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MONASH INSTITUTE
OF HEALTH SERVICES RESEARCH

Food Standards Australia New Zealand

**REQUEST FOR QUOTATION (RFQ 2007/08-22)
FOR THE PROVISION OF CONSULTANCY SERVICES IN RELATION TO RE-ANALYSIS OF QUANTITATIVE DATA ON CONSUMER RESPONSES TO NUTRITION CONTENT CLAIMS**

Final Report

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Executive Summary

We have re-analysed data from the Consumer Responses to Nutrition Content Claims collected by Roy Morgan Research on behalf of Foodstandards Australia New Zealand.

We have addressed eight specific research questions posed by FS ANZ:

1. Does a product with a nutrition content claim yield higher consumer purchase intentions compared with a product without a claim?
2. Does a product with a nutrition content claim yield higher consumer perceptions of nutritional quality (compared with other food types), compared with a product without a claim?
3. Does a product with a nutrition content claim yield higher consumer perceptions of nutritional quality (compared with other breakfast cereals/sweet biscuits), compared with a product without a claim?
4. Does a product with a nutrition content claim cause consumers to perceive a greater number of people will benefit from eating the product, compared with a product without a claim?
5. Does a product with a nutrition content claim cause consumers to attribute to it a greater number of perceived health benefits, compared with a product without a claim?
6. Do the five specific claim conditions have different effects on consumers' purchase intentions or product evaluations?
7. Does the type of claim or type of product influence product evaluations or purchase intentions?
8. Which socio-demographic and cognitive/behavioural factors impact consumer purchase intentions and product evaluations?

For each RQ, we reproduced the RMR results, using the same analysis methods. We then used a generalised linear model to evaluate the validity of each result. We chose to use an ordinal logistic regression model, which is appropriate for both ordered and continuous outcome variables, but makes no assumptions of distributional form. This model is suitable, in particular, for Likert scale responses. We present an appendix with a description of the ordinal logistic model and the interpretation of its output.

We found no changes to the results presented in the RMR analysis. In most cases, the significance levels from OLR were very close to those for the linear models and ANOVA used by RMR.

We have used graphical methods to display the effect sizes and confidence intervals from all the analyses.

We are confident that the results from RMR report are valid.

1. Does a product with a nutrition content claim yield higher consumer purchase intentions compared with a product without a claim?

1.1 Effect of a nutrition content claim on purchase intention (overall)

The outcome variable used in this analysis is 'purchase intention' (PI) which was measured on a seven-point scale (1-7) [Variables A2 & A4]. There are two PI scores for each respondent (one for cereal, one for biscuit): these have been averaged to obtain an overall PI score for each respondent. The distribution of overall PI score thus obtained is closer to a symmetric Normal distribution.

Since the distribution of PI scores was approximately normal, ANOVA was performed to investigate if there were any significant differences in purchase intention between those exposed to a nutrition content claim and those not exposed. The results showed that the mean scores of purchase intention did not differ between those respondents who viewed experimental mock packages (i.e. breakfast cereal/sweet biscuit boxes featuring nutrition content claims) and those who viewed control packages (i.e. boxes with no nutrition content claims) ($F(1,1037)=3.51$, $p=0.06$).

In order to confirm the results of ANOVA and to further estimate the magnitude of difference in purchase intention between those exposed to nutrition content and those not exposed, OLR analysis was carried out. The OLR is a statistical technique used to model the relationship between an ordinal outcome variable and a set of predictor variables. The use of OLR is appropriate as the outcome variable ‘purchase intention’ was measured on an ordinal scale.

The results of OLR analysis shows that the respondents who viewed the experimental packages were about 20% less likely (Odds Ratio = 0.78, $p=0.06$) to choose the higher purchase intention than those who viewed the control packages (95% CI: 0.59 to 1.01).

1.2 Comparison of purchase intention between cereal and biscuits

To further investigate whether the purchase intention was similar for cereal and biscuits in the experimental and control groups, the interaction effect between cereal and biscuits was examined. The analysis shows that there was no significant difference (t = 0.74, p= 0.46) between those who viewed the experimental packages and those who viewed the control packages, in terms of their purchase intention, for both cereal and biscuits (95% CI: -0.19 to 0.42).

1.3.1 Effect of a nutrition content claim on a breakfast cereal package on purchase intention

When ANOVA was used to look at the effect on purchase intention of breakfast cereal between claim and no claim groups, a significant effect was found. Respondents who received the experimental packages had lower purchase intentions than those who received the control packages ($F(1, 1050) = 4.01$, $p = 0.045$).

To confirm the above results of ANOVA and to determine the magnitude of difference in purchase intention between those exposed to nutrition content and those not exposed, OLR analysis was performed. The results of the analysis show that respondents who viewed the experimental packages were about 25% less likely (Odds Ratio = 0.76, p=0.04) to choose the higher purchase intention for breakfast cereal than those who viewed the control packages (95% CI: 0.59 to 0.99).

1.3.2 Effect of a nutrition content claim on a sweet biscuit package on purchase intention

When ANOVA was used for analysis, no significant difference was observed in the reported purchase intention for sweet biscuits, between experimental (with claim) and control groups (no claim) ($F(1,1043)=1.17$, $p=0.28$).

To confirm the results of ANOVA and to estimate the magnitude of difference in purchase intention between those exposed to a nutrition content and those not exposed, OLR analysis was performed. However, no significant difference was found between respondents who viewed the experimental packages (Odds Ratio = 0.86, p=0.26) and those who viewed the control packages in terms of their purchase intention for sweet biscuits (95% CI: 0.66 to 1.12).

2. Does a product with a nutrition content claim yield higher consumer perceptions of nutritional quality (compared with other food types), compared with a product without a claim?

2.1 Effect of a nutrition content claim on general product nutrition attitude (overall)

The outcome variable used in this analysis is ‘General Product Nutrition Attitude' (GPNA) which is the mean of two nutrition attitude variables, for cereal (Variables B1 & B2) and biscuits (Variables B11 & B12) ; both measured on a seven-point scale. Thus each individual's overall response is the average of four scale variables and the resulting variable is closer to a Symmetric Normal Distribution.

As the distribution of GPNA scores was approximately normal, ANOVA was done to find out if there were any significant differences in general product nutrition attitude between those exposed to a nutrition content claim and those not exposed. The results showed that the mean scores of general product nutrition attitude did not differ between those respondents who viewed experimental mock packages (i.e. breakfast cereal/sweet biscuit boxes featuring nutrition content claims) and those who viewed control packages (i.e. boxes with no nutrition content claims) ($F(1,1029)=0.07$, $p=0.798$).

In order to confirm the results of ANOVA and to further estimate the magnitude of difference in general product nutrition attitude between those exposed to a nutrition content and those not exposed, OLR analysis was performed. The use of OLR is appropriate as the outcome variable ‘general product nutrition attitude’ was measured on an ordinal scale.

The OLR analysis found no significant difference in general product nutrition attitude (Odds Ratio = 0.94, $p=0.64$) between the experimental and control groups (95% CI: 0.72 to 1.22).

2.2 Comparison of general product nutrition attitude between cereal and biscuits

To further understand whether the general product nutrition attitude was the same for cereal and biscuits in the experimental and control groups, the interaction effect between cereal and biscuits was examined. The analysis shows that there was no significant difference ($t = -1.35$, $p= 0.18$) between those who viewed the experimental packages and those who viewed the control packages, in terms of their general product nutrition attitude towards both cereal and biscuits (95% CI: -0.32 to 0.06).

2.3.1 Effect of a nutrition content claim on a breakfast cereal package on general product nutrition attitude

The outcome variable used in this analysis is 'general product nutrition attitude to breakfast cereal' which is the mean of two nutrition attitude variables for cereal (Variables B1 & B2). ANOVA was used to examine the effect of general product nutrition attitude to breakfast cereal between claim and no claim groups. However, no significant difference was found ($F(1, 1038) = 0.10$, $p = 0.75$).

