Appendix 1: Model set up and testing

Table A1. Parameterization data and pre-processing.

Data requirement	Data source name	Reference	Pre-processing steps
Household income	Income distribution (standardised income)	https://www.cbs.nl/en-gb/visualisaties/income-distribution	1. Used ratio of mean equivalized incomes, 2020 to 2016, to approximately rescale incomes to 2016 values 2. Divided annual income by 52 to rescale to weekly, to match diet prices (see below)
Household size, composition	CBS StatLine "Households; size, composition, position in the household, 1 January" (2016, Topic: Private Households)	https://opendata.cbs.nl/statline/#/CBS/en/dataset/82905ENG/table?ts=1638783715492	1. Downloaded data for 2020 (to match income data, see above), and calculated frequency of each household size in the population by dividing number of households of each size by total number of households in that composition group (number of adults, presence/absence of children) 2. Matched with income data to form household composition and income frequencies a. Used proportion of households of each composition (# of adults/# of children) in composition group (see #1 above) to estimate frequency of that composition of household in that income bracket b. Converted frequency to population-level proportion by dividing by total # of households across all income brackets c. Aggregated income brackets to create 15 income brackets (instead of 50) 3. In model, selected groups of a percentage of consumers that matched that household size and income frequency, who did not yet have a household size, and assigned them to that size bracket. Consumers with more than one adult in the household (e.g. married or unmarried partners) were combined into correctly sized household networks. For uneven household size frequencies (e.g. 125 consumers selected for households with 2 adults), an additional consumer who did not yet have a household size was added to the group (consumers who lived alone were assigned last to a household size of 1) 4. Members of the same household network were then (re)assigned identical weekly household income
Identifying food items in diets	RIVM Dutch Dietary Recall Survey, 2012-2016	van Rossum *et al*. (2016)	1. Identified consumption data for vegans, vegetarians, and pescatarians based on responses to questions in survey introduction 2. Identified consumption data for flexitarians based on median meat consumption per day (distribution was highly skewed so median was used as a more robust measure of center) – flexitarians assumed to be those that ate less than median meat consumption each day or ate no meat on one of the two recorded days. All respondents not classified as vegan, vegetarian, pescatarian, or flexitarian were classified as omnivores

<table>
<tr><td></td><td></td><td></td><td>3. Food products were matched with those in Foodcost Database (see below) based on NEVO code</td></tr>
<tr><td>Calculating prices of diets</td><td>Dutch Food Price database</td><td>The Dutch Food Price database was constructed by Mary Nicolaou, Coosje Dijkstra and Joreintje Mackenbach, who were funded to do so by the Health Behaviors and Chronic Diseases (HBCD) program of the Amsterdam Public Health research institute (MN, CD and JM) and the Netherlands Organisation for Scientific Research (JM)</td><td>1. A few common items for less frequent diets (e.g. vegan) that were missing prices were added to database, using regular (non-sale) prices for same or similar items at two common Dutch supermarkets (Plus and Albert Heijn) – not all items could be identified so basket prices are underestimates, but missing items typically represented less than 1% of daily consumption.
2. Prices were matched to RIVM Dutch Dietary Recall Survey items (see row above, step 3)
3. Observations with prices outside of median + IQR or median – IQR for that diet were removed, and the median was re-calculated
4. As there were only four vegans in the sample, vegan was assumed to be 0.50/day more than vegetarian, following estimates from Springmann et al. (2021)
5. Final diet prices were as follows:
<table>
<tr><th>Diet name</th><th>Price per person per week</th></tr>
<tr><td>Vegan</td><td>22.09</td></tr>
<tr><td>Vegetarian</td><td>18.59</td></tr>
<tr><td>Pescatarian</td><td>22.15</td></tr>
<tr><td>Flexitarian</td><td>13.94</td></tr>
<tr><td>Omnivore</td><td>17.95</td></tr>
</table>
6.</td></tr>
<tr><td>Motivations and perceptions</td><td></td><td>Verain et al. (2016)</td><td>1. Used qualitative statements in paper and quantitative statements on importance (see e.g. Table 3) to parameterize three clusters with proportions and motivations/perceptions matching those of clusters identified in paper
2. Assigned consumers in model to one of the three clusters
3. Diet calibration showed that distribution of diets across population roughly matched Dutch data at that time (van Rossum et al., 2016), so the initial parameterization was kept</td></tr>
<tr><td>Parameterizing norm adherence</td><td>European Social Survey, 2016</td><td>ESS Round 8: European Social Survey Round 8 Data (2016). Data file edition 2.2. NSD - Norwegian Centre for Research Data, Norway – Data Archive and distributor of ESS data for ESS ERIC.</td><td>1. The responses for the Netherlands were extracted, and answers to the following question were used:
“It is important to her/him to make her/his own decisions about what she/he does. She/he likes to be free and not depend on others” (negative answers = high norm adherence)
2. Respondents’ scoring of question (1-6, with 1 being ‘very much like me’ to 6 being ‘not at all like me’) were converted to values from 0 – 1:
Mean = orig. score * 1/6 – 1/12
SD = 0.04
The subtraction of 1/12 from the converted score centered the means between 0 – 1, such that the highest and lowest scores were >2 standard deviations from the bounds of the variables.</td></tr>
</table>

		doi:10.21338/NSD-ESS8-2016.	3. The frequency of each score in the survey was used to determine the percentage of consumers who should draw from a normal distribution using that score's mean and standard deviation to determine the values for their motivation and norm adherence variables. 4. An example of the distribution of motivations at initialization (note that stochasticity in initialization means that distributions will differ slightly each run, but this is illustrative). These were visually compared to the distributions of the survey scores to verify that the translation from scoring to motivations kept the overall shape of the distribution 5. Given that the variable ranged from [0,1] but a norm adherence of 1 would mean instant adoption of any other consumer's viewpoint, a scaling factor was applied – this was a model parameter, explored during the sensitivity analysis
Baseline values for interaction probability and average node degree	European Social Survey, 2016	ESS Round 8: European Social Survey Round 8 Data (2016). Data file edition 2.2. NSD - Norwegian Centre for Research Data, Norway – Data Archive and distributor of ESS data for ESS ERIC. doi:10.21338/NSD-ESS8-2016.	1. Identified relevant questions on social contact frequency ("How often do you meet socially? (1 = never, 2 = <1x/month, 3 = 1x/month, 4 = >1x/month, 5 = 1x/wk, 6 = >1x/wk, 7 = every day)") and number of close social contacts ("How many people, if any, are there with whom you can discuss intimate and personal matters? 0 = 0, 1 = 1, 2 = 2, 3 = 3, 4 = 4-6, 5 = 7-9, 6 = 10+) 2. Used social contact frequency to determine interaction probability – majority of respondents reported meeting more than once per week, so baseline interaction probability was set at 1/initial average node degree, such that it was likely that most consumers would initially interact with a social contact around once per timestep – although this is low for the sample population, since interactions represent a conversation about food or eating together, this may happen less than social contact more generally (except in the situation of colleagues eating together). 3. Used number of social contacts to determine average size of friends network – a majority of respondents indicated 4-6 close social contacts, so 5 was chosen as the baseline value
Average node degree (friends and acquaintances networks combined)			1. No data were available for the general Dutch population specifically, so a value of 150 was used as baseline from Dunbar (2020)

Table A2. Unit tests. Before performing diet calibration and sensitivity analysis, the model was initialized with baseline parameter values and all submodels, and the following tests were performed. Any necessary corrections to the code were made before preceding with further calibration.

Section	Test	Expected result
Set up	Household size distribution correct	Distribution of household sizes seems reasonable for Dutch population
		No consumers with household size = 0
		Consumers with household size > 0 and nAdults > 1 have correct number of household social ties
	Household income distribution correct	Distribution of household incomes matches those from parameterization data
	Consumer motivations distribution correct	Distribution of motivations matches those from parameterization data
	Diets created correctly	Diets created as specified, costs correct for those in file
	Consumer-diet links correct	Distributions of consumer perceptions match those in file
		Consumers each connected to an initial diet
		Consumers calculate correct perceived value
	Social network set up correctly	Initial average degree matches specified parameter
		Mean number of close friends and acquaintances correct
		Household members still connected
		All non-friends and non-household members and non-acquaintances have link-strength = 0
		Link strengths all between [0, 1]
		Similarity calculated correctly between all consumers
Recording	Data collection correct	All output CSVs have correct headers, contents, and formatting
Diet choice	Diet choice and utility calculation correct	Consumers only re-evaluate diets if their current diet's utility to them is below their satisfaction threshold
		Diet utility calculated correctly
		Diet choice probability linked to utility correctly (e.g. highest utility diet chosen most of the time)
		Chosen diet increments no. of times consumed
Social interaction	Social network interactions determined and accounted for correctly	No more than maximum no. of social contacts per timestep contacted

		Sorting of social contacts by link strength, social distance done correctly
		Close contacts contacted more frequently
		No. of interactions per timestep between consumers correct
		Household members exchange influence each timestep
		Contacts-this-timestep incremented by number of contacts made (including household members)
	Influence exchanged correctly	Influence of alter on ego reflects alter's perception of alter's diet, influence of ego on alter reflects ego's perception of ego's diet
		Influence accepted correctly - probability correct based on social tie strength, motivation similarity; update amount correct
		Influence ignored correctly - probability correct based on social tie strength, motivation similarity; update amount correct
		Influence rejected correctly - probability correct based on social tie strength, motivation similarity; update amount correct
		Ego and alter influence each other based on pre-interaction perceptions
		Actual perceptions updated from temporary variables correctly
	Taste perception updated	Taste perception updated correctly for diet consumed this timestep
	Network rewiring correct	Links strengthen and decay for consumers who do/don't contact one another
		Close friends and household members keep same link strength

