

Corrigendum to 'Identifying Personal and Social Drivers of Dietary Patterns: An Agent-Based Model of Dutch Consumer Behavior', Journal of Artificial Societies and Social Simulation, 27 (1) 4, 2024

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Abstract: This corrigendum refers to 'Identifying Personal and Social Drivers of Dietary Patterns: An Agent-Based Model of Dutch Consumer Behavior', Journal of Artificial Societies and Social Simulation, 27 (1) 4, 2024.

Keywords: Agent-Based Modeling, Sustainable Diets, Social Networks, COM-b Framework, Food-Related Value, Attitude-Behavior Gap

● Corrections Summary

- 1.1** An error in the household and social network creation caused the distribution of household incomes to not entirely accurately reflect the Dutch data with which the model was parameterized, and some consumers to be linked to multiple households. These errors have been corrected and the model rerun. There are very minimal changes to the results, but the distribution of diets in the population now better matches the empirical data, as far fewer consumers are in the 'financially constrained' category. Otherwise, the model outcomes are qualitatively nearly the same. The model itself is also the same, though to correct the household network formation error, the number of households (rather than consumers) was specified – the number of consumers can therefore vary slightly. The parameters for motivations were also changed slightly to calibrate the updated model to the dietary frequency in the empirical data. In the corrections below, the updated figures and relevant results and discussion text are described.

● Correction 1: A Correction to Table 7 of the Original Article

- 2.1** As part of correcting this error in the code (which is updated at this link: <https://www.comses.net/codebases/a0f46686-41cc-4e55-a55e-4eb97783a2ba/releases/1.1.0/>), the number of households was used

as a model parameter, rather than the number of consumers. The first column of Table 7 originally reported in the article has been revised (Davis et al. 2024). Table 1 below replaces the original Table 7.

Table 1: Global parameters.

Variable	Description	Symbol	Data type and range	Baseline value	Range for sensitivity analysis
No. of households	The number of households in the simulation run	N	Integer [1, un-bounded)	160	[80, 240]
Initial rewiring probability	The probability of rewiring when setting up the network initially	$p(r)$	Integer [0, 1]	0.5	[0.25, 0.75]
Initial mean 'friends' network node degree	The average number of friends a consumer is connected to initially	$\mu(d_F)$	Integer [0, un-bounded)	5	[2, 11]
Initial mean node degree	The total number of close friends and acquaintances a consumer is connected to initially	$\mu(d)$	Integer [1, 200]	50	[25, 75]
Mean household network link strength	Mean link strength among social contacts in the same household	$\mu(L_H)$	Numeric (0, 1]	0.925	[0.879, 0.971]
SD of household network link strength	Standard deviation of link strength among household contacts	$\sigma(L_H)$	Numeric (0, 1]	0.025	[0.024, 0.026]
Mean 'friends' network link strength	Mean link strength among friends in the network	$\mu(L_F)$	Numeric (0, 1]	0.825	[0.784, 0.866]
SD of 'friends' network link strength	Standard deviation of link strength among friends	$\sigma(L_F)$	Numeric (0, 1]	0.025	[0.024, 0.026]
Mean 'acquaintances' network link strength	Mean link strength among acquaintances in the network	$\mu(L_A)$	Numeric (0, 1]	0.350	[0.175, 0.525]
SD of 'acquaintances' link strength	Standard deviation of link strength among acquaintances	$\sigma(L_A)$	Numeric (0, 1]	0.05	[0.025, 0.075]
Max. number of contacts per step	Maximum number of contacts a consumer can make in each timestep	X_{max}	Integer [0, No. of consumers]	10	[5, 15]
Social information adherence scaling factor	Multiplier of social information adherence input data	α	Numeric [0, 1]	0.025	[0.001, 0.1]
Mean satisfaction threshold	Mean of consumer satisfaction thresholds across the population	$\mu(T)$	Numeric [0, 1]	0.50	[0.25, 0.75]

