# Supplementary Methods

## Observational study

The following pre-defined terms were searched on each of the supermarket websites: ‘milk’, ‘plant-based milk’, ‘plant milk’, ‘oat milk’, ‘soya milk’, ‘pea milk’, ‘nut milk’, ‘almond milk’ ‘coconut milk’ and ‘cashew milk’. These search terms were based on a small pilot study of ten searches on each of the supermarket websites.

Any items that appeared in a search term but were deemed to obviously not be a dairy milk or milk substitute (e.g., a chocolate bar), were excluded. Powdered products, flavoured products, products marketed for pets, products marketed for babies or children, tinned products (e.g., coconut milk), milkshakes, protein shakes, probiotic drinks, were also excluded.

Any products that were the same within a supermarket, but were different volumes (i.e., a 100ml semi-skimmed milk and a 400ml semi-skimmed milk) were recorded separately.

After 10% of data had been collected from each supermarket, a second researcher repeated the above procedure. Discrepancy rates between the two researchers were consistently <0.05% therefore data collection by researcher one continued.

## Experimental study

## *Additional measures.* Participant gender, age, highest education level, long-term dietary restrictions (i.e., following a vegan or dairy-free diet) baseline dairy milk consumption (Question: *H*ow many days a week do you consume dairy milk in an average week*?*) and baseline milk substitute consumption (Question: How many days a week do you consume a milk substitute [i.e.*,* a plant-based milk] in an average week*?*) werealso collected.

### At the end of the study participants were also asked an open question about what they thought the purpose of the study was, and any additional feedback they might have.

### Procedure. Participants were shown an information statement explaining the study and what they will be required to do. As a cover story, participants were told the study was about breakfast consumption in the UK. Participants were informed that they were able to withdraw from the study by closing their internet browser at any time. Before commencing the study, participants completed a tick-box consent page.

At the end of the study participants were debriefed, which included information about the real purpose of the study and directed to a payment page where each participant was reimbursed £0.63. The study took approximately eight minutes to complete. All data collected was anonymous; therefore, it was not possible for participants to withdraw after completing the study.

### Sample size calculation (secondary hypothesis). We were unaware of sufficiently similar previous research that could inform any power calculation. We were therefore also guided by results from (Gleckel, 2020), who showed that more participants understood that “Vegan Butter” could be used for baking biscuits, on pasta and on toast, than “Vegan Spread”. This study indicated effect sizes in Cohen’s d of 0.8, 0.5 and 0.2 respectively.

We consider that a meaningful difference between study conditions on the secondary outcome would be one more misidentified milk substitute in the Milk Labelling condition compared to the No Milk Labelling condition. Given a pooled SD of 1.25, estimated from the pilot study, this equates to an effect size of Cohen’s *d* = 0.8.

Using G\*Power 3, we calculated that a total of 68 participants would allow us to detect an effect of this magnitude or greater, for a two-group independent t-test of the secondary outcome, to test our secondary hypothesis, with alpha level of 5% and power of 90%.

We will therefore recruit 416 participants so that the study is powered to test both the primary and secondary hypotheses.

# Supplementary Figures

## Supplementary Figure S1. CONSORT diagram (experimental study).

## Enrollment

Clicked on study link

(n=416)

Left study page before randomisation (n=2 [<1%])

## Allocation

Randomised (n=414)

Milk Label condition

(n=207)

No Milk Label condition

(n =207)

Milk Label condition

• failed at least one attention check (n=23 [11%])

No Milk Label condition

• failed at least one attention check (n=39 [19%])

## Excluded

## Analysis

Milk Label condition

(n =184)

No Milk Label condition

(n =168)