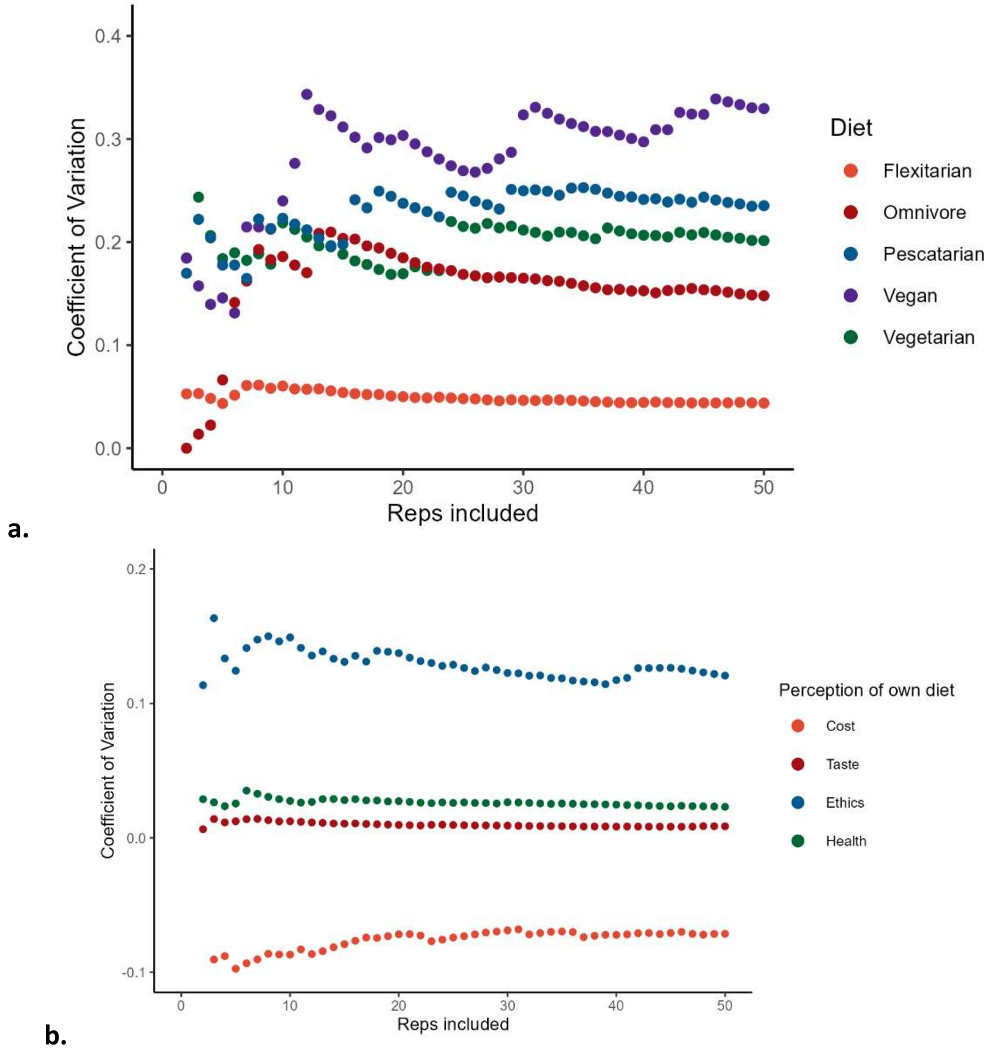
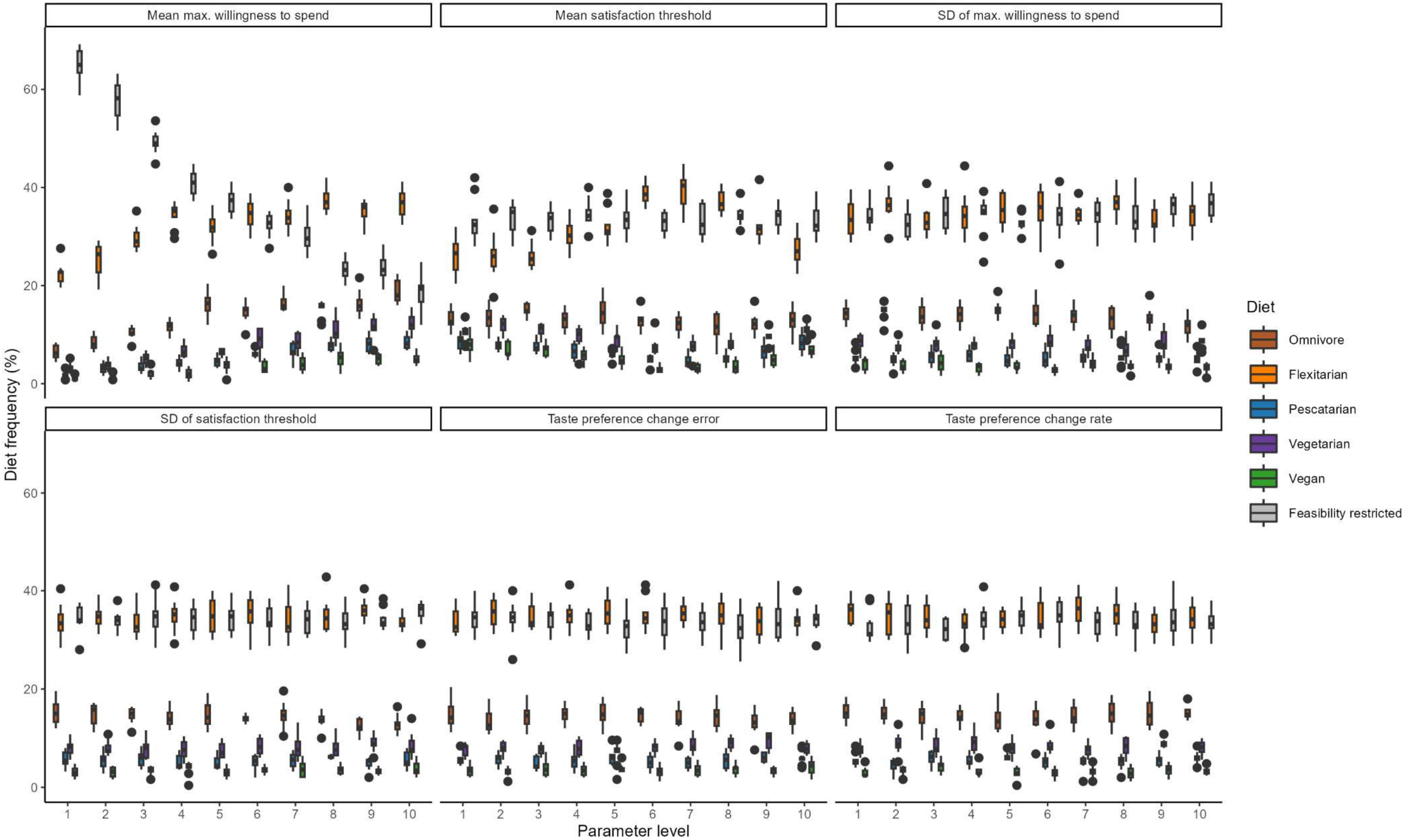
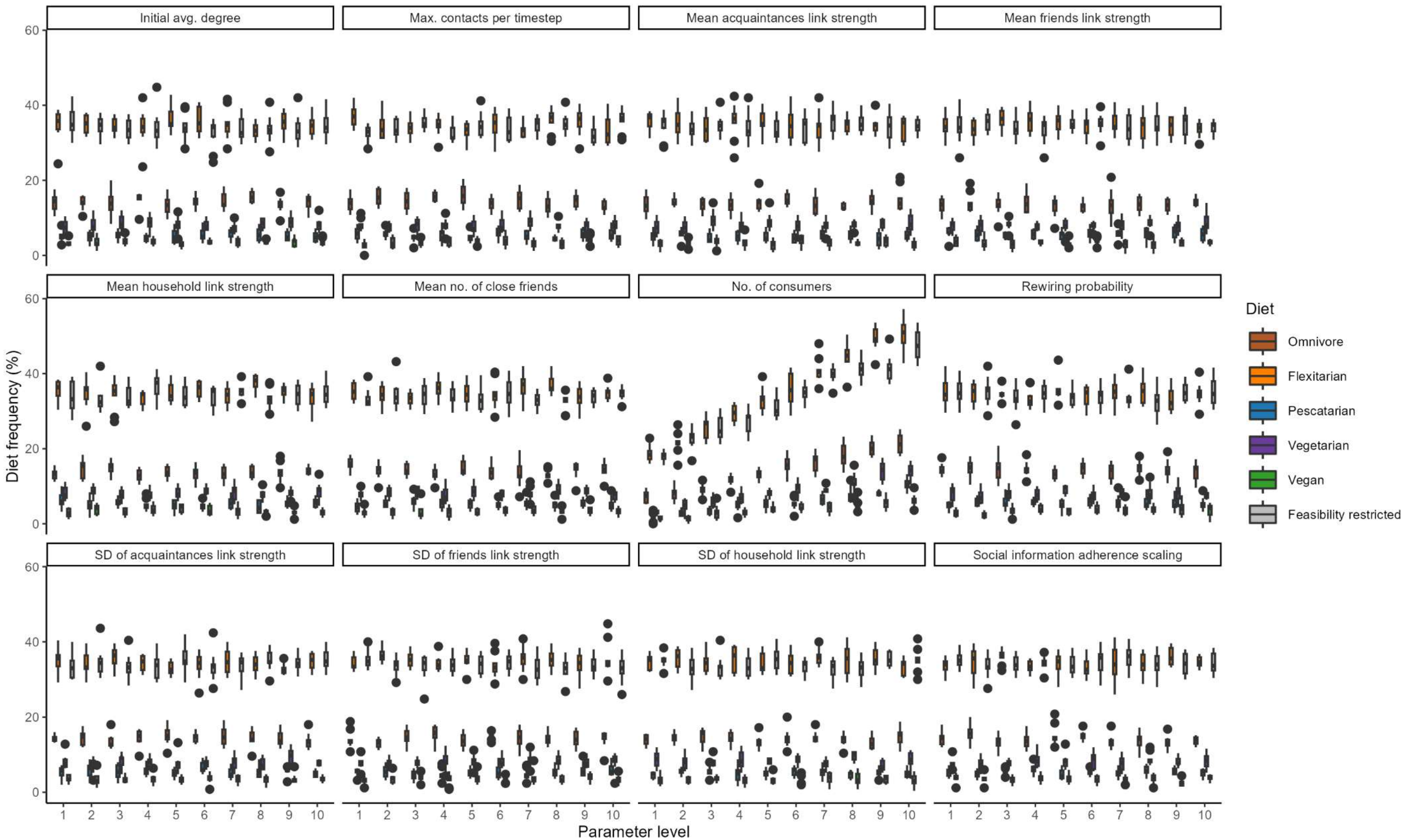