SD of satisfaction threshold	Standard deviation of consumer satisfaction thresholds across the population	$\sigma(T)$	Numeric [0, 1]	0.05	[0.025, 0.075]
Mean max. % of income spent on food	Mean of the percent of income consumers consider feasible maximum to spend on food	$\mu(S)$	Numeric [0.1, 0.2]	0.16	[0.08, 0.24]
SD of max % of income spent on food	Standard deviation of percent of income considered feasible maximum	$\sigma(S)$	Numeric [0.01, 0.05]	0.01	[0.005, 0.015]
Taste perception change rate	Rate of taste perception change with exposure	k	Numeric [0,1]	0.01	[0.005, 0.015]
Taste perception change gradient	Gradient of taste perception change from previous value	ϕ	Numeric (0, Inf)	50	N/A
Taste perception change error	Stochastic error applied to taste perception change when a diet is consumed	E	Numeric [0, 1]	0.001	[0.0005, 0.0015]
Link strength change rate	Rate of link strength change with interaction	γ	Numeric [0, 1]	0.001	[0.0005, 0.0015]
Link strength change gradient	Gradient of link strength change from previous value	Δ	Numeric (0, Inf)	50	N/A

Correction 2: A Correction to Figure 2 of the Original Article

3.1 Due to the nature of the household creation error described in Correction 1, the model runs were redone and re-analyzed, using the same analysis scripts as before. The updated figures are detailed in the corrections below. For convenience, the figure captions are also included here, but these were unchanged in respect to the article. Figure 1 below replaces Figure 2 in Davis et al. (2024).

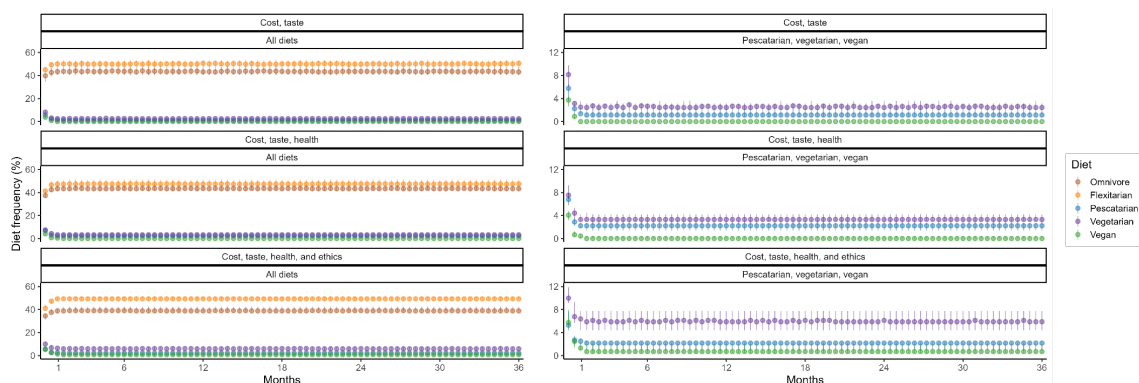


Figure 1: Diet frequency (% of population) over time for three different utility functions. The dietary attributes considered in each utility function are listed in the bar above the respective time series for that function. No social influence was included in these runs. Points and error bars show medians and interquartile ranges (IQRs) respectively across 10 replicates (IQRs not visible for larger scale including all diet frequencies).

- 3.2** The related text in the Discussion (Davis et al. 2024, Section 4.11, sentences 3-4), updated accordingly, would also remove sentence 3 about the popularity of flexitarian and vegetarian diets increasing with price decreases. Now, the text should read as follows:

On a more contextual level, constraints such as cost can prevent consumers from making choices in line with their values. The consumers in the model who were financially limited to the least expensive diet typically perceived their diets as less ethical than healthy, despite having similar motivations for ethics and health, suggesting they may have chosen another diet that they considered more ethical (but equally healthy) if cost were not a concern. Furthermore, while the small decreases in prices of flexitarian and vegetarian diets may have increased their popularity only slightly, alleviating cost constraints does facilitate consumers choosing diets in line with their motivations. While other aspects of food environment and consumption, such as accessibility, and time and knowledge required for preparation, were not modeled here, these can also be considerable barriers to change. Policy aimed at making switching to a sustainable diet as feasible as possible across a range of aspects will thus increase the likelihood that individuals are able to make this change (Trudel 2019).

● Correction 3: A Correction to Figure 3 of the Original Article

- 4.1** Figure 2 replaces Figure 3 of the original article (Davis et al. 2024).