To confirm the above results of ANOVA and to determine the magnitude of difference in general product nutrition attitude to breakfast cereal between those exposed to a nutrition content and those not exposed, OLR analysis was performed. But no significant difference was found (Odds Ratio = 1.04, p=0.79) between claim and no claim groups (95% CI: 0.79 to 1.36).

2.3.2 Effect of a nutrition content claim on a sweet biscuit package on general product nutrition attitude

The outcome variable used in this analysis is 'general product nutrition attitude to biscuits' which is the mean of two nutrition attitude variables for biscuits (Variables B11 & B12). ANOVA was done to examine the effect of general product nutrition attitude to biscuits between experimental and control groups. However, no significant difference was found ($F(1, 1037) = 0.51$, $p = 0.47$).

In order to confirm the results of ANOVA and to further estimate the magnitude of difference in general product nutrition attitude to biscuits between those exposed to a nutrition content and those not exposed, OLR analysis was performed. But no significant difference was found (Odds Ratio = 0.92, p=0.54) between claim and no claim groups (95% CI: 0.71 to 1.20).

3. **Does a product with a nutrition content claim yield higher consumer perceptions of nutritional quality (compared with other breakfast cereals/sweet biscuits), compared with a product without a claim?**

3.1 Effect of a nutrition content claim on specific product nutrition attitude (overall)

The outcome variable used in this analysis is 'Specific Product Nutrition Attitude' (SPNA) which is the mean of two nutrition attitude variables, for cereal (Variables B4 & B5) and biscuits (Variables B14 & B15) ; both measured on a seven-point scale. Thus each individual's overall response is the average of four scale variables and the resulting variable is closer to a Symmetric Normal Distribution

Since the distribution of SPNA scores are approximately normal, ANOVA was performed to examine if there were any significant differences in specific product nutrition attitude between those exposed to a nutrition content claim and those not exposed. The results showed that the mean scores of specific product nutrition attitude did not differ between those exposed to the claim material, and those who were exposed to the no claim material ($F(1,943)=0.38$, $p=0.54$).

To confirm the results of ANOVA and to determine the magnitude of difference in specific product nutrition attitude between those exposed to a nutrition content and those not exposed, Ordinal Logistic Regression (OLR) analysis was performed. The use of OLR is appropriate as the outcome variable 'specific product nutrition attitude' was measured on an ordinal scale.

The OLR analysis found no significant difference in specific product nutrition attitude (Odds Ratio = 1.11, $p=0.46$) between the claim and no claim groups (95% CI: 0.84 to 1.47).

3.2 Comparison of specific product nutrition attitude between cereal and biscuits

To further investigate whether the specific product nutrition attitude was similar for cereal and biscuits in the experimental and control groups, the interaction effect between cereal and biscuits was examined. Overall, there was no significant difference ($t = 1.397$, $p= 0.16$) between those who viewed the experimental packages and those who viewed the control packages, in terms of their specific product nutrition attitude towards both cereal and biscuits (95% CI: -0.06 to +0.34).

3.3.1 Effect of a nutrition content claim on a breakfast cereal package on specific product nutrition attitude

The outcome variable used in this analysis is 'specific product nutrition attitude to breakfast cereal' which is the mean of two nutrition attitude variables for cereal (Variables B4 & B5). ANOVA was used to examine the effect of specific

product nutrition attitude to breakfast cereal between the experimental and control groups. However, no significant difference was found (F(1, 984) = 0.01, p = 0.94).

To confirm the above results of ANOVA and to further estimate the magnitude of difference in specific product nutrition attitude to breakfast cereal between those exposed to a nutrition content and those not exposed, OLR analysis was performed. But no significant difference was found (Odds Ratio = 1.03, p=0.83) between claim and no claim groups (95% CI: 0.78 to 1.36).

3.3.2 Effect of a nutrition content claim on a sweet biscuit package on specific product nutrition attitude

The outcome variable used in this analysis is 'specific product nutrition attitude to biscuits' which is the mean of two nutrition attitude variables for biscuits (Variables B14 & B15). ANOVA was done to examine the impact of nutrition content claim on sweet biscuit package on specific product nutrition attitude. However, no significant difference was found (F(1, 972) = 1.46, p = 0.23) .

In order to confirm the results of ANOVA and to determine the magnitude of difference in specific product nutrition attitude to biscuits between those exposed to a nutrition content and those not exposed, OLR analysis was carried out. But no significant difference was found (Odds Ratio = 1.24, p=0.14) between the claim and no claim groups (95% CI: 0.94 to 1.63).

4. Does a product with a nutrition content claim cause consumers to perceive a greater number of types of people will benefit from eating the product, compared with a product without a claim?

4.1 Effect of a nutrition content claim on perceptions of number of types of people who would benefit from eating the food product (overall)

The outcome variable used in this analysis is the 'Number of types of people who would benefit from eating the food product'. This score was obtained by counting the number of categories which respondent indicated in the telephone interview, with scores ranging from 0 to 7. For overall score, numbers for cereal (Variables B7_1 to B7_7) & for biscuits (Variables B17_1 to B17_7) have been averaged. The resulting variable is best analysed by ANOVA/Regression models as it follows a Normal Distribution.

ANOVA was performed to study the effect of a nutrition content claim on perceptions of number of types of people who would benefit from eating the food product. The results showed that there was no effect of a nutrition content claim on perceptions of number of types of people who would benefit from eating the food product ($F(1, 1058)=2.21$, $p=0.14$) between the claim and no claim groups.

To confirm the results of ANOVA and to further estimate the magnitude of difference in the perceptions of number of types of people who would benefit from eating the food product, OLR analysis was performed. The use of OLR is appropriate as the outcome variable 'number of types of people who would benefit from eating the food product' was measured on an ordinal scale.

The OLR analysis shows that there was no larger effect (Odds Ratio = 1.20, $p=0.19$) of a nutrition content claim on perceptions of number of types of people who would benefit from eating the food product between the claim and no claim groups (95% CI: 0.92 to 1.56).

4.2 Comparison of perceptions of number of types of people who would benefit from eating the food product between cereal and biscuits

In order to further understand whether perceptions of number of types of people who would benefit from eating the food product was similar for cereal and biscuits, the interaction effect between cereal and biscuits was examined. The results suggest that there was no significant difference ($t = 0.81$, $p= 0.42$) between those who viewed the experimental packages and those who viewed the control packages, in terms of their perceptions of number of types of people who would benefit from eating the food product, for both cereals and biscuits (95% CI: -0.21 to +0.496).

4.3.1 Effect of a nutrition content claim on a breakfast cereal package on perceptions of number of types of people who would benefit from eating the breakfast cereal

The outcome variable used in this analysis is the 'Number of types of people who would benefit from eating the breakfast cereal'. This score was obtained by counting the number of categories which respondent indicated for cereal (Variables B7_1 to B7_7). ANOVA was done to determine if there were any significant differences in the perceptions of number of types of people who would benefit from eating the breakfast cereal between those exposed to a nutrition content claim and those not exposed. However, no significant difference was found ($F(1, 1058) = 0.83$, $p = 0.36$).

To confirm the results of ANOVA and to determine the magnitude of difference in the perceptions of number of types of people who would benefit from eating the breakfast cereal, OLR analysis was carried out. But no significant difference was found (Odds Ratio = 1.12, p=0.39) between the claim and no claim groups (95% CI: 0.86 to 1.46).

4.3.2 Effect of a nutrition content claim on a sweet biscuit package on perceptions of number of types of people who would benefit from eating the sweet biscuits

The outcome variable used in this analysis is the 'Number of types of people who would benefit from eating the sweet biscuits'. This score was obtained by counting the number of categories which respondent indicated for biscuits (Variables B17_1 to B17_7). ANOVA was performed to determine if there were any significant differences in the perceptions of number of types of people who would benefit from eating the sweet biscuits between those exposed to a nutrition content claim and those not exposed. However, no significant difference was found ($F(1, 1058) = 2.76$, $p = 0.097$).