Figure A1. Replicates test results, showing coefficient of variation for inclusion of 1-50 replicates, measuring a. diet frequency and b. perceptions of own diet. The model used baseline parameters and included all submodels (i.e. both social interaction and network structural change).

Appendix 2: One-Factor-at-a-Time Sensitivity Analysis results

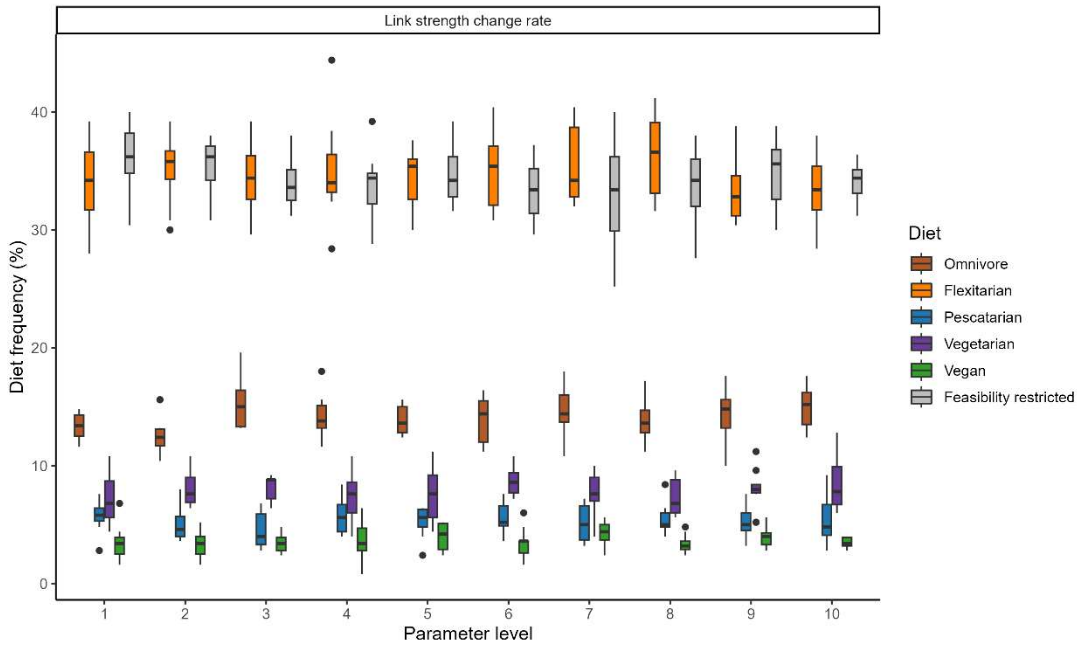


a.



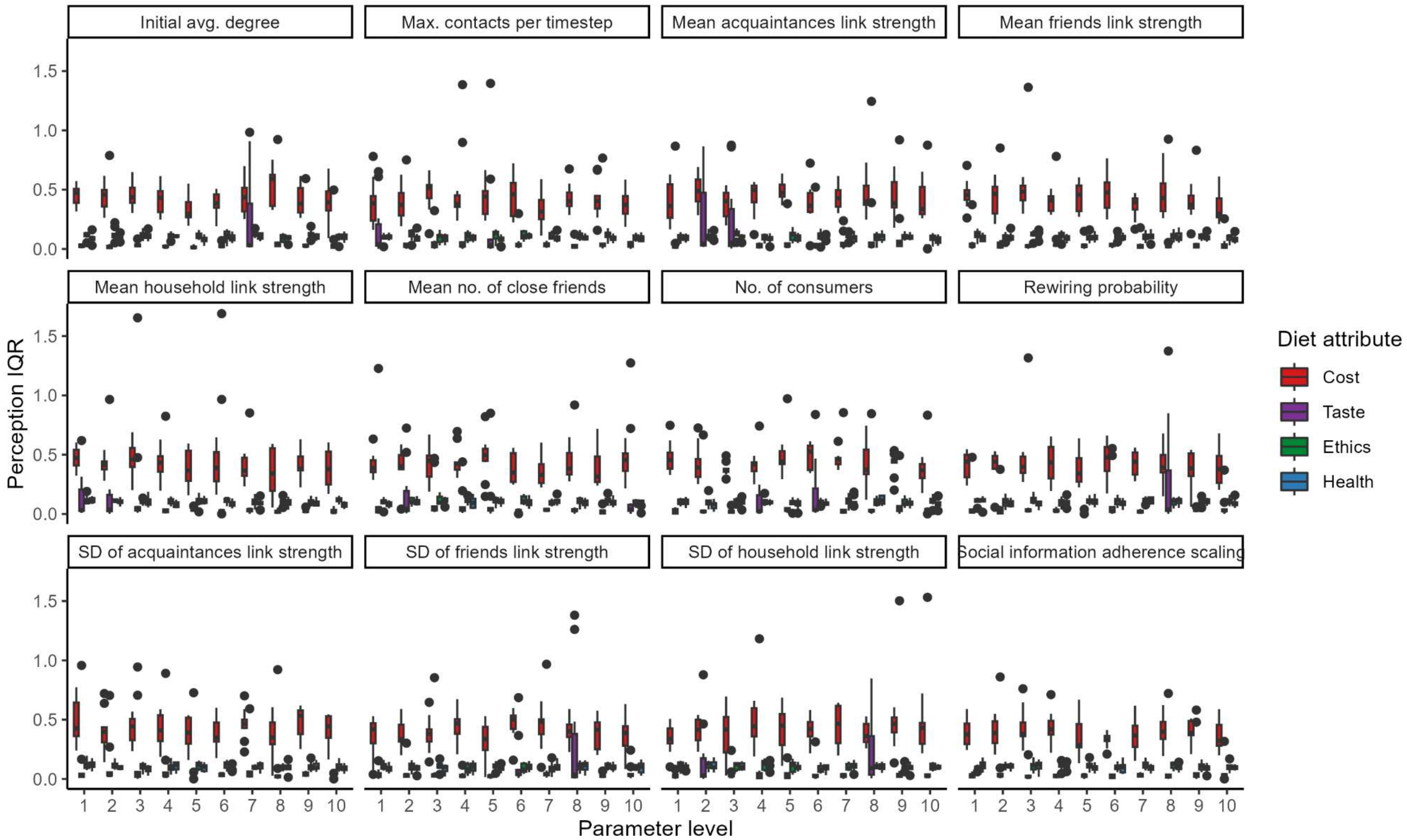
Initial avg. degree
Max. contacts per timestep
Mean acquaintances link strength
Mean friends link strength
Mean household link strength
Mean no. of close friends
No. of consumers
Rewiring probability
SD of acquaintances link strength
SD of friends link strength
SD of household link strength
Social information adherence scaling
Diet frequency (%)
Parameter level
Diet
Omnivore
Flexitarian
Pescatarian
Vegetarian
Vegan
Feasibility restricted

b.

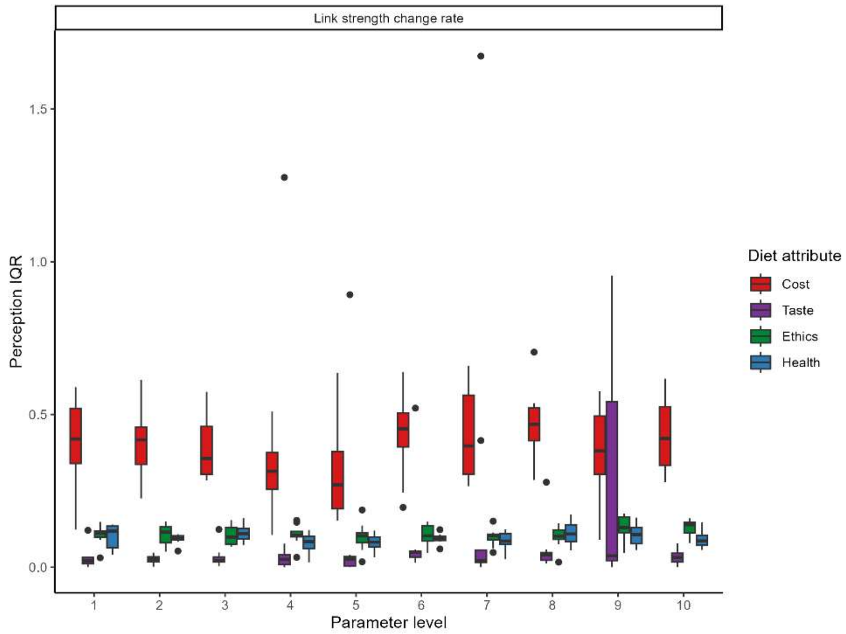


c.

