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Nudging sustainable grocery choices: the importance of choice context

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Abstract

Supermarkets increasingly use behavioural interventions to encourage more sustainable food choices, but it remains unclear whether one type of nudge works consistently better than others across different grocery decisions. This study compared four nudge approaches - information, salience, pre-selection and co-benefit framing - across four simulated grocery-choice tasks involving 172 UK shoppers and 688 repeated choice observations. The primary analysis found no significant overall difference between the four nudge conditions, although sustainable choice was close to ceiling in three of the four tasks, leaving little room for the nudges to differ. By contrast, sustainable choice varied substantially across the four product and task-stage conditions. Uptake was 93.9–97.5% for the strawberry, tomato and peanut butter alternatives but 18.5% for the bean burger option. Because they were always presented in the same order, however, product effects cannot be separated from task-order effects and this pattern should not be interpreted causally. Secondary analyses showed that cost and taste were among the strongest stated shopping priorities, while environmental impact ranked lower. Perceived expense was associated with lower odds of sustainable choice, whereas positive beliefs about health, taste, freshness and quality were associated with higher odds. Participants also reported greater willingness to pay when sustainability was paired with personal co-benefits. The findings suggest that nudge effectiveness may depend on the nature of the underlying choice and the wider conditions surrounding it. Light-touch nudges may be useful where sustainable alternatives are already familiar, acceptable and affordable, while larger dietary changes may require stronger action on price, availability, range, placement and product quality. Nudges are therefore best treated as one part of a wider retail strategy.

1. Introduction

As supermarkets come under increasing pressure to reduce the environmental impact of the food they sell, behavioural interventions have become a visible part of the retailer toolkit. Labels, prominent placement, recommendations, pre-selected options and messages linking sustainability with benefits such as health or taste can influence decisions without removing choice or substantially changing the shopping process (Thaler and Sunstein, 2008). What remains less clear is whether one type of nudge consistently works better than another across different food choices.

Food systems are major drivers of climate change, biodiversity loss and pressure on natural resources, making changes in food production and consumption central to sustainability goals (Rockström et al., 2025). Supermarkets are important actors in this transition because they shape the conditions in which food decisions are made. In the UK, major retailers account for the large majority of grocery sales and influence which products shoppers see, as well as their price, placement, promotion and availability (WWF, 2025; BIT, 2023).

At the same time, sustainable food purchasing is difficult to change through environmental concern alone. Grocery choices are shaped by immediate and often competing priorities, including price, taste, convenience, familiarity and household preferences (Fernqvist, Spendrup and Tellström, 2024; Munro,

Kapitan and Wooliscroft, 2023). Repeated purchasing can also become strongly habitual, reinforcing familiar products over time (Linder, Lindahl and Wijermans, 2026).

Nudges seek to address this by changing how options are presented at the point of choice. Existing studies show that information, salience, defaults and recommendations can influence food purchasing, but findings are mixed and often depend on the setting in which the intervention is tested (Grant et al., 2025). Much of the grocery literature focuses on healthier eating rather than environmentally sustainable choices, while sustainability studies have tended to examine one intervention or product category at a time.

There is a further reason to expect nudge effectiveness to vary. Not all sustainable food choices require the same degree of change from the shopper. Choosing different packaging or product origin may leave the underlying food largely unchanged, while moving from meat to a plant-based alternative may involve challenges around taste, habit, meal preparation and household acceptance. Deniau et al. (2026) found that consumers were more likely to express sustainability through product attributes such as packaging or provenance than through larger shifts between food categories. Research on meat reduction similarly highlights the continuing influence of habit, attitudes and established purchasing patterns (Çoker and van der Linden, 2022; Linder, Lindahl and Wijermans, 2026).

The wider retail environment may also shape what a nudge can achieve. Consumers can only act on a sustainable preference if the alternative is available, affordable and acceptable. Price, availability and convenience repeatedly emerge as barriers to sustainable food purchasing, suggesting that light-touch behavioural prompts may have limited effect where opportunity-related constraints remain (Ran et al., 2022; Munro, Kapitan and Wooliscroft, 2023). COM-B provides a useful way of understanding this interaction by framing behaviour as dependent on capability, opportunity and motivation together, not motivation alone (Michie, Atkins and West, 2014).

Retailers already use both kinds of intervention. UK supermarkets report light-touch measures such as labelling, price promotions and placement (Sainsbury's, 2026; Tesco PLC, 2026), while some European retailers have gone further by changing the offer itself, through plant-based sales-mix targets (Ahold Delhaize, 2025) or by reformulating mainstream own-brand products so that shoppers receive a lower-impact version without having to opt in (REWE Group, 2025). What remains unclear is when a light-touch prompt is likely to be enough and when the offer itself needs to change - the question this study speaks to.

This study compares four nudge approaches - information, salience, pre-selection and co-benefit framing - across four grocery tasks, and asks whether their effectiveness depends on the nature of the underlying choice and the level of change being asked of the consumer. Barriers, product beliefs and willingness to pay are examined as secondary outcomes. More broadly, the question speaks to a wider debate about how far responsibility for sustainable consumption should rest with individual shoppers or with the institutions that structure their choices (Munro, Kapitan and Wooliscroft, 2023).