To confirm the results of ANOVA and to further estimate the magnitude of difference in the perceptions of who would benefit from eating the sweet biscuits, OLR analysis was done. But no significant difference was found (Odds Ratio = 1.23, p=0.14) between the claim and no claim groups (95% CI: 0.94 to 1.61).

5. Does a product with a nutrition content claim cause consumers to attribute to it a greater number of perceived health benefits, compared with a product without a claim?

5.1 Effect of a nutrition content claim on perceptions of number of types of health benefits from eating the food product (overall)

The outcome variable used in this analysis is the 'Number of health benefits from eating the food product'. This score was obtained by counting the number of perceived health benefits reported by respondents in the telephone interview, with scores ranging from 0 to 11. For overall score, numbers for cereal (Variables B8_1 to B8_11) & for biscuits (Variables B18_1 to B18_11) have been averaged. The resulting variable is best analysed by ANOVA/Regression models as it follows a Normal Distribution.

ANOVA was done to examine the effect of a nutrition content claim on perceptions of types of health benefits from eating the food product. Overall, there was no effect of a nutrition content claim on perceptions of types of health benefits from eating the food product ($F(1, 1058)=0.84$, $p=0.36$).

To confirm the results of ANOVA and to determine the magnitude of difference in the perceptions of types of health benefits from eating the food product, Ordinal Logistic Regression (OLR) analysis was performed. The use of OLR is appropriate as the outcome variable 'number of health benefits from eating the food product' was measured on an ordinal scale.

The OLR analysis shows that there was no larger effect (Odds Ratio = 1.14, $p=0.32$) of a nutrition content claim on perceptions of types of health benefits from eating the food product between the claim and no claim groups (95% CI: 0.88 to 1.50).

5.2 Comparison of perceptions of number of types of health benefits from eating the food product between cereal and biscuits

To further understand whether perceptions of types of health benefits from eating the food product was similar for cereal and biscuits, the interaction effect between cereal and biscuits was examined. The results suggest that there was no significant difference ($t = 0.28$, $p= 0.78$) between those who viewed the experimental packages and those who viewed the control packages, in terms of their perceptions of types of health benefits from eating the food product, for both cereals and biscuits (95% CI: -0.33 to +0.44).

5.3.1 Effect of a nutrition content claim on a breakfast cereal package on perceptions of number of types of health benefits from eating the breakfast cereal

The outcome variable used in this analysis is the 'Number of health benefits from eating the breakfast cereal'. This score was obtained by counting the number of perceived health benefits which respondent indicated for cereal (Variables B8_1 to B8_11). ANOVA was carried out to determine if there were any significant differences in the perceptions of types of health benefits from eating the breakfast cereal between those exposed to a nutrition content claim and those not exposed. However, no significant difference was found ($F(1, 1058) = 0.49$, $p= 0.48$).

To confirm the results of ANOVA and to estimate the magnitude of difference in the perceptions of types of health benefits from eating the breakfast cereal, OLR analysis was performed. But no significant difference was found (Odds Ratio = 1.11, $p=0.45$) between the claim and no claim groups (95% CI: 0.85 to 1.45).

5.3.2 Effect of a nutrition content claim on a sweet biscuit package on perceptions of number of types of health benefits from eating the sweet biscuits

The outcome variable used in this analysis is the 'Number of health benefits from eating the sweet biscuits'. This score was obtained by counting the number of perceived health benefits reported by respondents for biscuits (Variables B18_1 to B18_11). ANOVA was done to examine if there were any significant differences in the perceptions of types of health benefits from eating the sweet biscuits between those exposed to a nutrition content claim and those not exposed. However, no significant difference was found ($F(1, 1058) = 0.90$, $p = 0.34$).

To confirm the results of ANOVA and to further estimate the magnitude of difference in the perceptions of types of health benefits from eating the sweet biscuits, OLR analysis was performed. But no significant difference was found (Odds Ratio = 1.15, $p=0.31$) between the claim and no claim groups (95% CI: 0.88 to 1.50).

Summary Graph, RQ 1-5

Figure 1 below summarises the ordinal logistic regression results in sections 1-5 above. Each outcome variable is displayed in one panel and the estimated odds ratio for each product (and overall) is shown as a circle in the plot area. The lines to either side of the odds ratio represent the 95% confidence interval for the odds ratio.

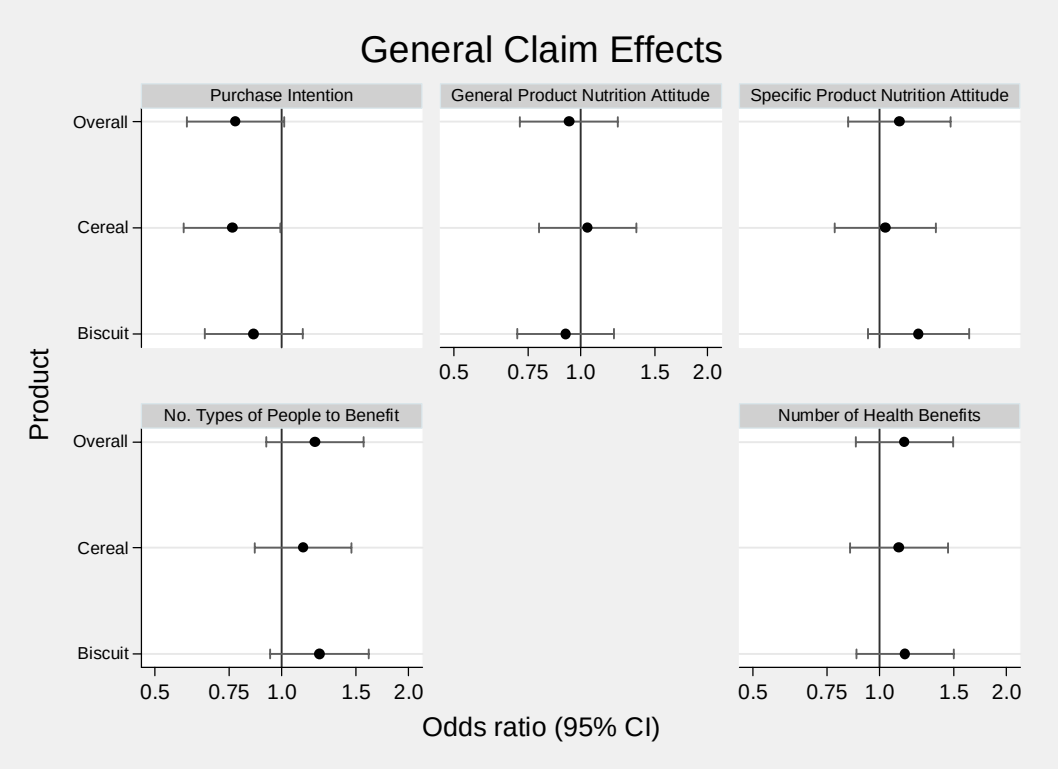


Figure 1 General Claim Effects

The 95% confidence interval for the odds ratio shows the least and greatest possible true values for the OR representing effect size for that outcome variable. An odds ratio of 1.0 indicates no association between presence of a claim on the product and the outcome variable.

6. **Do the five specific claim conditions have different effects on consumers' purchase intentions or product evaluations?**

7. **Does the type of claim or type of product influence product evaluations or purchase intentions?**

Research questions 6 & 7 have been combined and the results are reported

6 Effect of different nutrition content claims on product evaluations

6.1 Effect of different claims on purchase intention

6.1.1 Breakfast cereal product

The outcome variable used in this analysis is 'purchase intention for breakfast cereal' measured on a seven-point scale. ANOVA was performed to assess any differences in the impact of nutrition content claim type in breakfast cereal purchase intention. The results of this analysis indicated that there was no significant difference in purchase intention between the various nutrition content claims of breakfast cereal packaging ($F(4,1047) = 1.91$, $p = 0.107$).