Figure A2. OFAT sensitivity analysis outcomes, showing diet frequency with (a) no social interaction, (b) social interaction and static networks, (c) social interaction and acquaintance network structural change. Distributions show values across 10 replicates of each parameterization.

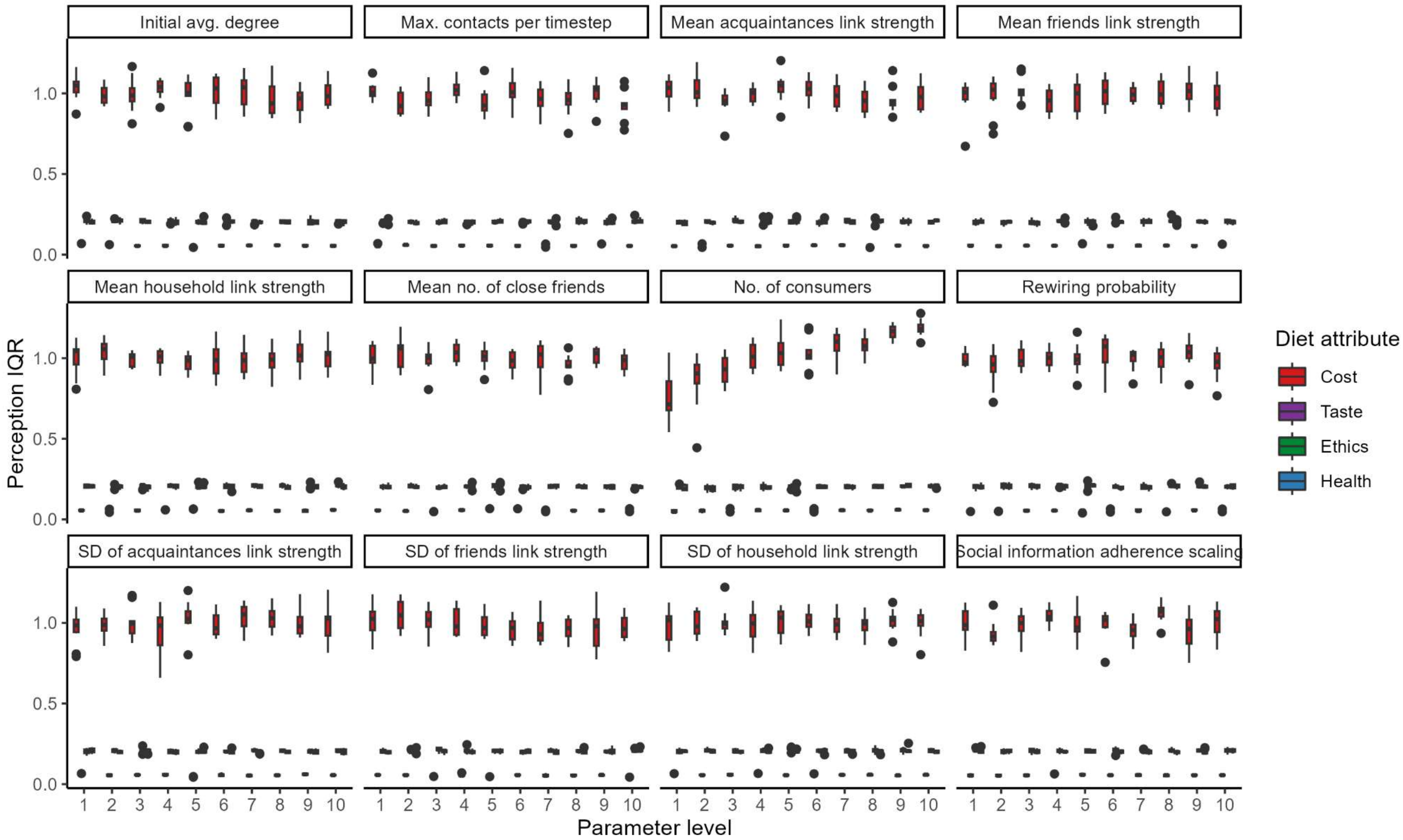

Initial avg. degree
Max. contacts per timestep
Mean acquaintances link strength
Mean friends link strength
Mean household link strength
Mean no. of close friends
No. of consumers
Rewiring probability
SD of acquaintances link strength
SD of friends link strength
SD of household link strength
Social information adherence scaling
Perception IQR
0.0
0.5
1.0
1.5
1
2
3
4
5
6
7
8
9
10
Parameter level
Diet attribute
Cost
Taste
Ethics
Health

d.



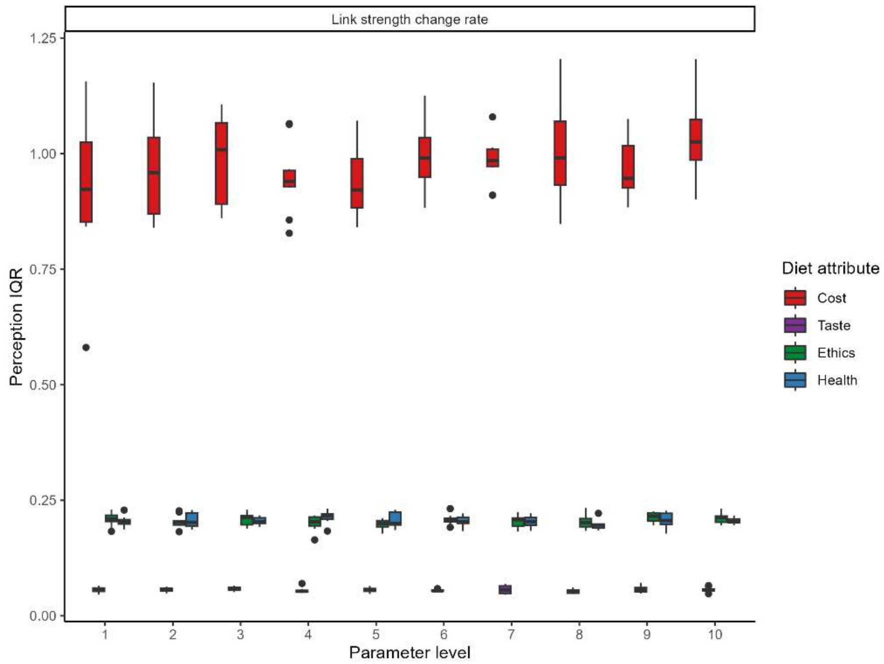
Link strength change rate
Perception IQR
1.5
1.0
0.5
0.0
1
2
3
4
5
6
7
8
9
10
Parameter level
Diet attribute
Cost
Taste
Ethics
Health

e.



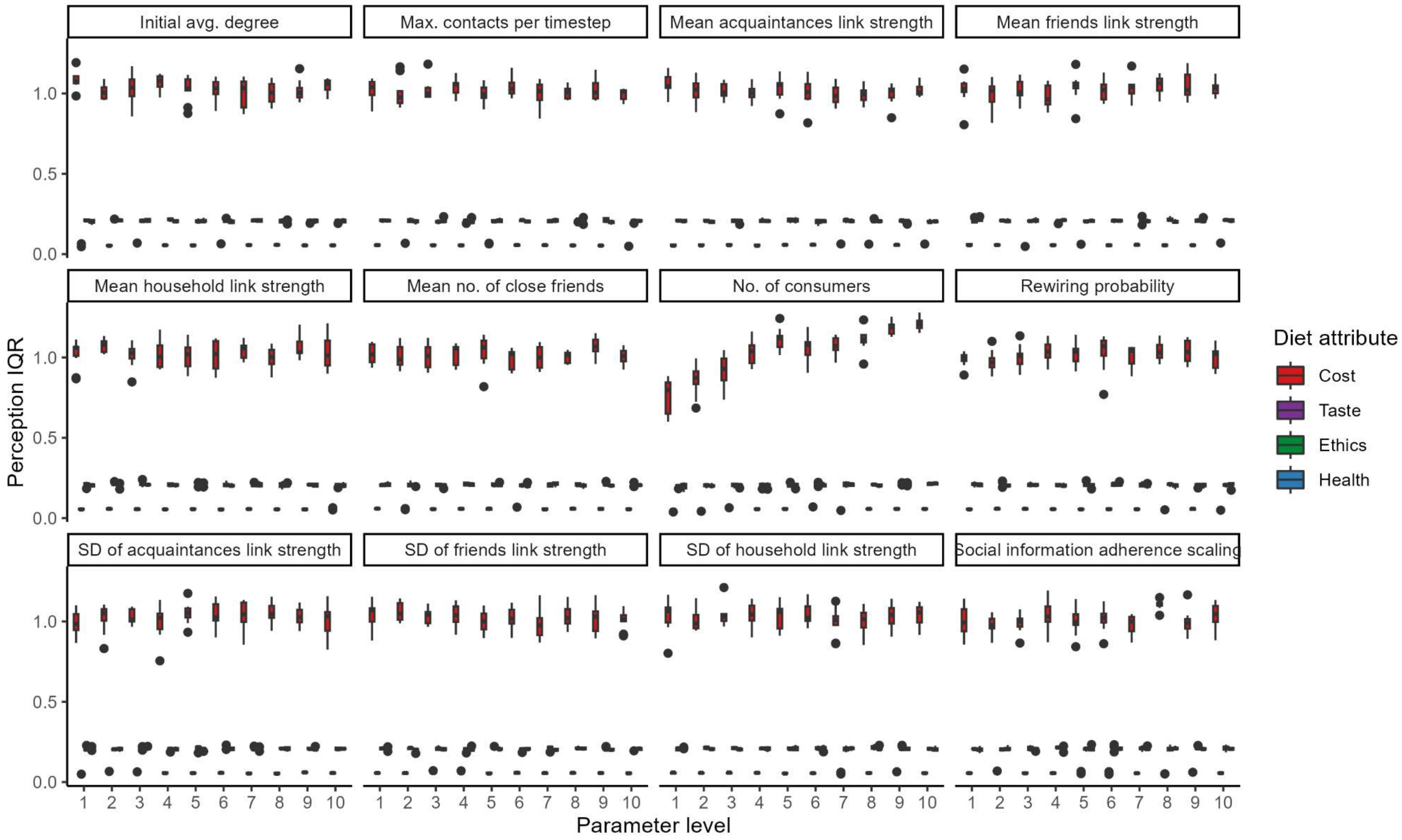
Initial avg. degree
Max. contacts per timestep
Mean acquaintances link strength
Mean friends link strength
Mean household link strength
Mean no. of close friends
No. of consumers
Rewiring probability
SD of acquaintances link strength
SD of friends link strength
SD of household link strength
Social information adherence scaling
Perception IQR
Parameter level
Diet attribute
Cost
Taste
Ethics
Health

