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Consumer Judgment of Food Labels: How Front of Pack Promotions Influences Choice Behaviour, Views of Nutritional Content, Judgments of Healthiness, and Willingness to Pay Estimates

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Abstract

Objective: The aim of the present study was to examine the potential bias of front-of-pack promotions on consumer choice behaviour and judgments.

Design: Using a between-subjects design, participants were randomly allocated to one of four conditions: (i) Baseline, (ii) Premium offers, (iii) Celebrity Endorsement, (iv) Nutritional Content Claims. In the three experimental conditions the promoted product was always the objectively unhealthy item compared to the non-promoted alternative (Baseline). In all conditions participants were asked to choose between two items (endorsed *vs.* non-endorsed), choose if they wanted to see the objective nutritional information of each, estimate the healthiness of the product they choose, as well as the amount they would be willing to pay for it.

Setting: Participants were recruited via an online crown sourcing social science platform Prolific Academic.

Subjects: Participants were UK nationals living in the UK, with English as their first language, aged between 18-74 years (*n* 481; 60% female).

Results: Compared to the other three conditions, Celebrity endorsement of unhealthy options were selected more often, for which participants were more likely to erroneously judge their choices as healthier than the baseline, and willing to pay more for them, and for Nutritional Content Claims promotions.

Conclusion: The present study supports and extends current work by demonstrating that, independent of viewing objective nutritional content, front-of-pack promotions not only strongly influences choice behavior, but also biases judgments of the healthiness of products and how much would be paid for them.

Keywords: Front-of-pack promotions; Biased consumer judgment; Willingness to pay

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Introduction

In the UK alone recent government health surveys have revealed that approximately 62.9% of adults are overweight or obese [1]. Beyond the ever increasing appetite for convenience foods [2-4] several other factors have been identified as contributing to high levels of obesity. For instance, consumers are dissuaded from buying healthy options because they carry several misconceptions regarding the cost of healthy alternatives [5,6]. However, to a large extent consumers are also influenced by current trends in food retail and marketing tools that dubiously promote food items as healthy which tap into consumer concerns regarding healthy eating [7,8]. On this point, researchers have shown the strong influence of promotions on the front of food packaging on consumer choices; worryingly, this type of information often conflicts with the precise details of mandatory nutrition facts labels typically presented on the back of food products [8]. To extend this work, the aim of the present study is to examine the extent to which food purchasing judgments (i.e. product preferences, frequency of viewing nutritional content, estimates of cost, perceived healthiness of product) are based on potentially misleading front of packaging promotions at the expense of nutrition facts labels.

Three particular front-of-pack methods designed to influence consumer choice behavior are nutrient content claims, premium offer promotions, and celebrity endorsements. Unlike mandatory nutrition facts labels, nutrient content promotions make additional claims about nutritional characteristics of the product such as levels of nutrients and amount of calories [9]. Food marketers often make strong use of nutrient claims (e.g., "high fibre" or "rich in omega 3") and health claims (including "calcium helps improve bone density") that associate specific ingredients to a desired state of health, by claiming to modify or improve the normal functions of the body [9,10]. For example, when comparing branded candy as "fruit chews" as opposed to "candy chews" judgments of healthiness of the product were higher in the former branded version of the candy [11]. Typically, consumers tend to perceive these claims as helpful and trust worthy, especially because they are easier to interpret than mandatory nutrition fact labels [12]. The consequence being that front-of-pack nutrient content claims promotions are more cognitively salient, and more influence on choice behavior than information provided in the nutrition facts labels [13]. This becomes problematic when the front-of-pack nutrient content claims highlight specific nutritional characteristics of food items without giving equal attention to the unhealthy attributes of the product [14].

Premium offers are also regularly used to advertise unhealthy and energy-dense foods with weak nutritional contents. This promotion method is considered to be the most overt marketing technique used on modern packaging to attract consumers [10]. This involves offering two or more complementary products sold together at a cheaper price than their combined price if sold separately [15]. Alternatively, free gifts are also designed to entice consumers to buy unhealthy options [16]. One reason for the success of these marketing methods is that they rely on an asymmetric value function regarding the perception of gains and losses [17], in other words, people do not want to miss out (loss) on a possible offer (gain).