To confirm the results of ANOVA and to further estimate the magnitude of difference in purchase intention between the various claim types, OLR analysis was conducted. The predictor variable used in this analysis was a five level categorical claim condition for breakfast cereal. Results of the analysis (Table 1) shows that respondents who received cereal packets with "increased fibre" claim (Odds ratio = 0.70, 95% CI : 0.50-0.99) & "good source of fibre" claim (Odds ratio = 0.68, 95% CI : 0.49-0.95) were about 30% less likely to have a higher purchase intention than those who received the control cereal packets.

Table 1 : Effect of nutrition content claims on purchase intention of breakfast cereal

Claim type	*Odds Ratio*	*95% CI*	*p*
97% fat free	0.93	0.67 – 1.30	0.67
Increased fibre	0.70	0.50 – 0.99	0.04
Good source of fibre	0.68	0.49 – 0.95	0.02
Reduced sugar	0.75	0.53 – 1.05	0.09

6.1.2 Sweet biscuit product

The outcome variable used in this analysis is 'purchase intention for sweet biscuits' measured on a seven-point scale. To assess any differences in the impact of nutrition content claim type in sweet biscuit purchase intention, ANOVA was used. However, no significant difference was found in sweet biscuit purchase intention according to the specific nutrition content claims featured on the sweet biscuit packaging ($F(4,1040) = 1.81$, $p = 0.125$).

OLR analysis was carried out to confirm the results of ANOVA and to determine the magnitude of difference in purchase intention for the various claim types. The results are presented in Table 2. Consumers who viewed sweet biscuit package with “Low in saturated fat ” claim were about 30% (Odds ratio = 0.72, 95% CI : 0.51-1.01) less likely to have a higher purchase intention for sweet biscuits than those who viewed the control packages.

Table 2 : Effect of nutrition content claims on purchase intention of sweet biscuits

Claim type	Odds Ratio	95% CI	p
Low in saturated fat	0.72	0.51 – 1.01	0.058
Reduced fat	0.86	0.62 – 1.20	0.38
Good source of fibre	0.80	0.57 – 1.12	0.20
No added sugar	1.09	0.78 – 1.53	0.61

6.2 Effect of different claims on general product nutrition attitude

6.2.1 Breakfast cereal product

The outcome variable used in this analysis is ‘general product nutrition attitude for breakfast cereal’ which is the mean of two nutrition attitude variables for cereal. ANOVA was used to investigate if there were any significant differences in general product nutrition attitude for cereal between the various claim types. The results showed that the nature of nutrition content claim on the breakfast cereal package did not impact respondent’s general product nutrition attitude ($F(4,1035) = 1.40$, $p = 0.234$).

In order to confirm the results of ANOVA and to further estimate the magnitude of difference in general product nutrition attitude between the various claim types, OLR analysis was performed using a five level categorical claim condition as predictor variable. The result of this analysis is given in Table 3.

Table 3 : Effect of nutrition content claims on general product nutrition attitude - breakfast cereal

Claim type	Odds Ratio	95% CI	p
97% fat free	0.94	0.67 – 1.31	0.71
Increased fibre	0.99	0.70 – 1.39	0.96
Good source of fibre	0.96	0.69 – 1.34	0.82
Reduced sugar	1.32	0.94 – 1.86	0.11

6.2.2 Sweet biscuit product

ANOVA results showed that there was no significant difference in general product nutrition attitude for the various nutrition content claims on sweet biscuit packaging ($F(4,1034) = 1.55$, $p = 0.185$).

To confirm the above results and to determine the magnitude of difference, OLR was carried out using a five level categorical claim condition as the predictor variable. . Table 4 shows the results.

Table 4 : Effect of nutrition content claims on general product nutrition attitude - sweet biscuits

Claim type	Odds Ratio	95% CI	p
Low in saturated fat	0.74	0.53 – 1.04	0.08
Reduced fat	0.89	0.64 – 1.23	0.48
Good source of fibre	1.11	0.79 – 1.56	0.54
No added sugar	0.99	0.71 – 1.38	0.94

6.3 Effect of different claims on specific product nutrition attitude

6.3.1 Breakfast cereal product

ANOVA revealed no significant differences between the various nutrition content claims of breakfast cereal packaging, in relation to specific product nutrition attitude of breakfast cereal ($F(4,981) = 1.00$, $p = 0.408$).

To estimate the magnitude of difference and to further confirm ANOVA results, OLR analysis was conducted using specific product nutrition attitude for breakfast cereal as the outcome variable. The predictor variable was categorical claim condition (5 levels) . Results of this analysis is presented in Table 5.

Table 5 : Effect of nutrition content claims on specific product nutrition attitude - breakfast cereal

Claim type	Odds Ratio	95% CI	p
97% fat free	1.01	0.71 – 1.43	0.97
Increased fibre	0.89	0.62 – 1.26	0.50
Good source of fibre	1.04	0.74 – 1.47	0.80
Reduced sugar	1.20	0.85 – 1.70	0.30

6.3.2 Sweet biscuit product

ANOVA revealed no significant differences between the various nutrition content claims of sweet biscuit packaging, in relation to specific product nutrition attitude of sweet biscuits ($F(4,969) = 1.67$, $p = 0.155$).

OLR analysis was performed to confirm the results of ANOVA. Table 6 shows that consumers who received sweet biscuit packets with “no added sugar” have higher specific nutrition attitude than those who received the contro packets with “no claim” (OR = 1.46). The consumers’ specific nutrition attitudes to the biscuits with “no added sugar” was at least 3% more likely to be higher than the control biscuits, and probably about 50% more likely to be higher (95% CI : 1.03 – 2.08).

Table 6 : Effect of nutrition content claims on specific product nutrition attitude - sweet biscuits

Claim type	**Odds Ratio**	**95% CI**	**p**
Low in saturated fat	0.98	0.69 – 1.40	0.92
Reduced fat	1.29	0.91 – 1.83	0.16
Good source of fibre	1.27	0.89 – 1.79	0.18
No added sugar	1.46	1.03 – 2.08	0.035

6.4 Effect of different claims on perceptions of who benefits from eating food product

6.4.1 Breakfast cereal product

ANOVA revealed no significant differences between the various nutrition content claims of breakfast cereal packaging, in consideration of the perception of types of people who would benefit from eating the breakfast cereal product ($F(4,1055) = 0.79$, $p = 0.533$)

OLR analysis was conducted using perceptions of the number of people to benefit from eating breakfast cereal as the outcome variable. The results are presented in Table 7.

Table 7 : Effect of nutrition content claims on perceptions of number of types of people who benefit from eating breakfast cereal

Claim type	Odds Ratio	95% CI	p
97% fat free	1.12	0.80 – 1.56	0.51
Increased fibre	0.95	0.68 – 1.33	0.76
Good source of fibre	1.16	0.84 – 1.61	0.38
Reduced sugar	1.30	0.92 – 1.83	0.13

6.4.2 Sweet biscuit product

ANOVA showed no significant differences between the various nutrition content claims of sweet biscuit packaging, in relation to perceptions of number of types of people to benefit from eating sweet biscuits ($F(4,1055) = 1.37$, $p = 0.242$).

To confirm the results of ANOVA, OLR analysis was performed. Table 8 shows that consumers who viewed biscuits with “no added sugar” claim were 41% more likely to have higher perceptions of number of types of people to benefit than those who viewed biscuits with “no claim”.