f.



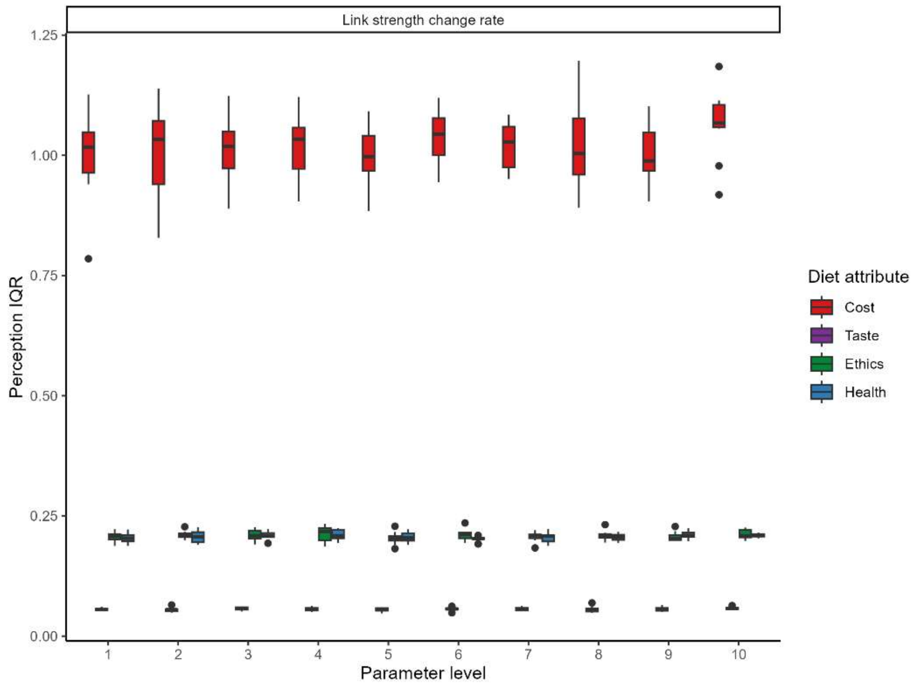
Link strength change rate
Perception IQR
1.25
1.00
0.75
0.50
0.25
0.00
1
2
3
4
5
6
7
8
9
10
Parameter level
Diet attribute
Cost
Taste
Ethics
Health

g.



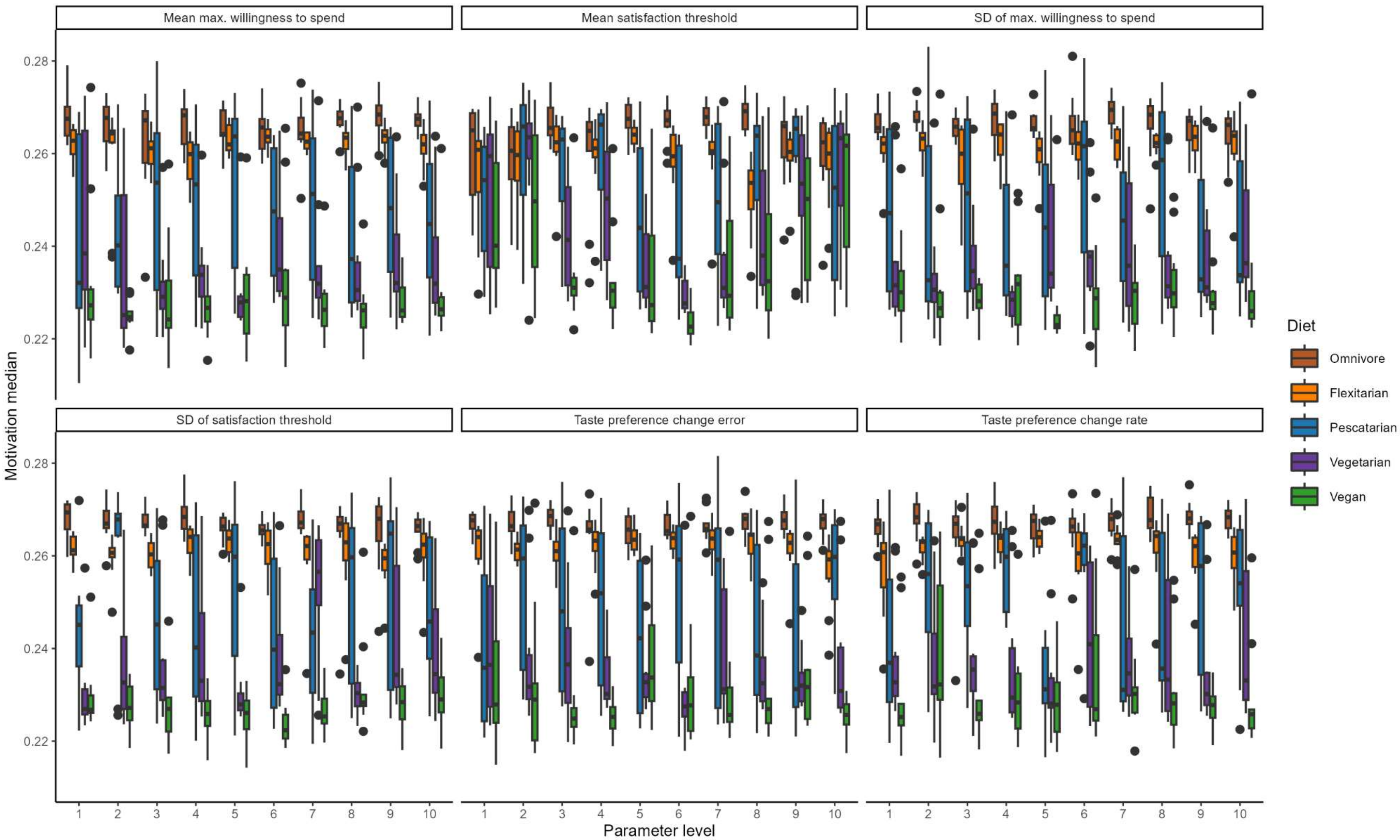
Initial avg. degree
Max. contacts per timestep
Mean acquaintances link strength
Mean friends link strength
Mean household link strength
Mean no. of close friends
No. of consumers
Rewiring probability
SD of acquaintances link strength
SD of friends link strength
SD of household link strength
Social information adherence scaling
Perception IQR
0.0
0.5
1.0
1 2 3 4 5 6 7 8 9 10
Parameter level
Diet attribute
Cost
Taste
Ethics
Health

h.