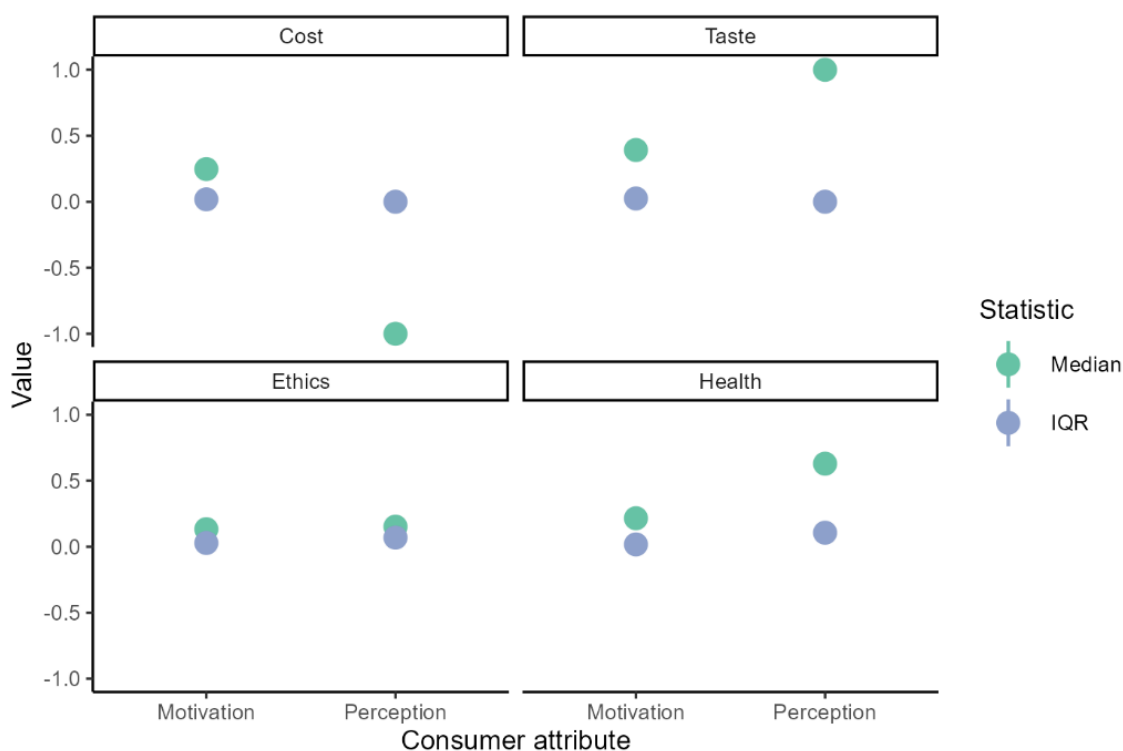


Figure 2: Median and interquartile range (IQR) of motivations and perceptions of financially constrained consumers. Subplot headers show the diet attribute linked to the consumer motivation or perception. Shown are medians across 10 replicates at month 36. IQR error bars not visible at this scale). Motivations ranged from [0, 1] and perceptions from [-1, 1], such that higher positive values for median motivations or perceptions indicate that these consumers typically weighed this attribute strongly in decision-making or perceived their diet positively in this attribute, respectively. Lower or negative median values for perceptions indicated that consumers perceived their diet less favorably in this attribute. The IQR illustrates heterogeneity in motivations and perceptions across these diet attributes among consumers.

- 4.2** The accompanying text (Davis et al. 2024, Section 3.4) should also be updated to remove the note about higher interquartile range of the consumers' ethics perceptions, and therefore should read:

Their ethics perceptions of the diet they were assigned by default, however, were slightly lower than their taste and health perceptions, indicating that some consumers could have perceived the diet to have similar levels of ethics and health, while others found it less ethical.

● Correction 4: A Correction to Figure 4 of the Original Article

5.1 Figure 3 below replaces Figure 4 of the original article (Davis et al. 2024, Section 3.6), and the accompanying text should be updated as the vegetarian diet no longer showed an increase in popularity with a decreased price, but flexitarian diets did become more popular when omnivore diets increased in price. It should therefore read:

Diets were stable to changes in price (Figure 4 [here, Figure 3]). Flexitarian diets became slightly more popular, and omnivore diets slightly less popular, when omnivore diet prices increased. Omnivore, pescatarian, vegetarian, and vegan diets did not show changes in popularity with price decreases, but all decreased with price increases.