Table 8 : Effect of nutrition content claims on perceptions of number of types of people to benefit from eating sweet biscuits

Claim type	Odds Ratio	95% CI	p
Low in saturated fat	1.16	0.83 – 1.62	0.38
Reduced fat	1.30	0.93 – 1.82	0.13
Good source of fibre	1.07	0.76 – 1.50	0.69
No added sugar	1.41	1.00 – 1.98	0.047

6.5 Effect of different claims on perceptions of number of types of benefits from eating food product

6.5.1 Breakfast cereal product

There were no significant differences between the various nutrition content claims of breakfast cereal packaging, in terms of the perceptions of number of types of health benefits from eating breakfast cereal ($F(4,1055) = 1.16$, $p = 0.326$)

To confirm the results of ANOVA, OLR analysis was conducted and the results are presented in Table 9.

Table 9 : Effect of nutrition content claims on perceptions of number of types of health benefits from eating breakfast cereal

Claim type	Odds Ratio	95% CI	p
97% fat free	1.07	0.76 – 1.49	0.70
Increased fibre	1.10	0.79 – 1.55	0.57
Good source of fibre	0.99	0.71 – 1.37	0.93
Reduced sugar	1.34	0.95 – 1.89	0.09

6.5.2 Sweet biscuit product

There were no significant differences between the various nutrition content claims of sweet biscuit packaging, in terms of the perceptions of number of types of health benefits from eating sweet biscuits ($F(4,1055) = 0.70$, $p = 0.590$).

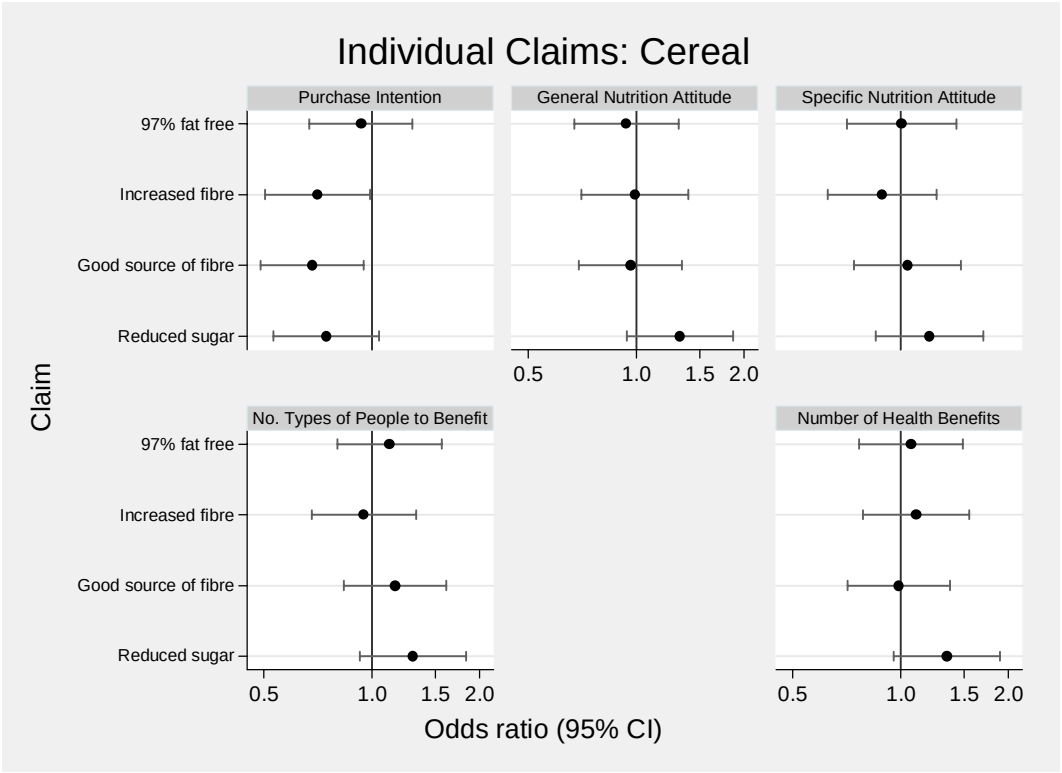
OLR analysis was done to confirm the above findings and the results are given below (Table 10).

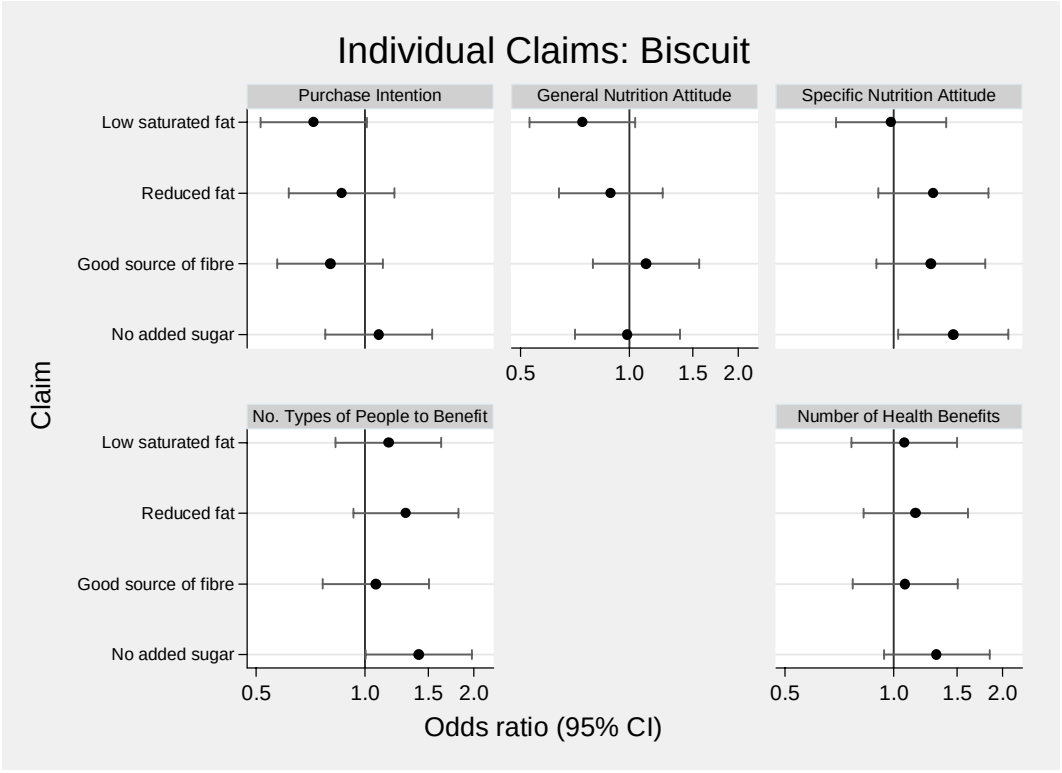
Table 10 : Effect of nutrition content claims on perceptions of number of types of health benefits from eating sweet biscuits

Claim type	Odds Ratio	95% CI	p
Low in saturated fat	1.07	0.76 – 1.50	0.69
Reduced fat	1.15	0.83 – 1.60	0.41
Good source of fibre	1.08	0.77 – 1.50	0.67
No added sugar	1.32	0.94 – 1.84	0.11

Summary Graphs – RQ 6/7

The two graphs below display odds ratios and 95% confidence intervals for the ordinal logistic regression models presented above. The two graphs display five outcome variables for the cereal product first, then for the sweet biscuit product. Each separate claim is shown in the vertical axes, and odds ratios indicate the magnitude of the effect of claim on outcome variable.





8. Level of impact of claim presence, socio-demographic and cognitive and behavioural measures on product evaluations

In order to replicate the RMR analyses, we conducted Multiple Linear regression (MLR) analyses using the dependent variables purchase intention, general product nutrition attitude, specific product nutrition attitude, perceptions of number of people to benefit and perceptions of number of health benefits. The lists of independent variables used in these analyses are presented in Table 11. Results of the MLR analyses are reported in the following sections.

Table 11 : Independent variables entered into the multiple regression & ordinal logistic regression analyses.

