------------------|
| Cereal content                                                                                                                                                       | Cocoa Krispies            | Lucky Charms                 | Froot Loops             | Cinnamon Toast Crunch              | Koala Crisp               |
| Sugar (% of total g of cereal by weight)                                                                                                                             | 39                        | 41                           | 41                      | 33                                 | 37                        |
| Na (mg/100g)                                                                                                                                                         | 484                       | 704                          | 466                     | 710                                | 333                       |
| Fibre (% of total g of cereal by weight)                                                                                                                             | 3                         | 4                            | 10                      | 3                                  | 7                         |
| Overall nutritional quality (0–100 scale)‡‡                                                                                                                          | 40                        | 36                           | 38                      | 36                                 | 50                        |
| Cereal characteristics questions: 'What do you think this label means about the cereal? This cereal...' (% selecting the meaning)                                    |                           |                              |                         |                                    |                           |
| A1. 'Has been reformulated'                                                                                                                                          | 48                        | 27                           | 53                      | 24                                 | 7                         |
| A2. 'Contains higher levels of [nutrient] than other brands of children's cereal'                                                                                    | 49                        | 50                           | 46                      | 52                                 | 25                        |
| A3. 'Is probably lower in calories than other brands of children's cereal'                                                                                           | 9                         | 8                            | 7                       | 6                                  | 21                        |
| A4. 'Is probably healthier than other brands of children's cereals'                                                                                                  | 29                        | 27                           | 24                      | 28                                 | 44                        |
| A5. 'Is healthy because it contains [nutrient]'                                                                                                                      | 38                        | 38                           | 30                      | 36                                 | 50                        |
| Child health benefits questions: 'How do you think the [nutrient] in this cereal will affect your child? This cereal may help my child...' (% selecting the meaning) |                           |                              |                         |                                    |                           |
| B3. 'Grow strong bones'                                                                                                                                              | 28                        | 17                           | 13                      | 80                                 | 19                        |
| B4. 'Control his/her weight'                                                                                                                                         | 14                        | 29                           | 27                      | 9                                  | 30                        |
| B2. 'Feel fuller for longer'                                                                                                                                         | 13                        | 60                           | 64                      | 15                                 | 22                        |
| B1. 'Keep from getting sick'                                                                                                                                         | 74                        | 11                           | 9                       | 15                                 | 28                        |
| Cereal benefits questions: 'What does the [nutrient] label make you think about this cereal in general?' (% selecting the meaning)                                   |                           |                              |                         |                                    |                           |
| C1. 'This cereal would be part of a healthy breakfast for my child'                                                                                                  | 39                        | 46                           | 37                      | 42                                 | 53                        |
| C2. 'When my child doesn't eat enough fruits and vegetables, the [nutrient] can help make up for it'                                                                 | 24                        | 10                           | 18                      | 14                                 | 12                        |
| C3. 'It's important for children to eat enough [nutrient]'                                                                                                           | 65                        | 64                           | 73                      | 70                                 | 25                        |
| Willingness to buy: 'How would the label affect your decision to buy the cereal?'                                                                                    |                           |                              |                         |                                    |                           |
| More willing                                                                                                                                                         | 46.0                      | 48.6                         | 50.0                    | 48.0                               | 28.4                      |
| Less willing                                                                                                                                                         | 3.7                       | 2.3                          | 2.5                     | 2.0                                | 17.8                      |
| No difference                                                                                                                                                        | 50.3                      | 49.1                         | 47.5                    | 50.0                               | 53.8                      |

‡Specific claim: 'Now helps support your child's IMMUNITY – 25% daily value of antioxidants & nutrients, Vitamins A, B, C & E'.

§Specific claim: 'with Whole Grain Guaranteed'.

||Specific claim: 'Now provides Fibre – a great way to keep kids healthy'.

¶Specific claim: 'Good source of Calcium & Vitamin D'.

††Specific claim: 'Organic'.

‡‡According to nutrition profiling index scores<sup>(2)</sup>. Scores for all cereals range from 30 to 82 (mean 53.2, sd 11.7). Cocoa Krispies, Lucky Charms, Froot Loops and Cinnamon Toast Crunch scores fall in the bottom 15% of all cereals.