2. Literature review

2.1 Four nudge mechanisms

Nudge theory shifts attention from persuading individuals to redesigning the environment in which decisions occur. Nudges alter choice architecture without removing options or substantially changing financial incentives (Thaler and Sunstein, 2008), making them particularly relevant to supermarkets and to grocery shopping, where fast, habitual decision-making often dominates over deliberate evaluation (Kahneman, 2011). Evidence suggests nudges can shift food choices, but with no consistently superior approach: Grant et al.'s (2025) review of technology-enabled grocery interventions found labelling, positioning, recommendations and defaults could each influence choice, but effect sizes varied too much across studies to identify one best strategy - a gap this study addresses by testing several mechanisms within one design instead of relying on cross-study comparison.

This study tests four such mechanisms, chosen to represent distinct and commercially realistic forms of choice architecture. Information nudges explain why an option is lower-impact; their effect tends to depend on the message being simple and credible: Buratto and Lotti (2024) found a low-emissions symbol alone did not shift plant-based dish selection, but adding a brief explanation did. Salience nudges make an option easier to notice without adding explanation: in an online experimental supermarket, Jostock et al. (2024) found that more prominent positioning reduced the environmental impact of selected baskets, whereas increasing availability alone did not significantly change choices. Pre-selection presents the sustainable option as the active choice while leaving it freely changeable - closer to a recommendation than a hard default, since acceptance of true defaults depends on them remaining transparent and easy to reject (Lemken, Wahnschafft and Eggers, 2023). Co-benefit framing links sustainability to a benefit shoppers already value, such as health, taste or freshness, on the basis that personally relevant outcomes may be more persuasive than an environmental appeal alone (BIT, 2023); such claims need to be credible and specific, since consumers can misjudge both the health and environmental performance of foods (Giacone et al., 2024). These four mechanisms map loosely onto different COM-B routes - information targets capability, pre-selection and salience largely target automatic motivation, and co-benefit framing targets reflective motivation. None directly addresses opportunity.

2.2 Why effectiveness may depend on the scale of change

Nudge effectiveness is unlikely to be independent of what is being nudged. Deniau et al. (2026) found that consumers were more willing to express sustainability through attributes such as packaging, origin or ingredient sourcing than through a change in food category - a distinction this study builds directly into its choice of products. Meat substitution is the clearest test case of a larger change: Çoker and van der Linden (2022) found that past behaviour remained important in predicting meat consumption even where attitudes and perceived control favoured reduction, and Linder, Lindahl and Wijermans (2026) similarly found that established meat-buying habits persisted among shoppers holding positive attitudes towards plant-based alternatives. In a mock supermarket using real prices, Yu, Wassmann and Siegrist

(2026) found only around 2% of plant-based swap recommendations were accepted once a shopper had already chosen a meat product - evidence that nudges asking shoppers to reverse an existing preference may be markedly weaker than those shaping an initial one.

Positive intentions towards sustainable food often fail to translate into purchase, particularly in habitual, low-deliberation settings such as grocery shopping and where availability is limited, claims are uncertain or trade-offs are perceived (Vermeir and Verbeke, 2006; Sheeran and Webb, 2016). Nudges preserve choice but do not directly address these opportunity-related constraints. Ran et al. (2022) found price and time constrained shoppers' ability to act on favourable attitudes towards sustainable food, and argued that information works best when it supports, rather than substitutes for, a viable product offer. Munro, Kapitan and Wooliscroft (2023) similarly argue that responsibility for the attitude–behaviour gap should not sit with shoppers alone, since availability, price, placement and trust are largely determined by retailers and suppliers. Wadi et al.'s (2024) systematic review of sustainable-diet interventions found somewhat stronger support for combinations of education, persuasion and environmental restructuring than for information alone, though the underlying evidence base remained mixed and inconsistent across studies.

The COM-B model (Michie, Atkins and West, 2014) provides a useful framework for bringing these explanations together: interventions that target *motivation* may do little where the main constraint is *opportunity* - a product's price, availability or convenience - instead. Price is a particularly important constraint here, since cost is a commonly reported barrier to sustainable consumption (Deloitte, 2024) and a nudge that preserves existing prices cannot compensate for a substantial price disadvantage - a limitation directly relevant to a controlled experiment, reported below, in which prices were deliberately held equal.

2.3 Research focus

Direct comparisons of multiple nudge types across multiple product contexts, within a single design, remain rare. Much of the existing food-nudge literature tests one mechanism within one product category, which makes it difficult to know whether a reported effect reflects the nudge, the product it happened to be tested on, or both. This study addresses that gap by testing four nudge mechanisms across four grocery choices that vary in the scale of substitution involved, asking not which nudge performs best in the abstract, but whether any nudge performs consistently once the underlying product changes.