Variable	Type
Claim	Dichotomous categorical (0 – no claim, 1 – claim)
Age group	Recoded into 3 dummy variables with Older as reference
Gender	Dichotomous categorical (0 – Male, 1 – Female)
Household income	Recoded into 4 dummy variables with 1st quartile as reference
Country of origin	Dichotomous categorical (0 – New Zealand, 1 – Australia)
Educational level	Dichotomous categorical (0 – Secondary, 1 – Higher than secondary)
Dependents	Dichotomous categorical (0 – None, 1 – One or more)
Ethnicity	Dichotomous categorical (0 – Non-indigenous, 1 – Indigenous)
Trust in nutritional label information	Mean (scale) score
Attention to healthy diet	Recoded into 3 dummy variables with Low attention as reference
Motivation to process nutrition information	Mean (scale) score
Daily fruit and vegetable intake	Mean (scale) score
Health concerns	Recoded into 4 dummy variables with None as reference
Main grocery shopper	Dichotomous categorical (0 – None or less than half of household , 1 – Half or most of household

Note on modelling used for multiple regression analyses

In the RMR report, multiple linear regressions were reported in tables which listed only the *statistically significant (P < 0.05)* predictor terms. In part, this was because the analysts in RMR used a stepwise regression algorithm (i.e. the computer program selected which variables to include or exclude from the final model, using a criterion based on the P-value, or on the F-statistic).

In reporting our ordinal logistic regression models, we have included *all* predictor variables from Table 11 in each of the models fitted. For consistency with RMR, however, we report only the significant terms in the tables of odds ratio estimates below. We report all the fitted terms in the Summary Graph which appears on p 28 of our report. In some cases, we report “non-significant” indicator terms when the main effect (for a categorical predictor) is statistically significant.

8.1 Impact of group assignment (exposure to claim), socio-demographic and cognitive and behavioural measures on purchase intention

Multiple Linear Regression (MLR) analysis was carried out to identify the independent variables which have an impact on purchase intention. Of the 14 independent variables entered into the model, the significant predictors were age group (18-34 years & 35-54 years), gender, income ($100,000+), country of origin, trust in nutritional label information, attention to healthy diet (medium level) and daily intake of fruit & vegetables (Table 12). The variance in purchase intention explained by the independent variables was 10.6% (R^2 = 0.106). With the exception of ethnicity, our analysis has identified all predictor variables reported in Table 78 (RMR report). In addition, country of origin and daily intake of fruit & vegetables were found to be significant in our analysis.

Table 12 : Impact of variables on purchase intention – MLR analysis

Predictor variable	Coef.	Std. Err.	t	p
Age (18-34 years)	-0.429	0.145	-2.95	0.003
Age (35-54 years)	-0.275	0.135	-2.03	0.042
Gender	0.229	0.105	2.19	0.029
Income ($40,001 - $70,000)	-0.032	0.130	-0.25	0.805
Income ($70,001 - $100,000)	-0.149	0.139	-1.07	0.285
Income ($100,000+)	-0.460	0.143	-3.22	0.001
Country of origin	-0.225	0.103	-2.18	0.030
Trust in nutritional label information	0.186	0.038	4.97	0.000
Attention to healthy diet (medium level)	0.596	0.235	2.54	0.011
Attention to healthy diet (high level)	0.456	0.239	1.91	0.057
Daily fruit and vegetable intake	-0.110	0.052	-2.13	0.033

In order to confirm the findings of MLR analysis, Ordinal logistic regression (OLR) analysis was also conducted and the results are given in table 13.

Table 13 : Impact of variables on purchase intention – OLR analysis.

Predictor variable	Odds Ratio	95% CI	P
Age (18-34 years)	0.58	0.40 – 0.84	0.004
Age (35-54 years)	0.72	0.51 – 1.02	0.062
Gender	1.36	1.04 – 1.79	0.024
Income ($40,001 - $70,000)	0.91	0.65 – 1.27	0.590
Income ($70,001 - $100,000)	0.81	0.57 – 1.16	0.249
Income ($100,000+)	0.54	0.37 – 0.77	0.001
Country of origin	0.75	0.58 – 0.98	0.034
Trust in nutritional label information	1.30	1.18 – 1.44	0.000
Attention to healthy diet (medium level)	2.29	1.25 – 4.19	0.007
Attention to healthy diet (high level)	1.89	1.02 – 3.49	0.042
Daily fruit and vegetable intake	0.87	0.76 – 0.99	0.030

8.2 Impact of group assignment (exposure to claim), socio-demographic and cognitive and behavioural measures on general product nutrition attitude

To determine the key predictors of general nutrition attitude, MLR analysis was employed with general product nutrition attitude as the dependent variable. All the independent variables listed in Table 11 were entered into the model. Table14 shows the significant predictor variables. We have found all the significant predictor variables reported in Table 79 (RMR report) except ethnicity. Moreover, our analysis showed that age group (18-34 years & 35-54 years) was also one of the significant predictors of general product nutrition attitude. 15.2% of the total variation in general product nutrition attitude was explained by these predictor variables (R^2 = 0.152).

Table 14 : Impact of variables on general product nutrition attitude – MLR analysis

Predictor variable	Coef.	Std. Err.	T	P
Age (18-34 years)	-0.255	0.116	-2.19	0.029
Age (35-54 years)	-0.261	0.108	-2.42	0.016
Education	-0.214	0.080	-2.69	0.007
Income ($40,001 - $70,000)	-0.163	0.104	-1.56	0.119
Income ($70,001 - $100,000)	-0.206	0.112	-1.84	0.067
Income ($100,000+)	-0.450	0.114	-3.93	0.000
Ethnicity	0.338	0.163	2.07	0.039
Trust in nutritional label information	0.212	0.030	7.02	0.000
Motivation to process nutrition information	-0.067	0.028	-2.38	0.017
Daily fruit and vegetable intake	-0.156	0.041	-3.76	0.000

OLR analysis was performed with general product nutrition attitude as dependent variable to confirm the above findings. The results are shown in Table15.

Table 15 : Impact of variables on general product nutrition attitude – OLR analysis.

Predictor variable	Odds Ratio	95% CI	p
Age (18-34 years)	0.55	0.38 – 0.80	0.002
Age (35-54 years)	0.58	0.41 – 0.82	0.002
Education	0.69	0.54 – 0.89	0.004
Income ($40,001 - $70,000)	0.75	0.54 – 1.05	0.093
Income ($70,001 - $100,000)	0.74	0.52 – 1.06	0.103
Income ($100,000+)	0.49	0.34 – 0.69	0.000
Ethnicity	1.70	1.01 – 2.86	0.044
Trust in nutritional label information	1.47	1.33 – 1.63	0.000
Motivation to process nutrition information	0.91	0.83 – 0.99	0.034
Daily fruit and vegetable intake	0.79	0.69 – 0.90	0.001

8.3 Impact of group assignment (exposure to claim), socio-demographic and cognitive and behavioural measures on specific product nutrition attitude

MLR analysis was performed with specific product nutrition attitude as the dependent variable. The independent variables entered into the model are given in Table 11. Of the 14 independent variables, age group (35-54 years), income (($70,001 - $100,000 & $100,000+) and trust in nutritional label information were significant (Table 16). With the exception of education, our analysis has found all the significant variables reported in Table 80 (RMR report). The amount of variation in specific product nutrition attitude explained by all the predictor variables was 9.8%
(R^2 = 0.098).

Table 16 : Impact of variables on specific product nutrition attitude – MLR analysis

Predictor variable	Coef.	Std. Err.	t	p
Age (18-34 years)	-0.061	0.105	-0.58	0.563
Age (35-54 years)	-0.187	0.098	-1.92	0.055
Income ($40,001 - $70,000)	-0.168	0.094	-1.79	0.073
Income ($70,001 - $100,000)	-0.201	0.099	-2.02	0.043
Income ($100,000+)	-0.277	0.102	-2.72	0.007
Trust in nutritional label information	0.173	0.027	6.41	0.000

In order to confirm the results of MLR, OLR analysis was carried out using specific product nutrition attitude as the dependent variable. Table 17 shows the significant predictor variables.