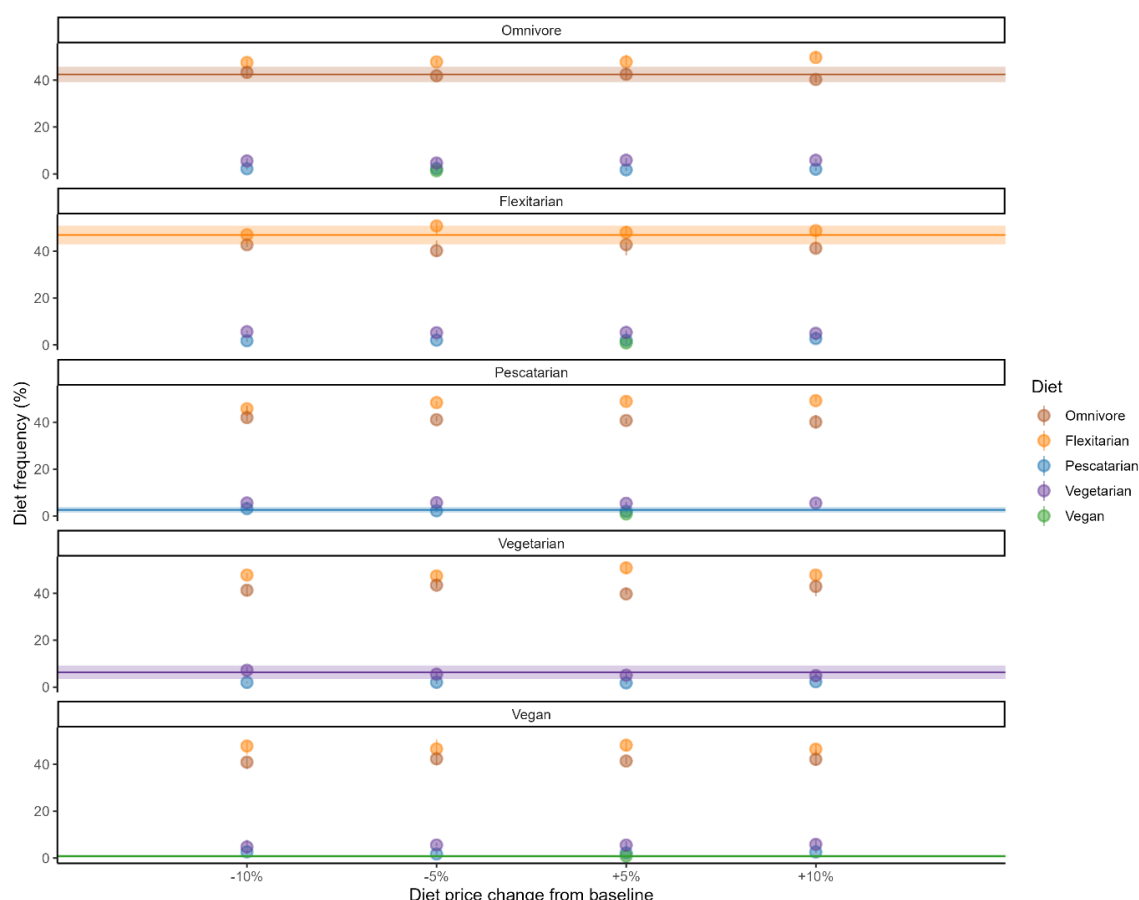


Figure 3: Frequency of diets across changes in price. Row headers show which diet's price is changed and by how much. Points show median frequencies across 10 replicates at month 36 (error bars showing IQR of frequency not always visible), horizontal lines show median frequency at baseline prices, with shading around lines to show the interquartile range of frequency at baseline prices.