3. Methodology

3.1 Research design

Participants completed four simulated grocery-choice tasks, each comparing a more and a less sustainable product, followed by a questionnaire on shopping behaviour, priorities, barriers, product

perceptions and willingness to pay. A within-participant design was used so that every participant experienced all four nudge conditions, with repeated observations accounted for in the analysis.

3.2 Product-choice tasks

Participants were asked to imagine they were completing a typical online grocery shop and to select the product they would be most likely to add to their basket. Each task presented two otherwise similar products, plus a no-preference option.

The four product pairs are shown in Table 1.

Table 1
Product pairs used in the experimental choice tasks

Product pair	More sustainable option	Less sustainable option	Sustainability dimension
Strawberries	UK strawberries in cardboard packaging	UK strawberries in plastic packaging	Packaging
Cherry tomatoes	UK-grown cherry tomatoes	Spanish-grown cherry tomatoes	Provenance
Peanut butter	Palm-oil-free peanut butter	Peanut butter containing palm oil	Ingredient sourcing
Burgers	Bean burger	Beef burger	Protein source

Prices were held equal within each pair (strawberries, 400 g, £2.50; cherry tomatoes, 250 g, £1.80; peanut butter, 340 g, £2.20; burgers, two-pack, £3.50) so that differences between the nudge conditions could be examined without price variation. This increased experimental control but removed an important real-world influence on grocery choice and is considered further under limitations.

The four products were always presented in the same order: strawberries first, tomatoes second, peanut butter third and burgers fourth. Product effects therefore cannot be separated from task-order effects. Any differences between the four product conditions are consequently described as product and task-stage effects rather than as independent product effects.

The more sustainable alternative was also always presented as Product B. This kept presentation consistent across the experiment but means that position may have influenced overall sustainable-choice rates.

3.3 Nudge conditions

Four nudge conditions were tested: information, salience, pre-selection and co-benefit.

- The information condition gave participants a short explanation of why one option had a lower environmental impact.

- The salience condition made the more sustainable option easier to notice through a simple lower-impact visual cue.
- The pre-selection condition presented the more sustainable option as already selected while allowing participants to switch freely at any point, more closely resembling a recommendation than a true default mechanism.
- The co-benefit condition linked the environmental benefit of the product to another attribute that consumers may value, such as health, taste, freshness or quality.

The wording and visual presentation were adapted to each product while keeping the underlying nudge mechanism consistent.

3.4 Allocation of nudges across products

Each participant completed all four product tasks and encountered each nudge condition exactly once. Nudge-to-product pairing was rotated across four experimental groups using a Latin-square structure (Table 2).

Table 2
Rotation of nudge conditions across products

Group	Strawberries	Tomatoes	Peanut butter	Burgers
1	Salience	Co-benefit	Pre-selection	Information
2	Information	Salience	Co-benefit	Pre-selection
3	Pre-selection	Information	Salience	Co-benefit
4	Co-benefit	Pre-selection	Information	Salience

Participants were randomly allocated to one of the four groups, with even distribution requested through Qualtrics. Group sizes were 42, 43, 43 and 44, so each nudge was paired with each product between 42 and 44 times, and each nudge condition and each product appeared 172 times in total.

This balancing allowed the overall association between nudge condition and sustainable choice to be estimated across the four tasks. However, only the nudge allocation was rotated. The products themselves were not randomised and remained in the same sequence for every participant. Product and task stage are therefore fully linked, meaning the study cannot determine whether differences between the four tasks were due to the products themselves, their position in the sequence, or both.

3.5 Questionnaire measures

The questionnaire, completed after the choice tasks, covered usual shopping mode, supermarkets used, household composition and weekly grocery spend. Participants also ranked the importance of cost, taste, health or nutrition, convenience, familiarity and environmental impact when buying groceries.

Further questions examined confidence in identifying sustainable products, trust in sustainability claims, barriers to sustainable purchasing and factors that might make sustainable choices easier. These included price, availability, labels, retailer recommendations, incentives and messages linking sustainability with health, taste or freshness.

Participants also rated whether sustainable products were likely to be healthier, taste as good, be fresher, be better quality and be more expensive than less sustainable alternatives. These measures were informed by COM-B and were treated as exploratory because they were collected after, not before, the experimental tasks.

Willingness to pay was measured twice: first for a more environmentally sustainable product alone, and then for a sustainable product that also offered an additional benefit such as better health, taste or freshness.

3.6 Participants and recruitment

Participants were recruited through Prolific. Eligibility criteria required participants to be aged 18 or over, resident in the UK and involved in household grocery shopping.

An a priori calculation for a small within-participant effect (Cohen's dz = 0.25) indicated a recruitment target of approximately 171 participants for 90% power; this was used as a pragmatic benchmark rather than as an exact power calculation for the subsequent GEE model.

The final sample comprised 172 participants. Prolific applied its standard eligibility and quality-assurance screening before the final dataset was provided, and all 172 completed responses received by the researcher were retained.