Table 17 : Impact of variables on specific product nutrition attitude – OLR analysis.

Predictor variable	Odds Ratio	95% CI	P
Age (18-34 years)	0.77	0.52 – 1.13	0.179
Age (35-54 years)	0.63	0.44 – 0.90	0.010
Income ($40,001 - $70,000)	0.73	0.51 – 1.03	0.075
Income ($70,001 - $100,000)	0.68	0.47 – 0.98	0.037
Income ($100,000+)	0.60	0.41 – 0.87	0.007
Trust in nutritional label information	1.43	1.29 – 1.59	0.000

8.4 Impact of group assignment (exposure to claim), socio-demographic and cognitive and behavioural measures on perceptions of number of types of person who would benefit from eating food product

To determine the key predictors of perceptions of number of types of person who would benefit from eating food product, MLR analysis was performed. Results are provided in Table 18. There were 8 significant variables – gender, country of origin, income, education, ethnicity, trust in nutritional label information, motivating to process nutrition information and daily intake of fruit & vegetables. The analysis has found all significant variables reported in Table 81 (RMR report). 20.8% of the total variation in perceptions of number of types of person who would benefit from eating food product was explained by the independent variables (R^2 = 0.208).

Table 18 : Impact of variables on perceptions of number of types of person who would benefit from eating food product – MLR analysis

Predictor variable	Coef.	Std. Err.	t	P
Gender	-0.340	0.143	-2.38	0.017
Country of origin	-0.491	0.141	-3.49	0.001
Income ($40,001 - $70,000)	-0.043	0.177	-0.25	0.806
Income ($70,001 - $100,000)	-0.412	0.190	-2.16	0.031
Income ($100,000+)	-0.603	0.195	-3.10	0.002
Education	-0.489	0.135	-3.62	0.000
Ethnicity	1.154	0.275	4.19	0.000
Trust in nutritional label information	0.402	0.051	7.95	0.000
Motivation to process nutrition information	-0.194	0.047	-4.10	0.000
Daily fruit and vegetable intake	-0.287	0.070	-4.08	0.000

To confirm the above results, OLR was conducted with perceptions of number of types of person who would benefit from eating food product as the dependent variable. The significant variables are presented in Table 19.

Table 19 : Impact of variables on perceptions of number of types of person who would benefit from eating food product – OLR analysis.

Predictor variable	Odds Ratio	95% CI	P
Age (18-34 years)	0.69	0.48 – 0.998	0.049
Age (35-54 years)	0.75	0.54 – 1.06	0.107
Gender	0.69	0.53 – 0.90	0.007
Income ($40,001 - $70,000)	0.94	0.68 – 1.30	0.715
Income ($70,001 - $100,000)	0.67	0.47 – 0.95	0.023
Income ($100,000+)	0.56	0.39 – 0.80	0.002
Country of origin	0.65	0.50 -0.84	0.001
Education	0.66	0.51 – 0.85	0.001
Ethnicity	3.11	1.87 – 5.17	0.000
Trust in nutritional label information	1.47	1.34 – 1.63	0.000
Motivation to process nutrition information	0.83	0.76 – 0.91	0.000
Daily fruit and vegetable intake	0.75	0.65 – 0.86	0.000

8.5 Impact of group assignment (exposure to claim), socio-demographic and cognitive and behavioural measures on perceptions of number of types of health benefits from eating food product

In terms of perceptions of number of types of health benefits from eating food product, MLR analysis identified 8 significant predictor variables as shown in Table 20. Our analysis has found all the reported variables in Table 82 (RMR report). The amount of variation explained by the independent variables was 18.6% (R^2 = 0.186).

Table 20 : Impact of variables on perceptions of number of types of health benefits from eating food product – MLR analysis

Predictor variable	Coef.	Std. Err.	t	P
Age (18-34 years)	-0.846	0.259	-3.27	0.001
Age (35-54 years)	-0.647	0.240	-2.69	0.007
Gender	-0.917	0.186	-4.92	0.000
Income ($40,001 - $70,000)	-0.485	0.231	-2.10	0.036
Income ($70,001 - $100,000)	-0.443	0.248	-1.78	0.075
Income ($100,000+)	-0.779	0.254	-3.06	0.002
Education	-0.572	0.176	-3.25	0.001
Ethnicity	1.533	0.360	4.26	0.000
Trust in nutritional label information	0.466	0.066	7.06	0.000
Daily fruit and vegetable intake	-0.344	0.092	-3.75	0.000
Health concerns (general)	-0.607	0.464	-1.31	0.192
Health concerns (specific)	-1.363	0.615	-2.22	0.027
Health concerns (general & specific)	-0.457	0.452	-1.01	0.313

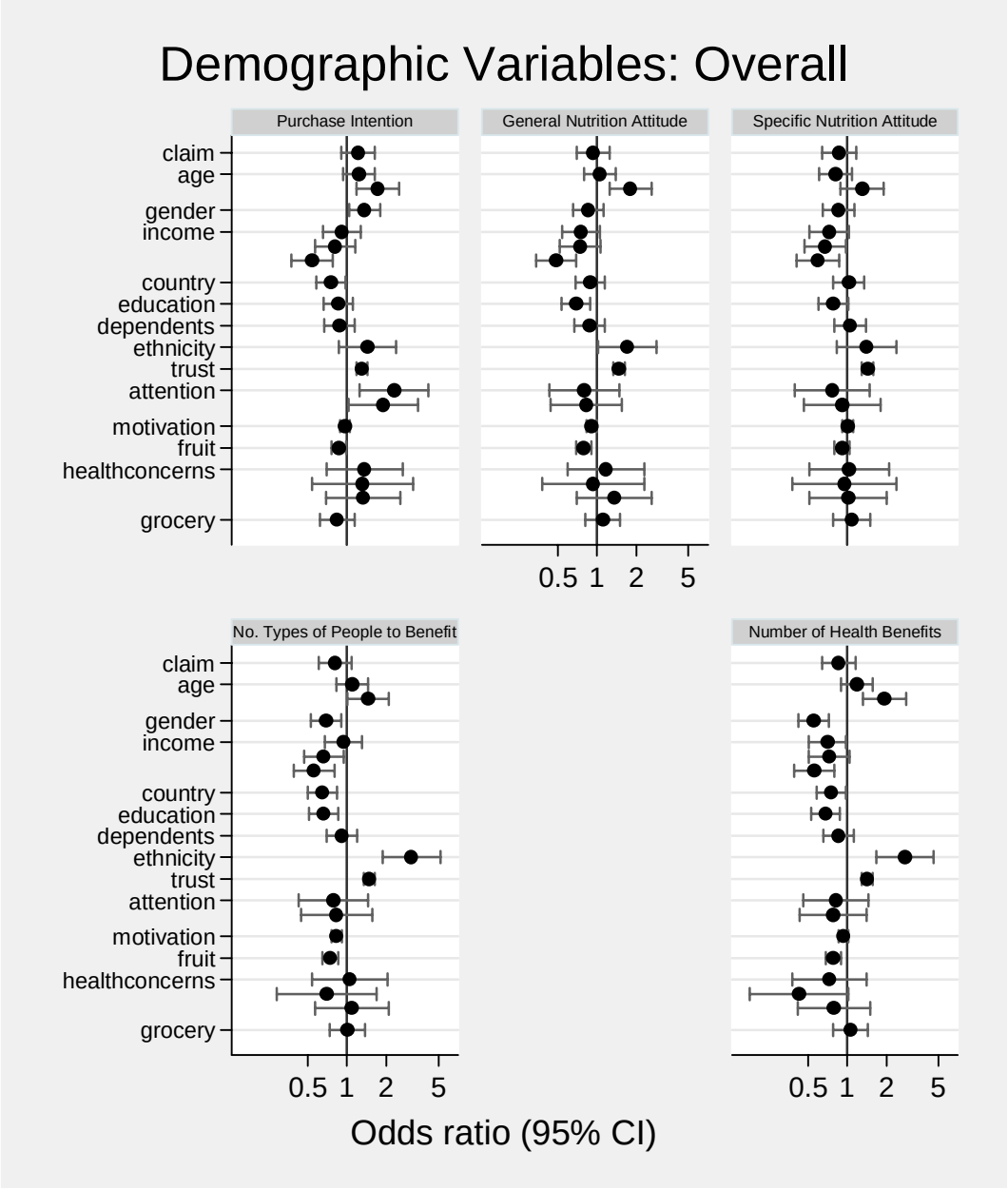
To confirm the above findings, OLR analysis was performed with perceptions of number of types of health benefits from eating food product as the dependent variable. Table 21 presents the significant predictor variables.