The third well known marketing strategy is to use celebrity endorsement to promote products, where the fame of celebrities or the social status of a well-known public figure carries enough cache or prestige to influence purchasing behavior [8,18]. The Match-up hypothesis predicts that when the characteristics ascribed to both the product and the endorsers are congruent the promotion can be highly effective [19]. While this can lead to the promotion of genuinely healthy food choice, the concern is that famous sports figures also promote unhealthy food products [20]. Thus, a major problem is that celebrity endorsement promotions are often associated with food products that are actually unhealthy, and because they have a great influence on consumer choice [21], this promotion strategy contributes to increased consumption of unhealthy food items [22,23].

Present Study

The purpose of this study is to explore the influence of front-of-pack promotions on consumers' judgments and the extent to which these promotions bias judgments of promoted unhealthy food options. The present study is based around the experimental design developed by Dixon et al. [8]. In their study they investigated pre-adolescent children's choice-behavior around three common forms of front-of-pack promotions: nutrient content claims, premium offers, and celebrity endorsements. Children were asked to indicate their preferred choice from two comparable child-orientated food products; one of which had a healthier nutritional profile than the equivalent promoted alternative. Dixon et al. [8] reported that children were significantly more likely to prefer the unhealthier food option containing energy-dense and nutrient-poor qualities in the nutrient content claims and celebrity endorsement condition compared to the premium offer and control condition (no promotion). However, children who viewed the products Nutrition Information Panel (NIP) had more realistic perceptions of the healthfulness of the products, but that viewing the NIP was not sufficient to weaken preferences for on-pack promotions.

As a point of departure, the present study investigates the effects of three common promotional techniques (celebrity endorsements, nutrient content claims, and premium offers) compared to a baseline (no-promotion) in an adult population. In order to examine whether in fact individuals opt for unhealthy food options because they are persuaded by on-pack promotions participants were presented with two comparable food items and asked to choose which one they preferred. They were also provided with the option to view specific details of the mandatory nutrient profiles of the food products that are presented on the back of the food packs. Participants were also asked to judge to healthiness of the product they chose. Finally, participants were also asked to estimate the amount they would be willing to pay for their preferred food choice. In each condition, one of the products was an on-pack promotion with an objective unhealthier nutritional profile and the other had no promotion but had a healthier objective nutritional profile.

We test four hypotheses. Hypothesis 1: In line Dixon et al. [8] study, we predict that in an adult population the three most common front-of-pack promotion methods (nutrient content claims, premium offer promotions, celebrity endorsements) will lead to significantly more choices of promoted unhealthy food products relative to an equivalent healthier non-promoted alternative. Hypothesis 2: Based on Dixon et al. [8] study, we predict that when given the option of examining mandatory nutrition facts labels, this information will be examined less under conditions where the products contain front-of-pack promotions compared to non-promoted equivalent alternatives. Hypothesis 3: Based on previous work showing the persuasiveness of front-of-pack nutrient claims [6,15,18,22,24] we predict that judged healthiness of food choices will be higher for nutrient claims promotions and celebrity endorsed products compared to non-promoted equivalent alternatives. Hypothesis 4: In line with evidence that consumers erroneously perceive healthier food product are costlier [5,6] estimates of costs, via willingness to pay judgments, will be higher for selected nutrient content claims promotional products compared to non-promoted equivalent alternatives.

Methods

Participants

A total of 481 participants were recruited from Prolific academic which is a crowd sourcing site that is used to conduct social science studies. The experiment was presented as an experiment online, though Qualtrics (an online platform for running experiments). Participants were all UK residents, living and working in the UK, with their first language being British English. They were paid ($ 1.50) to take part, and the average length of time to complete the study was 7 minutes. Ages ranged between 18-74, with most respondents were in the 25-34 age brackets. 60% of respondents were female (n=291). Participants were randomly allocated to one of the four conditions; Baseline (n=116), Premium Offer (n=124), Celebrity endorsement (n=121), and Nutrient content claims (n=120). The study was fully

Figure 1: Screen shot of a Nutrient content claims front-of-pack promotion and non-promoted equivalent, along with the screen shot of the nutritional information presented if participants elected to view this information.