# Supplementary Tables

## Supplementary Table S1. Product price and position (observational study).

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  |  | **Product was not found when the term ‘milk’ was searched**  **n (%)** | **Position#: When ‘milk’ was searched what page was the product found on^**  **mean (SD), median.** | **Price per litre (£)** | |
| **Mean** | **95% CI** |
| Supermarket 1 | Dairy milks (n=45) | 0 (0) | 1 (1), 1 | 0.89 | 0.81, 0.98 |
| Milk substitutes (n=54) | 28 (52) | 3 (1), 3 | 1.48 | 1.37, 1.59 |
| **Supermarket 2** | Dairy milks (n=63) | 0 (0) | 2 (1), 1 | 1.00 | 0.91, 1.09 |
| Milk substitutes (n=96) | 1 (1) | 8 (4), 10 | 1.68 | 1.58, 1.77 |
| **Supermarket 3** | Dairy milks (n=58) | 0 (0) | 1 (0), 1\* | 0.96 | 0.88, 1.04 |
| Milk substitutes (n=56) | 4 (7) | 1 (0), 1\* | 1.46 | 1.34, 1.58 |
| **Supermarket 4** | Dairy milks (n=49) | 0 (0) | 2 (2), 1 | 0.86 | 0.78, 0.94 |
| Milk substitutes (n=41) | 0 (0) | 11 (3), 12 | 1.41 | 1.26, 1.55 |
| **Total** | Dairy milks | 0 (0) | 1 (1), 1 | 0.94 | 0.89, 0.98 |
| Milk substitutes | 33 (13) | 6 (5), 4 | 1.54 | 1.48, 1.60 |

^Excluding those products not found when the term ‘milk’ was searched.

## #The page number that dairy milk and milk substitutes appear in the returned list of items when searching the term ‘milk’ on the supermarket website

\*all products for this supermarket were listed on one continuous page, referred to here as page 1.

Confidence interval (CI). Standard deviation (SD).

## Supplementary Table S2. Pilot study data (experimental study).

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
|  | **Study condition** | | | | | | **Observed difference** |
| **No Milk Labelling Condition (n=21)** | | | **Milk Labelling Condition (n=20)** | | |
| Mean (SD) | Median | Range | Mean (SD) | Median | Range |
| **Primary outcome –**  The number of milk substitute products the participant correctly identified in question 1 (out of 10) | 7.00 (3.46) | 9 | 0-10 | 8.30 (2.13) | 10 | 4-10 | 1.30 |
| **Secondary outcome -**  The number of products the participant misidentified in question 2 (out of 10) | 0.38 (1.53) | 0 | 0-7 | 0.55 (0.89) | 0 | 0-3 | 0.17 |

Standard deviation (SD).

**Supplementary Table S3. Results from all analysis (experimental study).**

|  |  |  |  |
| --- | --- | --- | --- |
|  | Results from binary logistic generalized linear model | | |
|  | Main effect between study conditions (reference category: No Milk Labelling Condition) | Interaction term (where appliable)\* | Covariate main effects (where applicable)\* |
| Primary outcome |  |  |  |
| Primary analysis | OR = 1.4, 95% CI = 1.1, 2.1, p = 0.042 |  |  |
| Secondary analysis1 | OR = 1.4, 95% CI = 0.9, 2.0, p = 0.069 | p = 0.573 | Dairy milk consumption: p = 0.161  Milk substitute consumption: p < 0.001 |
| Sensitivity analysis 12 | OR = 1.5, 95% CI = 1.1, 2.1, p = 0.044 |  |  |
| Sensitivity analysis 23 | OR = 1.5, 95% CI = 1.1, 2.1, p = 0.040 |  |  |
| Sensitivity analysis 34 | OR = 1.5, 95% CI = 1.1, 2.3, p = 0.027 |  |  |
| Sensitivity analysis 45 | OR = 1.5, 95% CI = 1.1, 2.1, p = 0.049 |  |  |
| Sensitivity analysis 56 | OR = 1.4, 95% CI = 1.1, 2.0, p = 0.024 |  |  |
| Sensitivity analysis 67 | OR = 1.3, 95% CI = 1.1, 1.8, p = 0.029 |  |  |
| **Secondary outcome** |  |  |  |
| Primary analysis | OR = 4.7, 95% CI = 2.3, 9.6, p < 0.001 |  |  |
| Secondary analysis1 | OR = 4.9, 95% CI = 2.6, 9.5, p < 0.001 | p = 0.669 | Dairy milk consumption: p = 0.365  Milk substitute consumption: p < 0.001 |