Table 21 : Impact of variables on perceptions of number of types of health benefits from eating food product – OLR analysis.

Predictor variable	Odds Ratio	95% CI	P
Age (18-34 years)	0.52	0.36 – 0.76	0.001
Age (35-54 years)	0.61	0.43 – 0.87	0.006
Gender	0.55	0.42 – 0.73	0.000
Income ($40,001 - $70,000)	0.70	0.51 – 0.98	0.038
Income ($70,001 - $100,000)	0.73	0.51 – 1.04	0.080
Income ($100,000+)	0.56	0.39 – 0.80	0.001
Country of origin	0.76	0.59 – 0.98	0.034
Education	0.68	0.53 – 0.88	0.003
Ethnicity	2.77	1.68 – 4.58	0.000
Trust in nutritional label information	1.42	1.29 – 1.57	0.000
Daily fruit and vegetable intake	0.78	0.69 – 0.90	0.000
Health concerns (general)	0.73	0.38 – 1.41	0.349
Health concerns (specific)	0.43	0.18 – 1.02	0.054
Health concerns (general & specific)	0.79	0.42 – 1.50	0.472

Summary Graph: RQ 8

The graph below displays odds ratio estimates from ordinal logistic regression models for each of five outcome variables, for both products combined. All variables were included in each of the five OLR models.



The strongest associations with outcome variables is clearly for ethnicity, where indigenous respondents showed much higher responses than non-indigenous respondents.

Appendix 1: Description of Ordinal Logistic Regression

Many variables of interest are ordinal. That is, you can rank the values, but the real distance between categories is unknown. Diseases are graded on scales from least severe to most severe. Survey respondents choose answers on scales from strongly agree to strongly disagree. Students are graded on scales from A to F. When your dependent variable is ordinal, Ordinal Logistic Regression (OLR) can be used.

OLR is a statistical tool for modelling the relationship between a response variable and a set of explanatory variables when the dependent (response) variable is ordinal (ordered from low to high). The OLR model does not assume normality and constant variance.

The effect size in ordinal logistic regression is an "odds ratio", which estimates the relative likelihood of being in a "higher" category. Thus, for example, OR=1.5 for the "reduced sugar" claim, relative to control, for the "number of perceived health benefits" means that subjects who received the cereal packet with "reduced sugar" claim were, on average, 50% more likely to report a higher number of perceived health benefits for the cereal than were the consumers who received the cereal packet with no claim.

An odds ratio of 1.0 (e.g. purchase intention for cereal and "97% fat free" claim for cereal) means that there was no difference in outcome between this claim and the control product.

An odds ratio less than 1.0 implies a trend towards lower outcome scores. For example, the purchase intention for cereal with "good source of fibre" claim has an odds ratio OR=0.68 (see Table 1), relative to control cereal. Therefore, the consumers receiving the cereal packets with "good source of fibre" were about 30% less likely to have a higher purchase intention than those with the control cereal.

The confidence intervals surrounding each OR shows the statistical significance of the result. If the confidence interval crosses the vertical line at OR=1, then the data support both directions of effect size for that combination of outcome and claim. For example, the purchase intention for biscuits with the "reduced fat" claim had OR=0.86 (95% CI: 0.62 to 1.20) (see Table 2). Since this CI crosses OR=1, the true purchase intention for "reduced fat" claim might be lower or higher than no claim. It is NOT true to say that there was "no difference" in purchase intention!

In cases where the CI does not cross OR=1, we can rule out one of the directions of effect. For example, the biscuits with the "no added sugar" claim have higher specific nutrition attitude than biscuits with no claim, with OR=1.46 (95% CI: 1.02 to 2.08) (see Table 6); the consumers' specific nutrition attitudes to the biscuits with "no added sugar" was at least 2% more likely to be higher than the control biscuits, and probably about 50% more likely to be higher.

Interpreting odds ratios can sometimes be confusing, particularly when assessing effects with similar magnitude on either side of the line OR=1.0. For example, an odds ratio of OR=0.75 (or, a 25% decrease in likelihood) shares the same magnitude as OR=1.33 (or a 33% increase in likelihood). The reason for this

apparent conundrum is that the former uses the larger risk as a denominator, while the latter uses the smaller risk as denominator.

This ‘stretching’ of the magnitude scale increases as OR gets further from 1.0. In the table below, we list the odds ratios above 1.0 (top two rows) with the corresponding odds ratios below 1.0 (lower two rows) with the same magnitude.

Increases	*Percent increase*	10%	25%	33%	50%	75%	100%	150%	400%
	Odds ratio	1.10	1.25	1.33	1.50	1.75	2.00	2.50	5.0
Decreases	*Odds ratio*	0.91	0.80	0.75	0.67	0.57	0.50	0.40	0.20
	Percent decrease	9%	20%	25%	33%	43%	50%	60%	80%

The table shows that, in an extreme example, an increase of 400% (OR=5.0) is the same magnitude as a decrease of 80% (OR=0.20). One way to appreciate this point may be to interpret “OR=0.20” as “one-fifth the magnitude” – it is then clear why this corresponds to the opposite effect of “OR = 5.0” which is “five times the magnitude”.

Appendix 2: Comments on Design of Experiment

We endorse the comments from the Peer Review document under the heading "A note on design for future studies". It seems from the set of eight research questions which the RFQ sought answers that the key exposure of interest is "any product claim", rather than any specific claim related to fat, sugar or fibre.

With the current design, the estimation of effect for "any product claim" versus "no claim" (ie control) is based on around 800 responses in the former category and 200 responses in the latter. This is inefficient, in the sense that 1000 responses would yield narrowest confidence intervals when split into groups of about 500 each. The confidence interval for equal groups would be about 84% the width of the same confidence interval for the 800:200 split. Stated another way, a design with equal numbers per group would need only 71% of the sample size of a 4:1 ratio split, to deliver the same power or confidence interval width.

Similarly, the research questions posed specified no comparisons between the cereal product and the biscuit product, despite the obvious design advantage that each participant provided responses for *both* a cereal product *and* a biscuit product. This within-person design is particularly efficient for precise comparisons between exposures where each person acts as his/her own control, thus removing all of the between-person 'noise' from the comparison. In this experiment, it seems that this design advantage was not necessary (although the cereal/biscuit comparison may be important in future re-analysis of these data).

The experiment may have been much more efficient, therefore, if just one product were sent to each participant. The data-collections costs (for CATI) would have been much less per respondent (not quite half, because of the necessary demographic information), so for the same cost almost twice as many respondents could have been included.

The current design gains a little efficiency by using the average of each respondent's cereal and biscuit responses as the outcome(s) of interest. However, because each person's paired responses are likely to be similar, then this efficiency gain is not maximised as it would be had the cereal respondent been a different person from the biscuit respondent.

Having noted these two issues in the design of this experiment, we should note that the design implemented in this case certainly was highly successful and did deliver the answers to the research questions posed. We congratulate Food Standards Australia New Zealand on the successful research which has been completed.