The sample was not intended to be representative of the UK population, but covered a range of ages, household types, spending levels and shopping habits (Table 3). Most participants were aged 25–54 (78.5%) and held an undergraduate or postgraduate degree (67.4%), so the findings may not generalise to less highly educated shoppers. Most shopped mainly in-store (61.6%), and Tesco was the most frequently used supermarket (58.7%). Gender was not collected.

Table 3
Sample characteristics

Characteristic	Category	n (%)
Age group	18–24	15 (8.7)
	25–34	43 (25.0)
	35–44	61 (35.5)
	45–54	31 (18.0)
	55–64	18 (10.5)
	65 or over	4 (2.3)
Highest education	Secondary school or equivalent	21 (12.2)
	Further education / college	34 (19.8)
	Undergraduate degree	80 (46.5)
	Postgraduate degree	36 (20.9)
	Prefer not to say	1 (0.6)
Usually buys groceries for	Mainly themselves	36 (20.9)
	Themselves and one other person	65 (37.8)
	A household with children	61 (35.5)
	A mix of people (e.g. housemates and family)	10 (5.8)
Weekly grocery spend	Less than £50	22 (12.8)
	£50-£74	58 (33.7)
	£75-£99	39 (22.7)
	£100-£149	37 (21.5)
	£150-£199	14 (8.1)
	£200 or more	1 (0.6)
	Prefer not to say	1 (0.6)
Usual shopping mode	Mostly in-store	106 (61.6)
	A mix of online and in-store	40 (23.3)

Note. N = 172. Percentages for supermarkets sum to more than 100% because participants could select up to three. Two participants who answered "prefer not to say" for education or weekly spend were excluded from the adjusted model.

Characteristic	Category	n (%)
	Mostly online	26 (15.1)
Most-used supermarkets (up to three)	Tesco	101 (58.7)
	Aldi	68 (39.5)
	Lidl	63 (36.6)
	Sainsbury’s	63 (36.6)
	Asda	49 (28.5)
	Morrisons	39 (22.7)
	Waitrose	20 (11.6)
	Ocado	10 (5.8)
	Other	12 (7.0)

Note. N = 172. Percentages for supermarkets sum to more than 100% because participants could select up to three. Two participants who answered "prefer not to say" for education or weekly spend were excluded from the adjusted model.

3.7 Data collection and outcome coding

The study was administered through Qualtrics and distributed to participants through Prolific on 29 June 2026. Median completion time was 3.7 minutes (interquartile range 3.0-5.1).

The primary outcome was whether the participant selected the more sustainable product in each task. Sustainable choices were coded 1 and less-sustainable choices 0.

Participants could also select “no preference”. These responses were retained in descriptive reporting but excluded from the primary binary model because they could not meaningfully be classified as either sustainable or less sustainable. A sensitivity analysis repeated the main model with no-preference responses coded alongside less-sustainable choices.

3.8 Statistical analysis

Descriptive analyses were conducted in Microsoft Excel and inferential analyses in IBM SPSS Statistics.

Because each participant completed four choice tasks, the primary analysis used a pooled binary logistic model with generalised estimating equations (GEE), specifying a binomial distribution with a logit link, an exchangeable working correlation structure and robust empirical standard errors, with the scale parameter fixed at 1. Participant ID was used as the clustering variable to account for repeated observations from the same individual. All tests were two-tailed, with the significance threshold set at alpha = .05.

The primary model included nudge condition and a combined four-level product and task-stage factor. The overall effects of these factors were assessed using omnibus Type III Wald chi-square tests. Predicted probabilities and 95% confidence intervals were also reported to show the scale of differences across conditions, particularly where sustainable-choice rates were close to ceiling.

An adjusted model added age, education, household composition and weekly grocery spend to test whether the main findings changed after accounting for differences between participants.

A separate exploratory model retained the experimental and socio-demographic terms and added four COM-B-informed measures: positive beliefs about the health, taste, freshness and quality of sustainable products; perceived expense; trust in sustainability labels; and confidence identifying sustainable products. Because these variables were collected after the experimental choices, they are interpreted as associations rather than causal predictors.

An exploratory nudge-by-product interaction model was also attempted to assess whether nudge effectiveness differed across product and task-stage conditions. This model did not converge because of sparse cells and near-ceiling sustainable-choice rates in several combinations. Product-specific nudge comparisons were therefore reported descriptively, with Wilson score 95% confidence intervals; they are not evidence of a statistical interaction.

Willingness-to-pay responses before and after the addition of co-benefits were compared using a Wilcoxon signed-rank test, a non-parametric test chosen because the responses were paired and measured on an ordinal scale, with effect size calculated as $r = Z/\sqrt{N}$.

3.9 Ethics

Ethical approval

(reference BENV0178/26/6b) and consent procedures are described in the ethics declarations. The product images shown in the choice tasks were created using a generative AI tool (ChatGPT, OpenAI); no AI-generated images are reproduced in this article.

4. Results

4.1 Main experimental findings

The primary analysis found no significant overall difference between the four nudge conditions, while there were very large differences across the four product and task-stage conditions.