● Correction 5: A Correction to Figure 5 of the Original Article

6.1 Figure 4 replaces Figure 5 of the original article (Davis et al. 2024, Section 3.7).

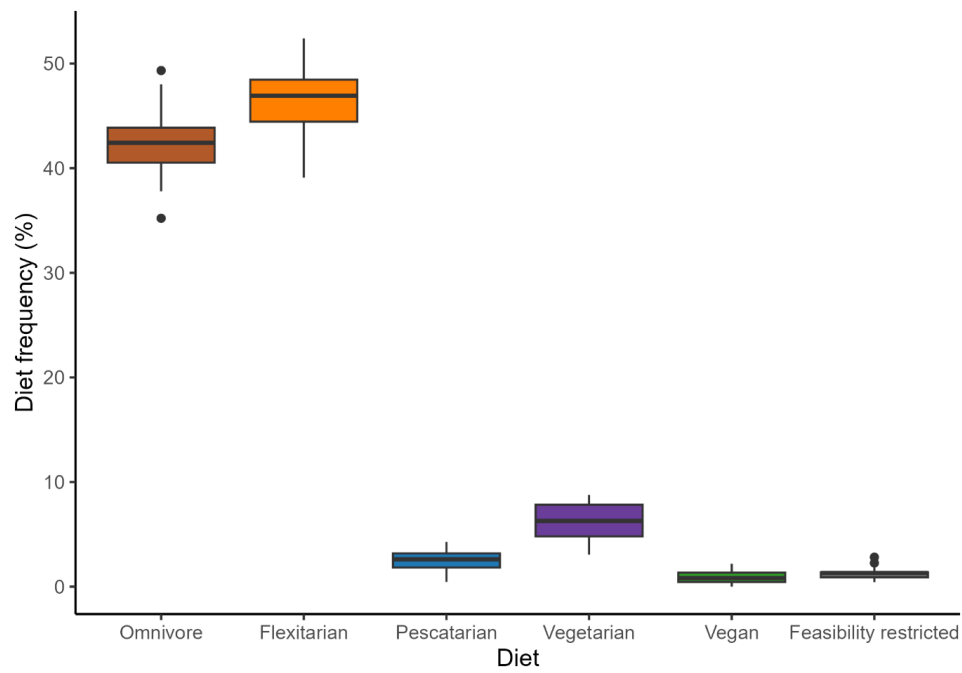


Figure 4: Diet frequency. Shown are data for month 36 of the full model (including both social interaction and network structural change) at baseline parameterization. Distribution shows values across 10 replicates. The category 'Feasibility restricted' refers to consumers with budgets, based on income, household size, and willingness-to-pay, that does not allow them to afford any of the diet choices, such that they default to the least expensive option.