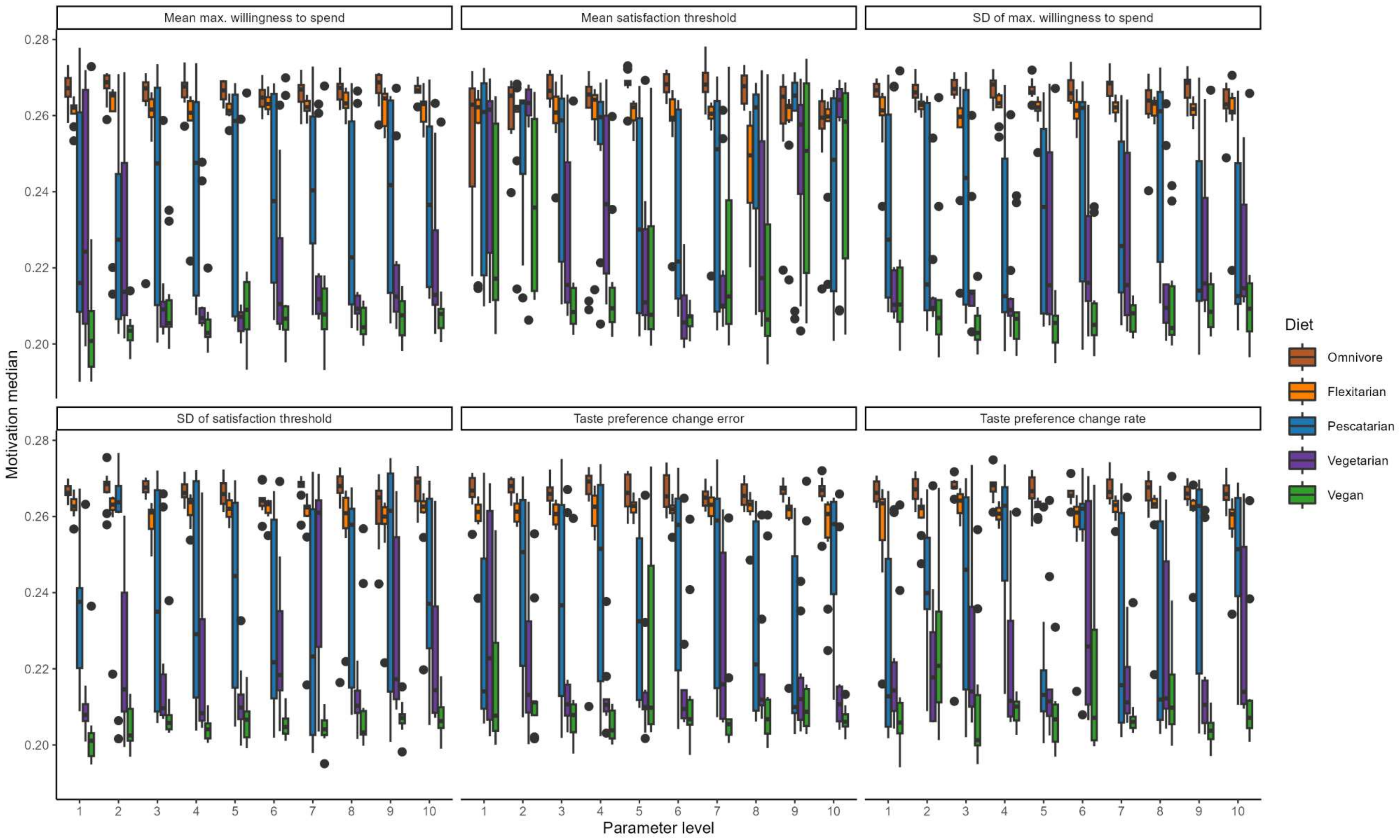
i.

Figure A3. OFAT sensitivity analysis outcomes, showing homophily of network perceptions (measured as IQR) of (d) household networks, social interaction and static networks, (e) household networks, social interaction and network structural change, (f) friends networks, social interaction and static networks, (g) friends networks, social interaction and structural change, (h) acquaintance networks, social interaction and static networks, (i) acquaintance networks, social interaction and structural change. Distributions show values across 10 replicates of each parameterization.



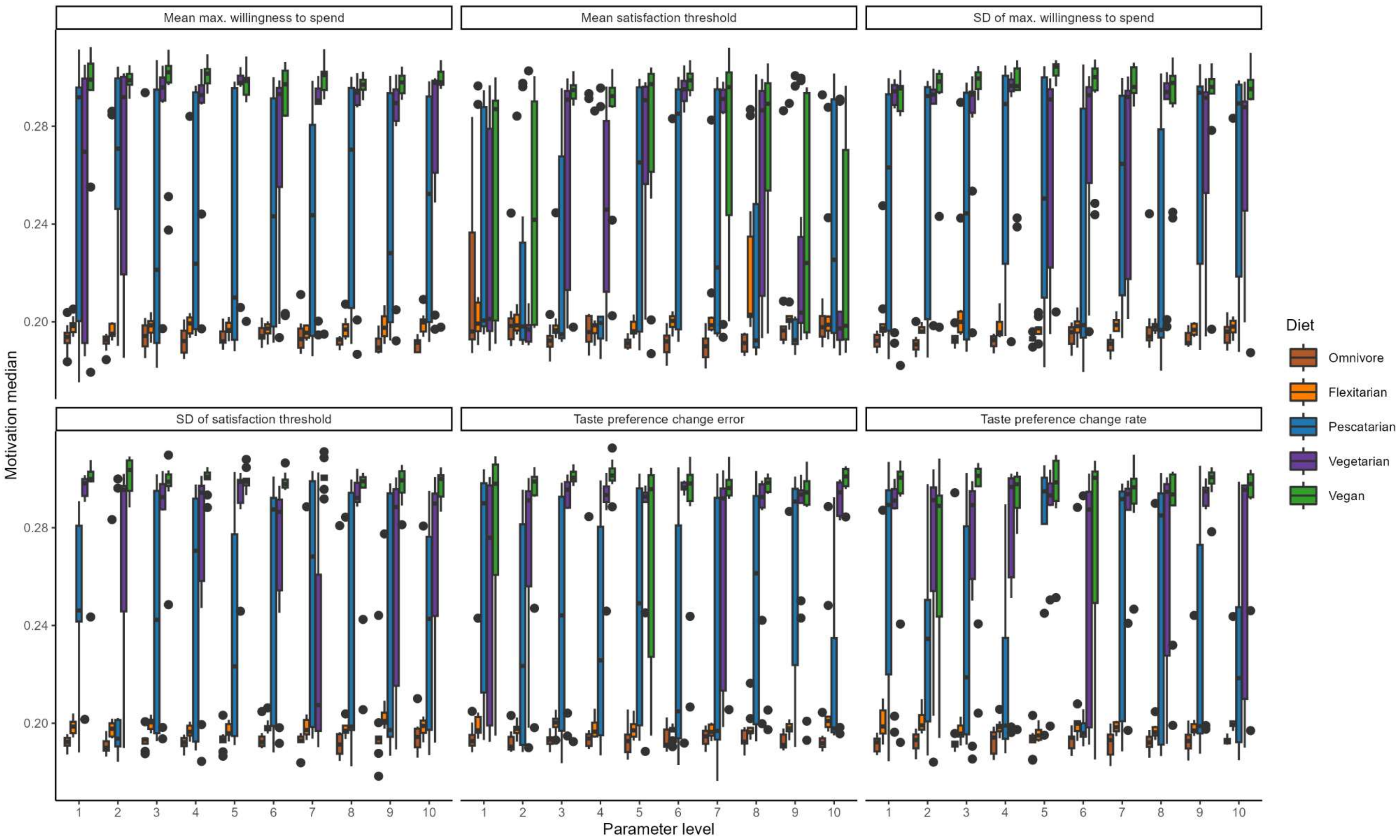
Mean max. willingness to spend
Mean satisfaction threshold
SD of max. willingness to spend
SD of satisfaction threshold
Taste preference change error
Taste preference change rate
0.28
0.26
0.24
0.22
Motivation median
1
2
3
4
5
6
7
8
9
10
Parameter level
Diet
Omnivore
Flexitarian
Pescatarian
Vegetarian
Vegan

j.



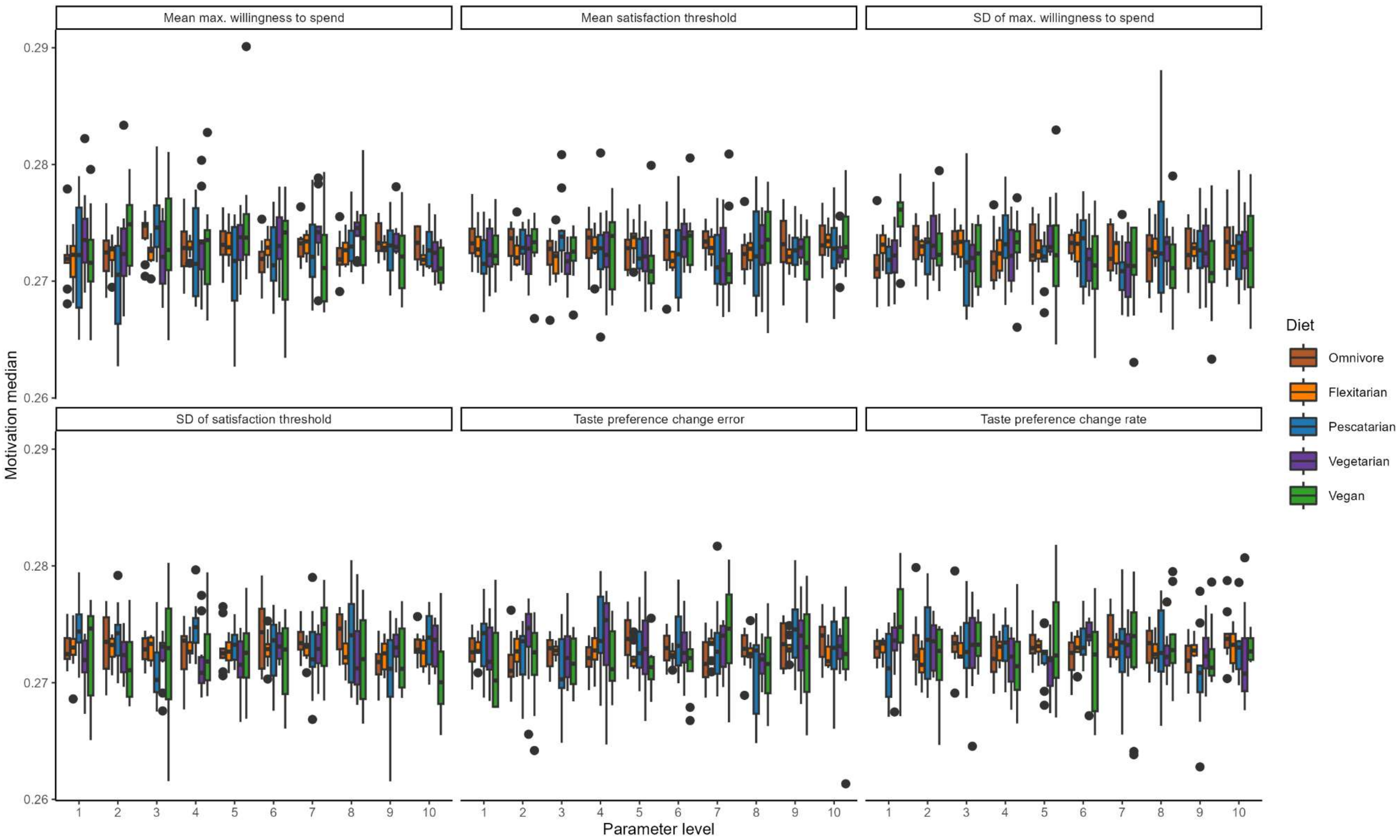
Mean max. willingness to spend
Mean satisfaction threshold
SD of max. willingness to spend
SD of satisfaction threshold
Taste preference change error
Taste preference change rate
Motivation median
0.28
0.26
0.24
0.22
0.20
Parameter level
1
2
3
4
5
6
7
8
9
10
Diet
Omnivore
Flexitarian
Pescatarian
Vegetarian
Vegan

k.