The 172 participants completed four product-choice tasks, generating 688 observations. Of these, 495 (71.9%) were sustainable choices, 160 were less-sustainable choices and 33 indicated no preference. No-preference responses were retained descriptively but excluded from the primary binary analysis, giving 655 observations.

A pooled binary logistic generalised estimating equation (GEE) model tested the effects of nudge condition and the combined product and task-stage factor on sustainable choice while accounting for repeated observations within participants. There was no significant overall difference between the four nudge conditions, Wald $\chi^2(3) = 4.99$, $p = .173$. The study therefore did not detect evidence that one of the four nudge approaches was consistently more effective than the others across the choice tasks.

Raw sustainable-choice rates (Table 4) were highest under salience (78.8%), followed by co-benefit (76.4%), pre-selection (74.1%) and information (73.2%). Core-model predicted probabilities are shown in Table 6. Salience had the highest estimated probability, but this should not be interpreted as evidence that it was the most effective nudge overall because the omnibus nudge test was non-significant.

Table 4
Sustainable choice by nudge condition (raw counts)

Nudge condition	Less sustainable	No preference	Sustainable	Valid binary N	Sustainable %
Information	44	8	120	164	73.2%
Salience	34	12	126	160	78.8%
Pre-selection	43	6	123	166	74.1%
Co-benefit	39	7	126	165	76.4%

In contrast, the product and task-stage association was large and statistically significant, Wald $\chi^2(3) = 256.98$, $p < .001$. Sustainable uptake among participants expressing a preference (Table 5) was 94.5% for strawberries, 93.9% for tomatoes and 97.5% for peanut butter, compared with 18.5% for the bean burger. The corresponding predicted probabilities are shown in Table 6. The differences across product and task-stage conditions were much larger than those across nudge conditions.

Table 5
Sustainable choice by product and task stage (raw counts)

Product / task stage	Less sustainable	No preference	Sustainable	Valid binary N	Sustainable %
Strawberries / first	9	9	154	163	94.5%
Tomatoes / second	10	8	154	164	93.9%
Peanut butter / third	4	12	156	160	97.5%
Bean burger / fourth	137	4	31	168	18.5%

Table 6
Core-model predicted probabilities for sustainable choice

FACTOR	LEVEL	PREDICTED PROBABILITY	95% CI
Nudge	Information	.83	[.72, .91]
Nudge	Pre-selection	.85	[.76, .91]
Nudge	Co-benefit	.89	[.82, .93]
Nudge	Salience	.92	[.86, .96]
Product and task stage	Strawberries / first	.95	[.90, .97]
Product and task stage	Tomatoes / second	.94	[.90, .97]
Product and task stage	Peanut butter / third	.98	[.94, .99]
Product and task stage	Bean burger / fourth	.18	[.13, .25]

Note. Predicted probabilities are estimated marginal means from the core pooled binary logistic GEE model (655 observations; 172 participants), calculated for each level of one factor averaged across the levels of the other. Nudge-level probabilities are therefore higher than the raw rates in Table 4 because three of the four product and task-stage conditions were near ceiling. Omnibus tests: nudge condition, Wald $\chi^2(3) = 4.99$, $p = .173$; product and task stage, Wald $\chi^2(3) = 256.98$, $p < .001$. Product and task stage cannot be separated because products were presented in a fixed order.

These figures need to be interpreted cautiously because all participants completed the products in the same order. Product and task stage cannot therefore be separated. The lower sustainable-choice rate for the bean-burger task is a clear descriptive pattern, but the design cannot separate a genuine product effect from its fixed position in the sequence.

The main finding was unchanged after adjustment for age, education, household composition and weekly grocery spend (647 observations; 170 participants). The nudge factor remained non-significant, Wald $\chi^2(3) = 3.35$, $p = .341$, while the product and task-stage association remained significant, Wald $\chi^2(3) = 245.78$, $p < .001$. Age ($p = .300$), education ($p = .306$) and household composition ($p = .701$) were not significantly associated with sustainable choice. Weekly grocery spend differed overall, Wald $\chi^2(5) = 13.21$, $p = .022$, although there was no consistent linear pattern across spending categories: relative to participants spending under £50 per week, only the £75-£99 (OR = 0.23, 95% CI [0.05, 0.95], $p = .042$) and £100-£149 (OR = 0.19, 95% CI [0.04, 0.85], $p = .030$) groups had lower odds of sustainable choice. Because weekly spend partly reflects household size, it should not be read as a proxy for income.

A sensitivity analysis treating all 33 no-preference responses as less-sustainable choices produced the same overall result. The product and task-stage association remained significant, Wald $\chi^2(3) = 226.41$, $p < .001$, while the nudge effect remained non-significant, Wald $\chi^2(3) = 2.28$, $p = .516$. An exploratory check adding usual shopping mode (mostly in-store, mixed or mostly online) found no association with sustainable choice, Wald $\chi^2(2) = 0.44$, $p = .803$, and did not change the nudge or product and task-stage results.