**Table 2** Binary logistic regression analyses to predict that the claim would make parents more willing to buy the cereal†

|                                                                              | Immunity<br>OR | Whole grain<br>OR | Fibre<br>OR | Calcium/vitamin D<br>OR | Organic<br>OR |
|------------------------------------------------------------------------------|----------------|-------------------|-------------|-------------------------|---------------|
| <b>Beliefs about overall nutritional quality and health-related outcomes</b> |                |                   |             |                         |               |
| A4. Healthier than other cereals                                             | 4.80***        | 2.37**            | 1.92        | 6.06***                 | 1.40          |
| A5. Healthy because contains [nutrient]                                      | 1.78†          | 1.52              | 2.52*       | 2.70**                  | 2.26*         |
| B1. Keeps child from getting sick                                            | 2.00†          | 2.92*             | 2.31        | 2.09                    | 2.03*         |
| B3. Grows strong bones                                                       | 2.65*          | 1.33              | 1.32        | 2.66*                   | 1.9           |
| C1. Part of healthy breakfast                                                | 1.99*          | 1.59              | 1.77        | 1.69                    | 1.12          |
| C2. Makes up for fruits and vegetables                                       | 3.04***        | 1.15              | 1.50        | 2.73*                   | 5.32***       |
| <b>Beliefs about nutrient content and non-health-related benefits</b>        |                |                   |             |                         |               |
| A1. Reformulated                                                             | 0.76           | 0.95              | 0.56†       | 0.66                    | 2.34          |
| A2. Higher in [nutrient]                                                     | 3.52***        | 2.43**            | 0.99        | 1.46                    | 2.01*         |
| A3. Lower in calories                                                        | 2.01           | 1.90              | 1.21        | 1.98                    | 1.21          |
| B2. Child feels full                                                         | 2.14           | 1.29              | 0.97        | 2.06                    | 2.54*         |
| B4. Control child's weight                                                   | 2.41†          | 1.18              | 2.62*       | 1.33                    | 2.59**        |
| C3. Important to eat [nutrient]                                              | 1.32           | 1.53              | 1.50        | 1.10                    | 2.75***       |

† $P \leq 0.10$ ; \* $P \leq 0.05$ ; \*\* $P \leq 0.01$ ; \*\*\* $P \leq 0.001$ .

‡Includes trusting front-of-package labels and demographic characteristics as control variables.

the USA. Promoting specific positive nutrients in products with other, less beneficial, ingredients (e.g. high-sugar cereals) appears to be a highly effective and low-risk marketing strategy for food companies. These claims provide an opportunity to enhance product image and increase sales with limited potential for consumer scepticism or other negative reactions. In addition, the use of such claims may proliferate as they become increasingly necessary to effectively compete against other companies that regularly use this strategy. If companies profit from this practice, it is unlikely they will discontinue its use in the absence of government intervention. One potential regulatory approach would be to require that any products with nutrition-related claims meet minimum overall nutrition criteria to ensure that claims do not lead consumers to incorrectly infer that products are nutritious. Australia has passed legislation that will require all high-level health claims to meet nutrition eligibility criteria<sup>(15)</sup>. Another option would be to require the FDA to pre-approve all types of claim, not just health claims, before companies are allowed to use them. This approach would ensure that claims are supported by scientific evidence and are not misleading, and is currently in place in the EU and Canada for structure/function types of claims<sup>(4)</sup>.

There is evidence of a move toward greater scrutiny of nutrition-related claims in the USA. The GAO has recommended that the FDA increase oversight of structure/function claims specifically to reduce the use of false or misleading claims<sup>(4)</sup>. One of the claims we investigated, the immunity claim on Kellogg's Rice Krispies and Cocoa Krispies, was widely criticized by nutrition experts<sup>(16)</sup>. In November 2009, the San Francisco City Attorney sent a letter to Kellogg and the FDA to provide proof of the claim; in response, Kellogg discontinued its use. In June 2010, due to concerns about the immunity claim and a prior claim about Kellogg's Frosted Mini-Wheats' effects on children's cognitive health, the US Federal Trade Commission prohibited Kellogg from 'making claims about any health benefit of any food

unless the claims are backed by scientific evidence and not misleading<sup>(17)</sup>. Kellogg may have crossed the line to health claim in these instances; however, other non-contested nutrient content claims (e.g. General Mills' calcium and vitamin D claim) also convey similar potentially misleading information about products' potential health benefits. General Mills continues to promote its 'calcium and vitamin D' message on its high-sugar cereals, including in marketing to parents claiming that these cereals help their children 'grow up strong'<sup>(18)</sup>.

Although the nutrition-related claims examined in the present study are technically accurate and most meet the criteria for such claims set by the FDA, the majority of consumers misunderstood their meaning. When these claims are used to promote products that also contain high levels of sugar and/or sodium, they incorrectly imply that the products are nutritious overall; and they can even convey similar health-related benefits as stringently regulated health claims. Therefore, the common use of nutrition-related claims on otherwise nutritionally poor products raises significant public health concerns. These results affirm the need for increased regulation in the USA to protect consumers from the potentially misleading information conveyed by nutrition-related claims.

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