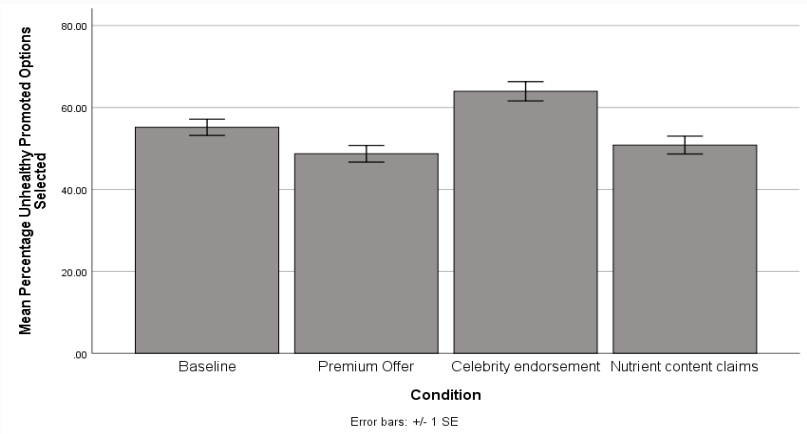

Figure 2: Mean overall percentage for selecting the promoted unhealthy option by Condition.

reviewed and approved by Queen Mary Ethics of Research Committee (QMREC2016-30).

Design

This experiment employed a between-subject design in which participants were randomly allocated to the baseline condition or one of three front-of-pack promotion conditions: celebrity endorsement, nutrient content claims, premium offers, and no front-of-pack promotion (baseline). Thereafter, each participant was presented with four key measures in the order presented here: (1) a forced-choice between two alternatives: promoted option vs. non-promoted option (in the case of the baseline condition there were two non-promoted options, but one was objectively healthier than the other); (2) choice of viewing nutritional information or not, (3) willingness to pay estimates for each of five food product categories: savoury (crisps or crackers), sweet (ice cream), ready meal, flavoured milk drink and sweetened breakfast cereal; (4) a rating of how healthy they believed the product they chose was. Packaging styles for both products were matched in order to control for visual attractiveness of the products (aside from the factors present in the promotion conditions).

Materials

The study used a web-based questionnaire created on Qualtrics, an online social science studies online platform for running experiments. Participants were able to complete the questionnaire on a computer or a mobile device. Before completing the main study, all participants were asked to indicate how health conscious they are, recorded on a 9-point Likert scale (0= not at all health conscious, 9= very health conscious). After this, they were presented with the main study in which they completed a total of 20 questions; four of the same questions for each of the five foods product categories (Cereal, Milky Drink, Savoury Snack, Sweet Snack, and Ready Meal).

The first question for each category of food item in which images of two food products positioned side-by-side (Figure 1) was whether participants wished to view (clicking 'view' or else clicking 'next')

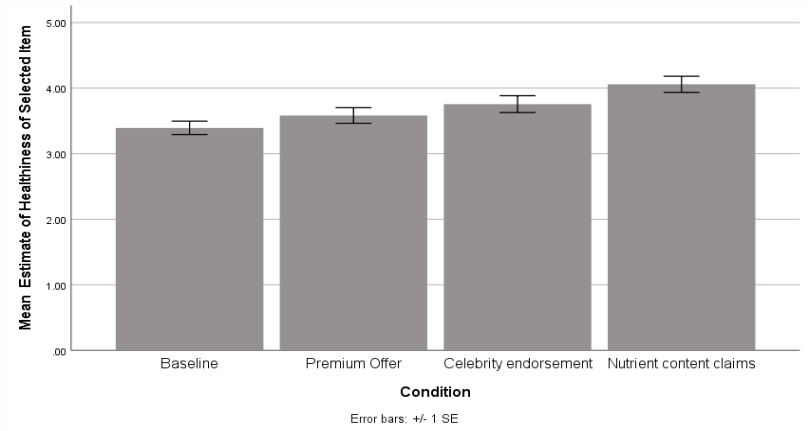

Figure 3: Mean overall estimates of healthiness of products chosen in each of the four conditions.