An exploratory nudge-by-product interaction model did not converge because of sparse cells and near-ceiling sustainable-choice rates in several conditions. Product-specific comparisons are therefore descriptive only. The largest spread between nudge conditions occurred in the bean-burger task, where sustainable uptake ranged from 11.9% (95% CI [5.2, 25.0]) under pre-selection to 28.6% (95% CI [17.2, 43.6]) under salience, and a burger-only logistic regression found no significant overall nudge effect ($p = .221$). Confidence intervals overlapped substantially, however, so these figures do not provide clear evidence of a product-specific nudge effect.

4.2 Barriers, enablers and consumer beliefs

Secondary analyses explored some of the wider factors associated with sustainable choice.

Cost (mean rank 2.13, where 1 = most important) and taste (2.27) were the highest-ranked considerations in grocery shopping, followed by health or nutrition (2.98), familiarity (4.23) and convenience (4.42), while environmental impact ranked lowest (4.96). Cost was also the most frequently reported barrier to sustainable purchasing, selected by 61.0% of participants, followed by prioritising taste, quality or convenience (39.5%), buying the same products every week (35.5%) and limited availability (32.0%). Lower prices were the most commonly selected factor that would make sustainable choices easier (84.9%), followed by greater availability (58.1%) and clearer environmental impact labels (47.1%).

In the exploratory COM-B model (610 observations; 160 participants with complete data), more positive beliefs about the health, taste, freshness and quality of sustainable products were associated with higher odds of sustainable choice (OR = 2.16, 95% CI [1.36, 3.43], $p = .001$). Perceiving sustainable products as more expensive was associated with lower odds of sustainable choice (OR = 0.57, 95% CI [0.39, 0.83], $p = .004$).

Trust in sustainability claims was not significantly associated with sustainable choice (OR = 0.80, 95% CI [0.50, 1.27], $p = .343$), and neither was confidence in identifying sustainable products (OR = 1.05, 95% CI [0.47, 2.34], $p = .900$).

These analyses are exploratory because the belief measures were collected after participants completed the choice tasks and may therefore partly reflect their earlier responses. The reduced complete-case sample also means that the core experimental model remains the basis for the main conclusions.

4.3 Willingness to pay

Willingness-to-pay analysis was also treated as a secondary outcome. Of the 164 participants with valid paired responses, 95 (57.9%) reported a higher willingness to pay when sustainability was accompanied by personal benefits such as health, taste or freshness. Sixty-seven participants (40.9%) reported no change, while two (1.2%) reported a lower willingness to pay.

The difference was statistically significant in the Wilcoxon signed-rank test ($Z = 8.82$, $p < .001$, $r = .69$). WTP was hypothetical, however, and should not be interpreted as observed purchasing behaviour.

5. Discussion

5.1 Choice context versus nudge type

This study examined whether four supermarket nudges produced different levels of sustainable choice across grocery tasks, or whether variation across the choice contexts was greater than variation between nudge types. No nudge emerged as significantly more effective than the others. Instead, the clearest pattern was the much greater variation across product and task-stage conditions. Because product order was fixed, this cannot establish a causal product effect, but it suggests a more useful practical question: when is a light-touch nudge likely to be enough?

5.2 The role of product and task context

The much lower uptake for the bean burger (18.5%, compared with 93.9–97.5% for the other three tasks) is consistent with wider evidence that the nature of the underlying change can matter. Deniau et al. (2026) found that participants were more likely to express sustainability through attributes such as packaging or provenance than through a change in food category. Evidence from settings with greater real-world consequences also suggests that larger substitutions can be difficult. Yu et al. (2026), for example, found that only 2% of plant-based swap recommendations were accepted when participants faced real prices and received their chosen products. Linder, Lindahl and Wijermans (2026) similarly found that established meat-purchasing habits remained important among consumers who intended to reduce meat consumption. Çoker and van der Linden (2022) also highlight the importance of attitudes, perceived behavioural control and past behaviour in meat reduction. Because the burger was always the fourth task, however, this result remains descriptive. It fits the wider literature but cannot show that meat substitution is inherently harder to nudge than the other swaps tested here.

5.3 No single best-performing nudge

The nudge comparison was non-significant in all three models. Salience had the highest raw and estimated rates, but there is no basis for identifying it, or any other approach, as the best nudge overall. A ceiling effect is a likely part of the explanation: sustainable choice was already 93.9–97.5% in three of the four tasks, leaving little room for any nudge to stand out. The comparison is therefore most informative for the bean-burger task, where uptake was far from ceiling, and even there the burger-only model found no significant difference between nudges.

This does not necessarily mean that nudges were ineffective, although the design had no no-nudge control and so cannot show whether any of them raised uptake above what participants would have chosen anyway. At equal prices, sustainable uptake for three of the four choices was consistently high across all nudge conditions. One interpretation is that, where a sustainable alternative is already familiar, acceptable and equally priced, the specific form of behavioural prompt may matter less. This is consistent with Grant et al. (2025), who found mixed effects across technology-enabled grocery nudges and emphasised the role of context and user engagement over any single consistently effective intervention.