● Correction 6: A Correction to Figure 6 of the Original Article

7.1 Figure 5 replaces Figure 6 of the original article (Davis et al. 2024, Section 3.9).

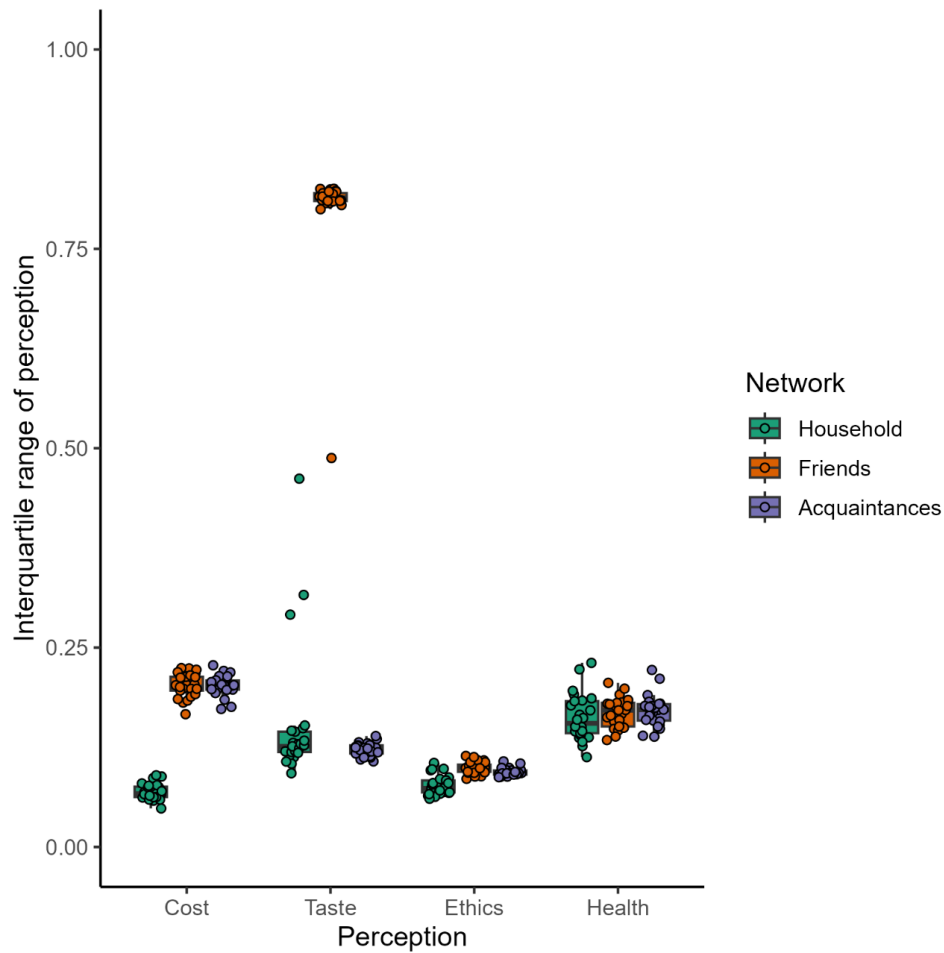


Figure 5: Homophily of perceptions across networks. Shown are distributions of interquartile ranges (IQRs) across 10 replicates at month 36 of the full model (including both social interaction and network structural change) at baseline parameterization. Points plotted over distributions show original values for that network.

● Correction 7: A Correction to Figure 7 of the Original Article

8.1 Figure 6 replaces Figure 7 of the original article (Davis et al. 2024, Section 3.10).

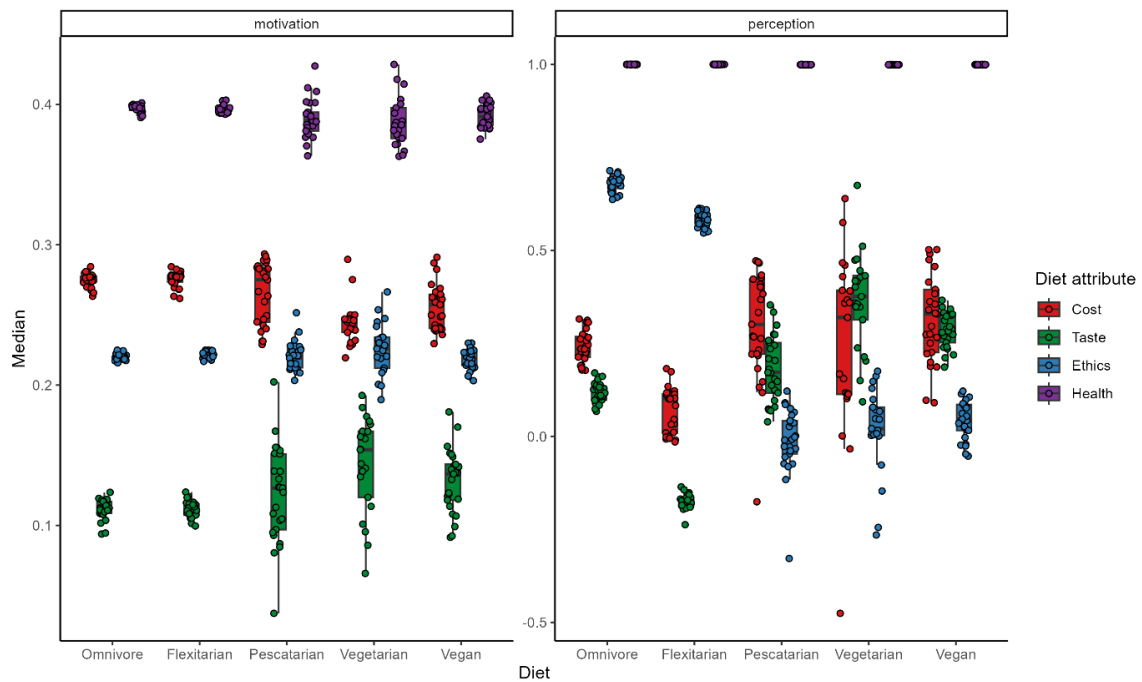


Figure 6: Motivations and perceptions for consumers following the same diet. Shown are distributions of medians across 10 replicates at month 36 of the full model (including both social interaction and network structural change) at baseline parameterization. Note different y axis ranges. Points plotted over distributions show original values for that diet attribute. A plot showing distributions of IQRs is included in Appendix 3.

References

Davis, N., Dermody, B., Koetse, M. & van Voorn, G. (2024). Identifying personal and social drivers of dietary patterns: An agent-based model of Dutch consumer behavior. *Journal of Artificial Societies and Social Simulation*, 27(1), 4