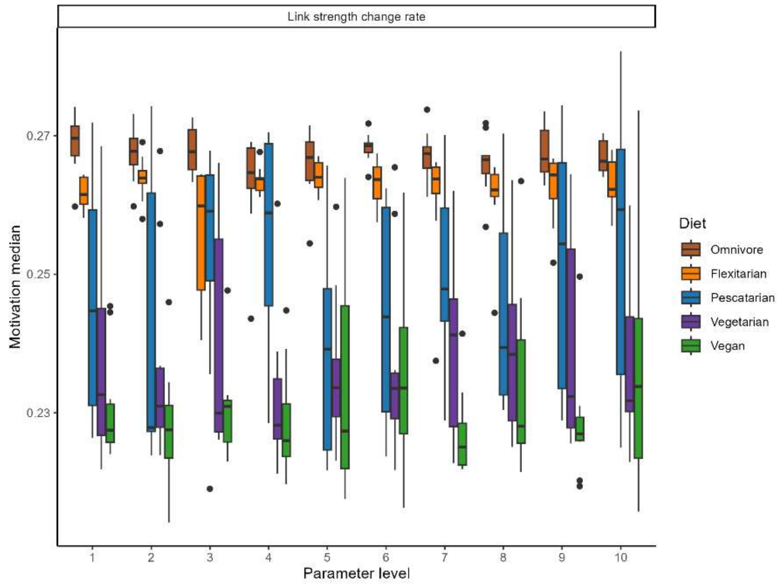
Mean max. willingness to spend
Mean satisfaction threshold
SD of max. willingness to spend
SD of satisfaction threshold
Taste preference change error
Taste preference change rate
Motivation median
0.20
0.24
0.28
Parameter level
1
2
3
4
5
6
7
8
9
10
Diet
Omnivore
Flexitarian
Pescatarian
Vegetarian
Vegan

I.

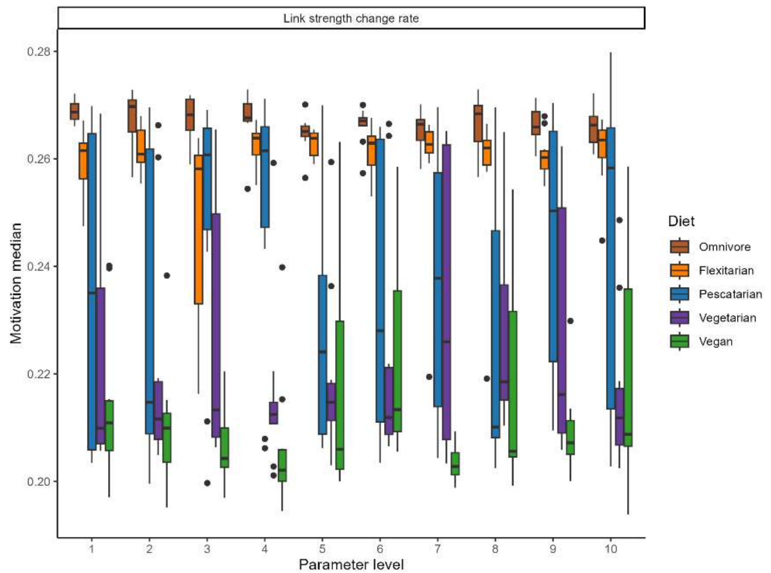


Mean max. willingness to spend
Mean satisfaction threshold
SD of max. willingness to spend
SD of satisfaction threshold
Taste preference change error
Taste preference change rate
Motivation median
Parameter level
0.26
0.27
0.28
0.29
1
2
3
4
5
6
7
8
9
10
Diet
Omnivore
Flexitarian
Pescatarian
Vegetarian
Vegan

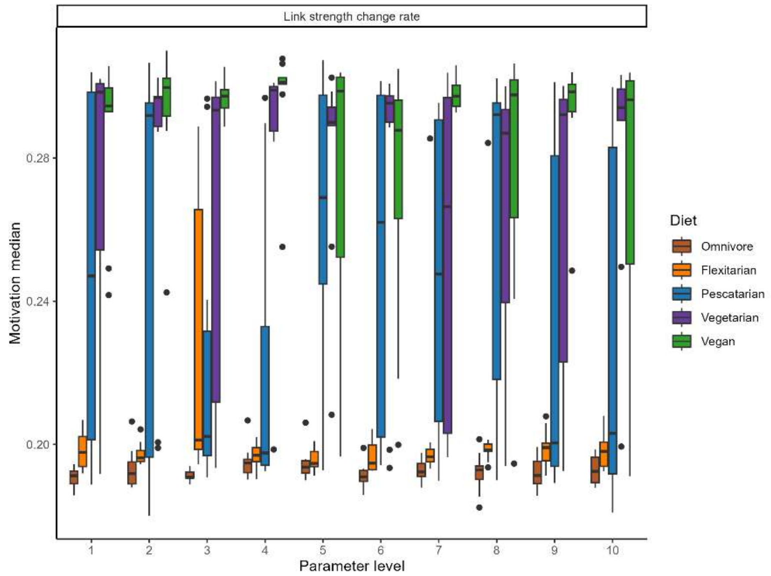
m.


Link strength change rate
Motivation median
0.27
0.25
0.23
1
2
3
4
5
6
7
8
9
10
Parameter level
Diet
Omnivore
Flexitarian
Pescatarian
Vegetarian
Vegan

n.

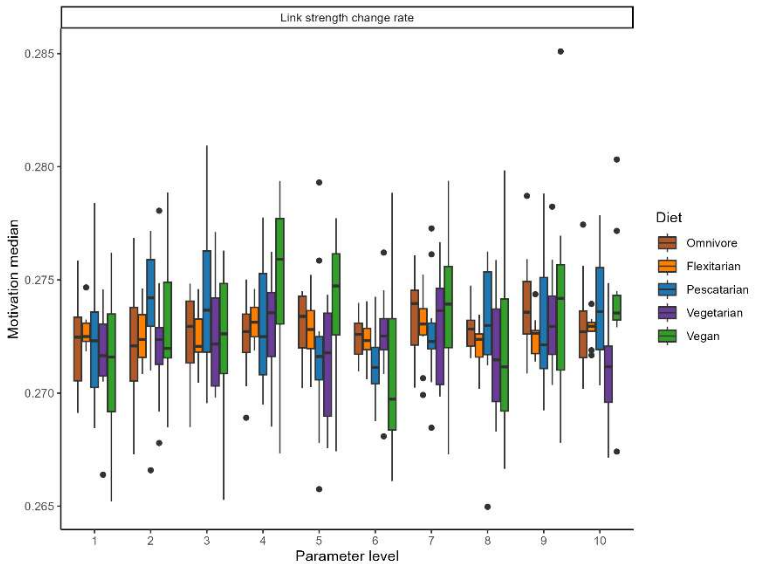

Link strength change rate
Motivation median
0.28
0.26
0.24
0.22
0.20
1
2
3
4
5
6
7
8
9
10
Parameter level
Diet
Omnivore
Flexitarian
Pescatarian
Vegetarian
Vegan

o.



Link strength change rate
0.28
0.24
0.20
Motivation median
1
2
3
4
5
6
7
8
9
10
Parameter level
Diet
Omnivore
Flexitarian
Pescatarian
Vegetarian
Vegan

p.



Link strength change rate
0.285
0.280
0.275
0.270
0.265
Motivation median
1
2
3
4
5
6
7
8
9
10
Parameter level
Diet
Omnivore
Flexitarian
Pescatarian
Vegetarian
Vegan

q.

Figure A4. OFAT sensitivity analysis outcomes, showing perceptions across followers of same diet (median of perceptions) for (j) cost perception, social interaction and static networks, (k) taste perception, social interaction and static networks, (l) ethics perception, social interaction and static networks, (m) health perception, social interaction and static networks, (n) cost perception, social interaction and structural change, (o) taste perception, social interaction and structural change, (p) ethics perception, social interaction and structural change, (q) health perception, social interaction and structural change. Distributions show values across 10 replicates of each parameterization.