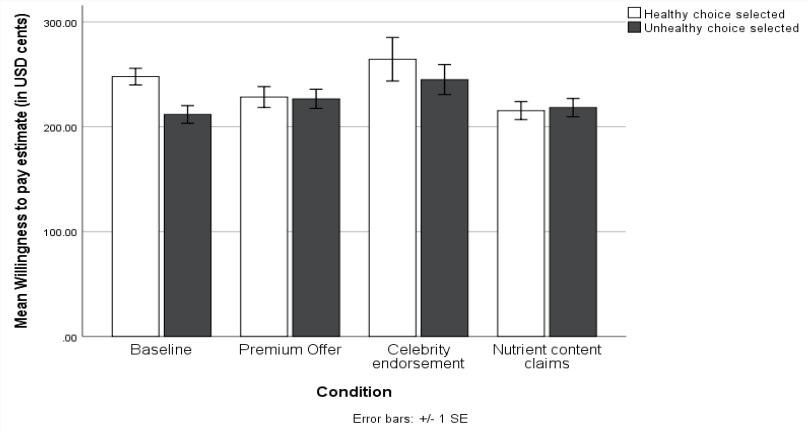

Figure 4: Mean estimate of amount willing to pay (USD - in cents) by conditions, and separated out by choices for actual healthy choices made, and unhealthy choices made.

the nutrient contents on the back of the food products. The second question asked participants to choose which product (out of the two) they would prefer to buy, which they indicated by moving the cursor and clicking on the product. The third question asked participants how much money they would be willing to pay for the product they had chosen. Participants were provided with a text entry box, and were requested to give their answer in pounds (£) and pence (p). The last question asked participants to rate how healthy they believed the product they chose was. This was recorded on a 9-point Likert scale on a scale ranging from 0= not healthy to 9= very healthy.

There were four different conditions which varied according to the promotion that was displayed on the image of the products (Celebrity endorsement, Nutrient content claims, Premium offers, and Baseline). For the celebrity endorsement condition an image of a well-known British or American celebrity featured clearly on the front of the product. A pilot study was conducted in order to support that the chosen celebrities were considered to be popular and well known to a UK population sample. The nutrient content claims condition presented participants with products that highlighted at least two positive nutritional features of the product, for example, 'high in fibre' and 'without artificial colours and flavours'. The premium offers condition featured the food product accompanied with an imagine of a complimentary item (e.g., a teddy bear) that was provided on purchase of the item, or else a featured competition to win a prize, such as a sum of money, or a chance to win tickets for a football match. For the baseline condition there was no front-of-pack promotion for either of the two choice alternatives.

Procedure

Participants were provided with a link to access an online questionnaire. They were first presented with an information screen that included: aim of the research, participant's role, ethical guidelines and the researchers' contact details. Participants were informed they were taking part in a study investigating consumer preferences, and were asked to provide honest opinions on various food products. If they agreed to take part in the study they were then asked to provide informed consent, and to confirm that they were at least 18 years of age. Next, participants were asked to write their personal identifier (first three letters of their mother's maiden name and their date of birth), gender, and age. Participants were also requested to indicate how health conscious they considered themselves. In order to start the main experiment and to move from one question to the next, participants were required to press the arrows on the bottom right hand side of the screen. Additionally, if participants wanted to go back to a previous question during the experiment they were required to press the arrows on the bottom left hand side. There were five trials, each one representing a different food product category. A trial consisted of responses to a set of four questions that were the same for each of the 5 product categories.