**1** Pre-specified covariates of baseline dairy milk consumption and baseline milk substitute consumption

2 Excluding participants that guessed the true nature of the study (n=34 [10%] excluded)

3 Excluding those that reported being on a restricted diet (diary-free or vegan) (n=58 [17%] excluded)

4 Excluding any participant that said yes to adding a ‘other drink’ (i.e., a fruit juice) to their tea or coffee (n= 53 [15%] excluded)

5 Excluding anyone who answered zero to the ‘number of times the participants consumes dairy milk in an average week (n=59 [17%] excluded)

6 Including those that failed the attention check (n=62 included [n=414 in total]), due to an imbalance been the number of participants excluded (see Supplementary Figure S1).

7 Removing milk substitute six which produced outlying results for all outcomes (see Supplementary Table S5)

\*Interaction terms > 0.05 were removed from the model, leaving only the three main effects of study condition, dairy milk consumption and milk substitute consumption

## Supplementary Table S4. Participants demographic characteristics between study conditions (experimental study).

|  |  |  |  |
| --- | --- | --- | --- |
|  | | **Study Condition**  **n (%)** | |
| **No Milk Labelling** | **Milk Labelling** |
| Sex | Male | 89 (53) | 86 (47) |
| Female | 79 (47) | 97 (53) |
| Other | 0 | 1 (<1) |
| Prefer not to say | 0 | 0 |
| Highest education level | Education to <16 years old | 0 | 1 (<1) |
| Education to 16 years old | 19 (11) | 29 (16) |
| Education to 18 years old | 52 (31) | 47 (26) |
| Bachelor's degree or higher, or equivalent | 95 (57) | 105 (57) |
| Other^ | 2 (1) | 2 (1) |
| Long-term dietary restrictions\* | Yes | 23 (14) | 35 (19) |
| No | 145 (86) | 149 (81) |
| Age (years), mean (SD) | | 38 (13) | 38 (13) |
| Dairy milk consumption in an average week (number of days), mean (SD) | | 5 (3) | 5 (3) |
| Milk substitute consumption in an average week (number of days), mean (SD) | | 2 (2) | 2 (3) |

\*following a vegan or dairy-free diet

^no further information was available

Standard deviation (SD).

## Supplementary Table S5. Responses (yes, no and unsure) for each question, presented descriptively for each milk substitute label (experimental study).

The tables below show the response to each question for each of the ten milk substitutes. Milk substitute six, which had a name very similar to ‘milk’, showed differing results compared to all the other milk substitutes with a higher confusion rate for statement two, compared to the other milk substitutes. Milk substitute six was therefore removed for a sensitivity analysis of the primary outcome (Supplementary Table S3)

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|  | **Response to question 1 (would someone add to tea), n (%)** | | | | | |
| **Milk substitute** | **Yes** | | **No** | | **Unsure** | |
| Milk label condition | No milk label condition | Milk label condition | No milk label condition | Milk label condition | No milk label condition |
| 1 (oat) | 158 (86) | 133 (79) | 13 (7) | 20 (12) | 13 (7) | 15 (9) |
| 2 (soya) | 166 (90) | 156 (93) | 12 (7) | 9 (5) | 6 (3) | 3 (2) |
| 3 (soya) | 161 (88) | 134 (80) | 15 (8) | 20 (12) | 8 (4) | 14 (8) |
| 4 (rice) | 121 (66) | 92 (55) | 26 (14) | 52 (31) | 37 (20) | 24 (14) |
| 5 (almond) | 155 (84) | 125 (74) | 15 (8) | 30 (18) | 14 (8) | 13 (8) |
| 6 (coconut) | 173 (94) | 161 (96) | 3 (2) | 5 (3) | 8 (4) | 2 (1) |
| 7 (oat) | 160 (87) | 125 (74) | 12 (7) | 28 (17) | 12 (7) | 15 (9) |
| 8 (soya) | 165 (90) | 146 (87) | 12 (7) | 12 (7) | 7 (4) | 10 (6) |
| 9 (cashew) | 130 (71) | 107 (64) | 30 (16) | 33 (20) | 24 (13) | 28 (17) |
| 10 (rice) | 119 (65) | 96 (57) | 33 (18) | 47 (28) | 32 (17) | 25 (15) |