5.4 Price and barriers to nudge effectiveness

The secondary findings point in the same direction. Cost was the most common barrier and lower prices the most popular enabler, environmental impact ranked last among shopping priorities, and perceiving sustainable products as more expensive was associated with lower odds of sustainable choice.

Price is particularly important when interpreting the experimental findings because all product pairs were presented at equal prices. This deliberately removed price as a competing influence and allowed the behavioural interventions to be compared more clearly, but it also removed one of the strongest constraints shoppers reported in the questionnaire. The high sustainable-choice rates observed for some tasks therefore cannot be assumed to carry over to situations where the sustainable option costs more. Ran et al. (2022) and Munro, Kapitan and Wooliscroft (2023) similarly identify price, availability and other situational constraints as barriers to sustainable food choice.

Seen through COM-B, this points particularly to the importance of physical opportunity. Information or labels may help consumers identify a more sustainable choice, while framing sustainability alongside benefits such as health or taste may strengthen motivation. Neither addresses whether the product is affordable, readily available, conveniently placed or acceptable in quality. For larger changes in diet, these opportunity-focused factors may therefore become more important than the behavioural prompt itself. This is consistent with combining nudges with changes to the product offer itself, so that shoppers are not left to overcome structural barriers on their own.

5.5 Co-benefits and shopper-relevant framing

The secondary co-benefit findings are also relevant. Positive beliefs about the health, taste, freshness and quality of sustainable products were associated with more than twice the odds of sustainable choice in the exploratory model. In the hypothetical WTP exercise, 57.9% of participants also reported a greater willingness to pay when sustainability was accompanied by personal benefits such as health, taste or freshness. These findings should be treated cautiously because the belief measures were collected after the experiment and WTP was hypothetical. However, they are consistent with the idea that sustainability may be more compelling when it connects with benefits consumers already value.

This has practical relevance for retailers because health, taste and quality are already familiar parts of food communication. Co-benefit framing may therefore offer a way of making sustainability more relevant without requiring environmental impact to become the shopper's primary motivation. Any such claims would need to be credible and product-specific, however, and should not be expected to compensate for poor value, limited availability or an unattractive product.

5.6 Overall interpretation

Taken together, the results point towards matching the intervention to the scale and nature of the underlying choice. For familiar, lower-compromise substitutions, light-touch interventions may help make an already acceptable sustainable option more visible or easier to choose. Where the change is larger,

particularly where it involves established habits, preferences or a different food category, nudging alone may be less likely to be sufficient. In these cases, retailers may need to change the product offer itself as well as how it is presented. Some retailers already do this, through plant-based sales-mix targets or reformulated own-brand products (Ahold Delhaize, 2025; REWE Group, 2025); the present findings are consistent with that approach, although they do not test it directly.

The study's contribution is to suggest that nudge effectiveness may depend on the conditions in which nudges are used. The fixed task order means it cannot show this causally, but variation across choice contexts was far greater than variation between the four nudges, which supports treating nudging as one part of the retail environment.

6. Practical implications for retailers

For retailers, the findings point towards matching the intervention to the type of choice and the barriers around it, instead of searching for a single best nudge. The study did not test any structural intervention, so the points below are offered as directions for further testing.

6.1 Match the intervention to the scale of change

Retailers may wish to first consider how much the customer is being asked to change. Light-touch interventions such as clearer information, salience or pre-selection may be appropriate to test where the sustainable option is already familiar, acceptable and easy to substitute. Larger dietary changes may require action beyond the nudge itself, particularly where established habits, taste expectations or household preferences are involved.

6.2 Make the sustainable option affordable and available

Price and availability were among the strongest barriers identified in the study's self-reported data. This points to pricing, promotions, own-brand development and range decisions as plausible levers for reducing the practical disadvantage of sustainable alternatives. Nudges are unlikely to have much effect if the preferred option is significantly more expensive or difficult to find.

6.3 Make sustainable choices mainstream and appealing

Positioning sustainable products within the main range, instead of only as specialist alternatives, may help. Placement, search order, reformulation and product development could make lower-impact choices feel more normal, while credible co-benefits such as taste, freshness, health or quality may strengthen their appeal. These benefits should support, rather than substitute for, a good underlying product offer.

6.4 Use nudges alongside wider structural action

More substantial shifts in diet are unlikely to be achieved through communication alone. Retailers may therefore benefit from combining behavioural prompts with changes to range, placement, pricing, reformulation and convenience, testing any such combination for unintended effects before drawing

conclusions about its effectiveness. Collaboration with suppliers, other retailers and policymakers may also be needed where the cost or risk of structural change is difficult for one business to absorb alone.

7. Limitations

First, product order was fixed for all participants: strawberries were always shown first, followed by tomatoes, peanut butter and burgers. Product effects therefore cannot be separated from task-order effects. The much lower sustainable-choice rate in the burger condition is an important descriptive finding, but on this design alone it is not possible to rule out that sequence position, not the product itself, drove the result.