Data analysis

For the first question, responses for the option 'view' was represented by the number '1' and for option 'next' by the number '2'. This information was then used to calculate the overall percentage of times participants from each condition viewed the nutrient information. For the second question, participants were given a score of '1' if they chose the healthier food option and a score of '2' if they chose the unhealthier food option, again, the overall percentage for choosing the healthier food options was then calculated across the 5 trials for each participant for each condition. For the third question, responses for the willingness to pay involved changing the values into pence in order to calculate the overall cost participants would spend separately for both actual healthy and relatively unhealthy products; in the results section the final amounts are converted to USD at the time of study. For the fourth question, responses were taken from the exact score participants gave on the 9-point Likert scale, where 0=not healthy and 9=very healthy.

Results

Preferences for promoted unhealthy food products

A Kruskal-Wallis test was conducted to examine the effect of front-of-pack promotions on choice of product (for the three experimental conditions, the promoted product was always unhealthy). The Kruskal-Wallis H test revealed a statistically significant effect of condition on choice of promoted product, $\chi 2(3)$ 28.25, p=0.0003, with a mean rank of overall percentage of unhealthy chose products of 242.76 for Baseline, 208.98 for Premium Offer, and 293.32 for Celebrity Endorsement, and 219.68 for Nutrient Content claims (Figure 2). Follow up Mann-Whitney U tests revealed that compared to Baseline participants selected the promoted unhealthy option significantly more often when endorsed by Celebrity (U=5452.50, p=0.0002), the Premium offer (U=4913.40, p=0.0005), and the Nutrient content claims (U=5083.50, p=0.0005). Also, compared to the baseline, the unhealthy promoted product was selected less often in the Premier Offer condition (U=6128.00, p=0.014). No other comparisons were significant.

Nutrient information

The mean proportion of views of objective nutrient content of food items was similar across conditions: Baseline (M=57.74, SD=39.72), Premier Offer (M=61.00, SD=34.77), Celebrity Endorsement (M=60.00, SD=39.24), Nutrient Content Claims (M=60.00, SD=35.59). Looking more closely, across all four conditions, 37% (n=179) of participants consistently looked at nutritional content for all 5 food categories, and 12% (n=57) explicitly avoided examining this information. A Kruskal-Wallis test revealed that based on the proportion of views of the actual nutrient content of the 5 food categories there was no significant difference by condition.

Given that condition made little difference to the proportion of times that participants opted to view the objective nutritional details of the five food categories, we considered the extent to which age, gender, and self-reported health consciousness predicted how often people deliberately viewed the nutritional information. A linear regression analysis was used to test if these factors significantly predicted the proportion of times nutritional details were viewed. The results of the regression indicated that overall the three predictors explained 5% of the variance (R^2=0.05, F(3,475)=8.61, p<0.00002). It was found that as age increased so did the tendency to view nutritional content information (β=0.13, p<0.005), and as self-reported health consciousness ratings increased so did views of nutritional content (β=0.18, p<0.0001).

Estimate of healthiness of actual choices selected

A Univariate ANOVA was conducted (Figure 3), and revealed a main effect of condition on estimates of the healthiness of selected options, F(3,477)=5.58, p<0.001. *partial eta=0.03.* Follow up t-test comparisons revealed that, compared to baseline, mean estimates of healthiness for selected items in the nutrient content claims condition were higher (p<0.05), and similarly for the premium offer condition (p<0.006), and the celebrity endorsement condition (p<0.05). No other differences were significant. Independent of whether or not the selected items were healthy, overall, these results suggest that, items selected in the three promotion conditions were typically estimated are healthier relative to the baseline.

Willingness to pay

Willingness to pay estimates were separated by type of choice made, that is, the estimates of willingness to pay by whether the option selected was healthy or unhealthy. The mean willingness to pay estimates for healthy and unhealthy choices was subjected to a repeated ANOVA with estimates of healthy and unhealthy options as the within-subject variable, and condition as the between subject variable. The analyses revealed a main effect of condition (Figure 4), F(3,477)=3.69, p<0.01. partial eta=0.02. There was no significant difference in estimates for healthy and unhealthy options, and no significant interaction between healthy *vs.* unhealthy options by condition. Applying Bonferonni correction, follow-up comparisons reveal that, participants were on average willing to pay significantly more for products endorsed by celebrities compared to each of the other three conditions ([baseline, t(235)=2.24, p<0.04], [premier offer, t(243)=2.40, p<0.04], [Nutrient content claims, t(239)=2.65, p<0.01]), whereas there was no difference in estimates between the remaining three conditions.