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|  | **Response to question 2 (comes from an animal source), n (%)** | | | | | |
| **Milk substitute** | **Yes** | | **No** | | **Unsure** | |
| Milk label condition | No milk label condition | Milk label condition | No milk label condition | Milk label condition | No milk label condition |
| 1 (oat) | 2 (1) | 0 | 177 (96) | 167 (99) | 5 (3) | 1 (<1) |
| 2 (soya) | 2 (1) | 0 | 178 (97) | 166 (99) | 4 (2) | 2 (1) |
| 3 (soya) | 1 (<1) | 0 | 178 (97) | 168 (100) | 5 (3) | 0 |
| 4 (rice) | 0 | 0 | 181 (98) | 165 (98) | 3 (2) | 3 (2) |
| 5 (almond) | 2 (1) | 0 | 180 (98) | 168 (100) | 2 (1) | 0 |
| 6 (coconut) | 39 (21) | 8 (5) | 122 (66) | 158 (94) | 23 (13) | 2 (1) |
| 7 (oat) | 1 (<1) | 0 | 181 (98) | 168 (100) | 2 (1) | 0 |
| 8 (soya) | 5 (3) | 2 (1) | 175 (95) | 166 (99) | 4 (2) | 0 |
| 9 (cashew) | 1 (<1) | 1 (<1) | 180 (98) | 167 (99) | 3 (2) | 0 |
| 10 (rice) | 0 | 2 (1) | 181 (98) | 165 (98) | 3 (2) | 1 (<1) |

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|  | **Response to question 3 (would purchase in future), n (%)** | | | | | |
| **Milk substitute** | **Yes** | | **No** | | **Unsure** | |
| Milk label condition | No milk label condition | Milk label condition | No milk label condition | Milk label condition | No milk label condition |
| 1 (oat) | 101 (55) | 87 (52) | 68 (37) | 65 (39) | 15 (8) | 16 (10) |
| 2 (soya) | 69 (38) | 63 (38) | 105 (57) | 87 (52) | 10 (5) | 18 (11) |
| 3 (soya) | 58 (32) | 46 (27) | 116 (63) | 110 (66) | 10 (5) | 12 (7) |
| 4 (rice) | 48 (26) | 34 (20) | 113 (61) | 111 (66) | 23 (13) | 23 (14) |
| 5 (almond) | 83 (45) | 73 (44) | 89 (48) | 82 (49) | 12 (7) | 13 (7) |
| 6 (coconut) | 80 (43) | 70 (42) | 72 (39) | 71 (42) | 32 (17) | 27 (16) |
| 7 (oat) | 88 (48) | 79 (47) | 75 (41) | 75 (45) | 21 (11) | 14 (8) |
| 8 (soya) | 59 (32) | 53 (32) | 111 (60) | 104 (62) | 14 (8) | 11 (7) |
| 9 (cashew) | 61 (33) | 46 (27) | 106 (58) | 102 (61) | 17 (9) | 20 (12) |
| 10 (rice) | 50 (27) | 31 (19) | 108 (59) | 111 (66) | 26 (14) | 26 (16) |

**Supplementary Table S6. Relevant comments made by participants (experimental study).**

|  |
| --- |
| The study seems to consider whether use is likely in the future. In my case I have answered 'no' because I have already, in the past, tried various plant based milk substitutes and, apart from oat milk, have decided I don't like them so I habitually use semi-skimmed milk but periodically do use oat milk. |
| Some of the other milk I said no to just because I do not enjoy the taste of anything nut related. |
| Some of the milk alternatives I don't buy as I do not like the taste and others because they are too expensive |

## References

Gleckel, A. (2020). Are Consumers Really Confused by Plant-Based Food Labels? An Empirical Study [Online]. Available: <https://papers.ssrn.com/sol3/papers.cfm?abstract_id=3727710>.