Second, the more sustainable option was always shown as Product B. This may have influenced overall sustainable-choice rates through position or response tendencies. Because Product B was used consistently across all nudge conditions, this is less likely to explain differences between the nudges themselves, but it remains a limitation of the design.

Third, participants made simulated choices rather than real purchases. They did not spend their own money or receive the products they selected, so responses may not fully reflect behaviour in a real supermarket setting. The online format also more closely resembles online than in-store shopping and may particularly favour pre-selection, although usual shopping mode was not associated with sustainable choice in an exploratory check. The sample was also recruited through an online research panel and was not designed to be representative of UK grocery shoppers.

Fourth, prices were held equal within each product pair. This allowed the four nudge conditions to be compared without price variation, but removed one of the strongest real-world influences on grocery choice. Cost was the most prominent barrier reported in the questionnaire, meaning the high sustainable-choice rates observed for some products should not be assumed to persist where the sustainable option is more expensive.

Fifth, the design had no no-nudge control condition. It can therefore compare the four nudges with one another but cannot show whether any of them raised sustainable choice above what participants would have chosen without a prompt.

Finally, several secondary measures, including product beliefs and willingness to pay, were exploratory. Belief measures were collected after the choice tasks and may partly reflect participants' earlier decisions, while willingness to pay was hypothetical rather than observed. These findings therefore provide context for the main experimental results; they are not causal evidence.

8. Conclusion

This study found no significant overall difference between four supermarket nudge approaches - information, salience, pre-selection and co-benefit framing - across the experimental tasks. This is likely

to partly reflect a ceiling effect, since sustainable choice was already very high in three of the four tasks, leaving little room for the nudges to differentiate from one another. By contrast, sustainable choice varied substantially across the different product and task-stage conditions.

Because product and task order were fixed together, the study cannot establish that this variation was caused by the products themselves. However, the pattern is consistent with the wider literature suggesting that the nature of the underlying choice may shape how much behavioural support is needed. Relatively familiar or low-compromise substitutions may be more responsive to light-touch interventions, while larger dietary changes may require more than a change in how the choice is presented.

For supermarkets, the implication is to match behavioural interventions to the underlying choice and support them with an acceptable product offer. Where the sustainable alternative is already affordable, available and familiar, clear information, salience or pre-selection may help. Where the change is larger, retailers may need to change the offer itself.

The study therefore contributes to a more conditional understanding of nudging in sustainable grocery choice. Nudges may form a useful part of the retailer toolkit, but their effectiveness is likely to depend on what consumers are being asked to change and whether the surrounding conditions make that change realistic. In doing so, it suggests that debates about sustainable food consumption should look beyond individual choice to the conditions in which choices are made, although testing which of those conditions matters most remains a task for future research.

Declarations

Data availability

The data and materials supporting this study are openly available in Harvard Dataverse at https://doi.org/10.7910/DVN/7ZLK8G. The repository contains: (1) the anonymised raw participant-level survey responses (172 participants) and the processed long-format dataset used for all analyses (688 choice observations); (2) a codebook defining every variable, its coding scheme and any transformations applied; (3) the survey instrument and study protocol, including the survey workflow, the participant information and consent page, all choice-task stimuli and nudge wording for each experimental group, and the follow-up questionnaire; and (4) the SPSS syntax and output for all reported models, sensitivity analyses and exploratory checks. The data contain no names, Prolific IDs, IP addresses or other identifying information, and participants consented to their anonymised data being used for future research. All materials are available without restriction.

Ethical approval

Ethical approval for this study was granted by University College London Ethics Committee (reference BENV0178/26/6b) on 23 March 2026, and an amendment covering the final four-product design was approved on 18 June 2026, before data collection began. The research was conducted in accordance

with the UCL Research Ethics Framework and relevant guidelines and regulations, including the UK General Data Protection Regulation and the Data Protection Act 2018.

Informed consent

Informed consent was obtained electronically from all participants before they began the survey. Participants were given information about the purpose of the study, the voluntary and anonymous nature of participation and how their data would be used, and could stop the survey at any time before submitting their responses without giving a reason. All participants confirmed that they were aged 18 or over and agreed that their anonymised data could be used for future research.

Competing interests

K.T. is a co-founder of Small & Wild, a children's tea brand sold through UK grocery retailers, and a founding member of the Kids Food & Drink Collective, a group of brands that promotes healthy and sustainable food and drink through joint retailer activity. Neither organisation produces or sells any of the products used in the choice tasks, and neither had any role in the design of the study, the collection, analysis or interpretation of the data, or the decision to publish. L.L. declares no competing interests.

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Author contributions

K.T. conceived and designed the study, developed the survey instrument, collected and analysed the data, and drafted the manuscript. L.L. supervised all stages of the research, contributed to the study design and analytical approach, reviewed and refined the survey instrument and research materials, and critically reviewed the manuscript and proposed revisions. Both authors read and approved the final manuscript for submission.

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