Pattern of selection of healthy choices by viewing objective nutritional content

We explored the possibility of differences in the proportion that selected healthy options conditional on whether they opted to view the objective nutritional content of their presented choices. The results of chi-squared analyses are summarized in Table 1. Overall there seemed to be a general pattern emerging that the more often people viewed the nutritional details of the options, the more likely they were to select the healthier option, however the pattern was not consistent across all food categories.

Conclusion

The objective of this study was to examine the way in three typical forms of front-of-pack promotional strategies bias consumer choice and judgment to the extent that they favour unhealthy promoted items over non-promoted healthier items. Overall, we found evidential support for this, and extend previous empirical work in this domain. In summary, compared to the other three conditions, participants have a stronger preference for selecting the promoted unhealthy option when the front-of-pack promotion strategy uses celebrity endorsement, providing partial support for Hypothesis 1. Second, the viewing patterns of nutritional content were not sensitive to the experimental manipulations, failing to support Hypothesis 2. This may be because participants find the factual information difficult to navigate and do not know exactly how to use this information when making comparisons between like for like food products

Table 1: Summary of analyses examining the selection of healthy options conditional on viewing nutritional content for each of the four conditions.

	Cereal	Sweet Snack	Ready Meal	Savoury Snack	Milky drink
Baseline	N.S	Healthier option = more views X(116) =7.62, p=0.006	Unhealthier option = more views X(116) =15.65, p=0.0001	N.S	Healthier option = more skips X(116) =22.17, p=0.000003
Premium offer	N.S	Healthier option = more views X(124) =4.90, p=0.03	Healthier option = more views X(124) =8.44, p=0.004	Healthier option = more skips X(124) =5.53, p=0.02	Unhealthier option = more skips X(124) =11.37, p=0.001
Celebrity endorsement	N.S	Healthier option = more views X(120) =12.40, p=0.0004	N.S	N.S	Unhealthier option = more skips X(120) =20.87, p=0.000005
Nutritional content claims	N.S	N.S	Healthier option = more views X(120) = 36.90, p=0.000001	Healthier option = more views X(120) = 4.46, p=0.04	Unhealthier option = more skips X(120) =9.60, p=0.002

[14,25-27]. Moreover, given that consumers want to increase their efficiency in their product selections [28], front-of-pack promotions are still likely to be the most salient basis on which they make their consumer choices [12,14,25-29], especially when claims are made about the healthiness of the product.

In fact, regardless of the type of promotion, participants tended to view nutritional content information approximately 55% of the time – though not consistently for all five food categories and this behaviour was shown to be influenced by age and self-reported health conscious ratings. Moreover, there was evidence to suggest that when nutritional content was viewed, this was more likely to lead to the selection of healthier options; though this was not found across all five food categories. This is broadly consistent with Dixon et al. [8] study. Third, the estimated healthiness of food choices was higher for celebrity endorsed products, compared to baseline, and similarly, estimated healthiness of food choices was higher for nutritional content claims promotions, which provides support for Hypothesis 3. Forth, on average participants were willing to pay more for products endorsed by celebrities as compared to each of the other three conditions, which provides support for Hypothesis 4.

In sum, what the present study shows is that not only are front-of-pack promotions highly persuasive in influencing choice behavior, they also have a significant impact in biasing the way in which the products are perceived. When front-of-pack promotions make nutrient content claims, participant judged promoted items as overall healthier compared to all other conditions, bearing in mind that the items promoted were objectively less healthy than non-promoted alternatives. Similarly, even when celebrity endorsed products made no nutrient claims, they were also judged as healthier than baseline. This provides strong evidence of the extent to which consumers misattribute positive health factors to promoted items, at the expense of the objective information of the nutrient content of those items.

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