Appendix 3: Additional figures

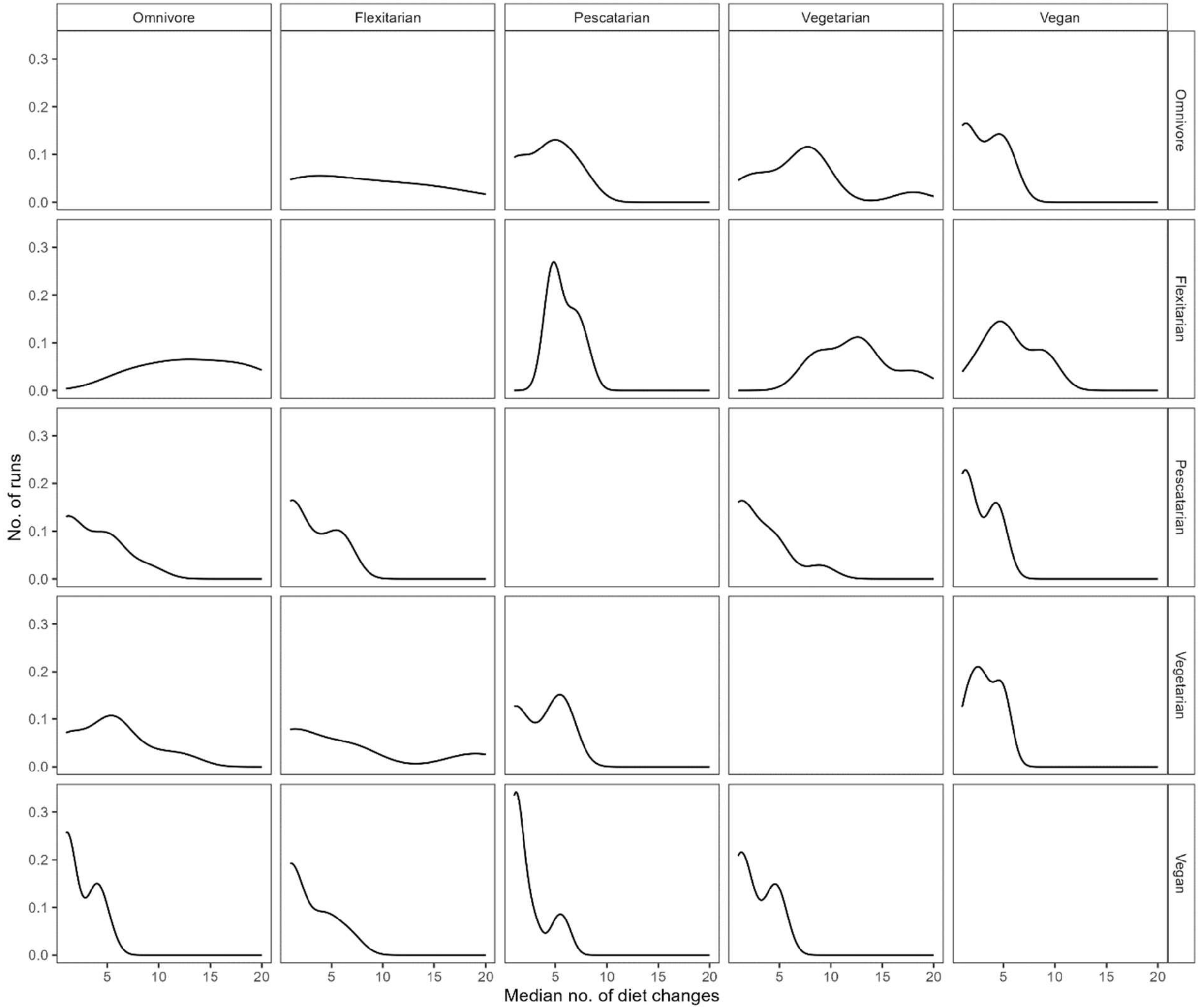


Figure A5. Frequency of diet changes. Rows represent diets changed from, columns represent diets changed to. Shown are distributions of medians from 10 replicates over baseline parameters, with both social interaction and network structural change submodels included.

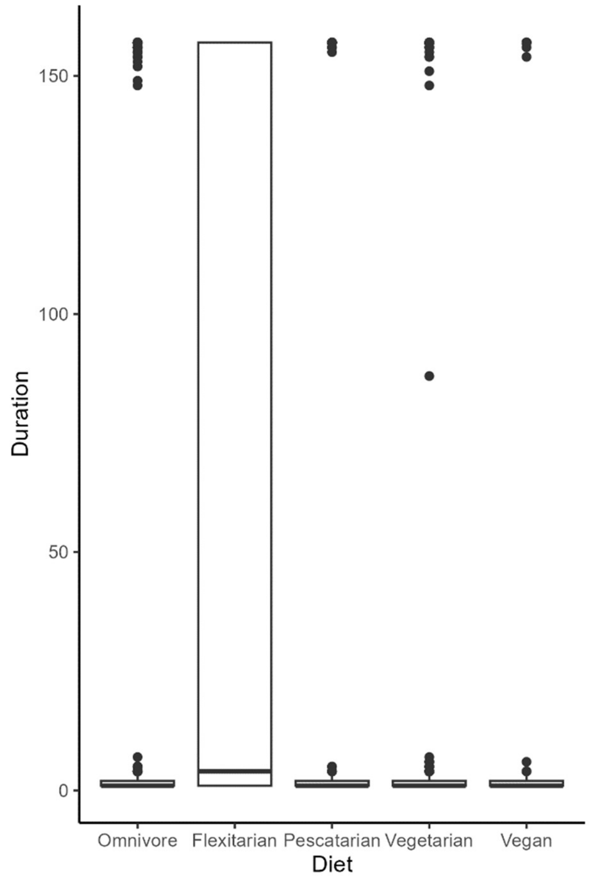


Figure A6. Median duration of diets. Shown are distributions of medians from 10 replicates with baseline parameters, with both social interaction and network structural change submodels included.

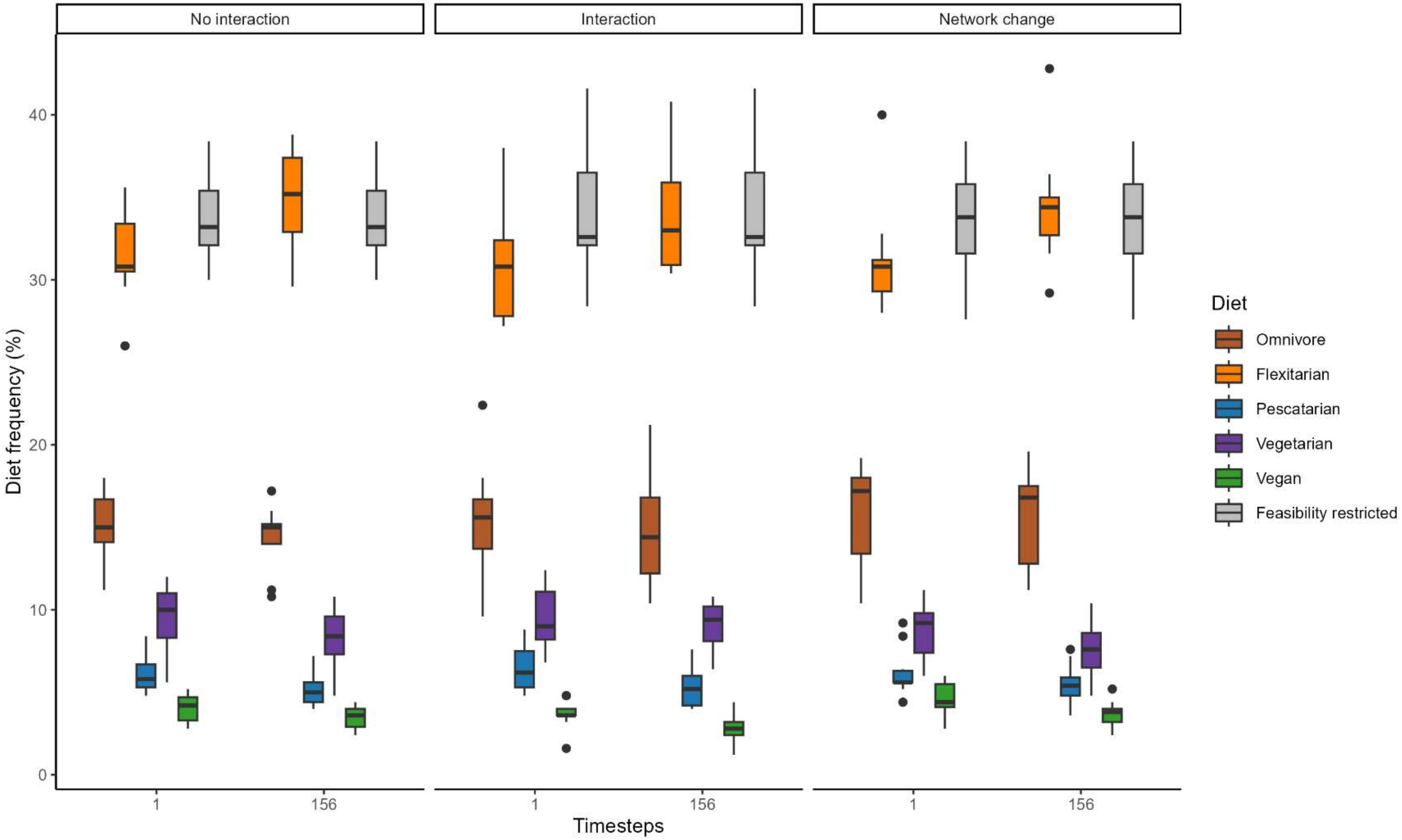


Figure A7. Diet frequency over time, comparing models with no social interaction, social interaction and static networks, and social interaction and acquaintance network structural change. Distributions show data across 10 replicates with baseline parameters.

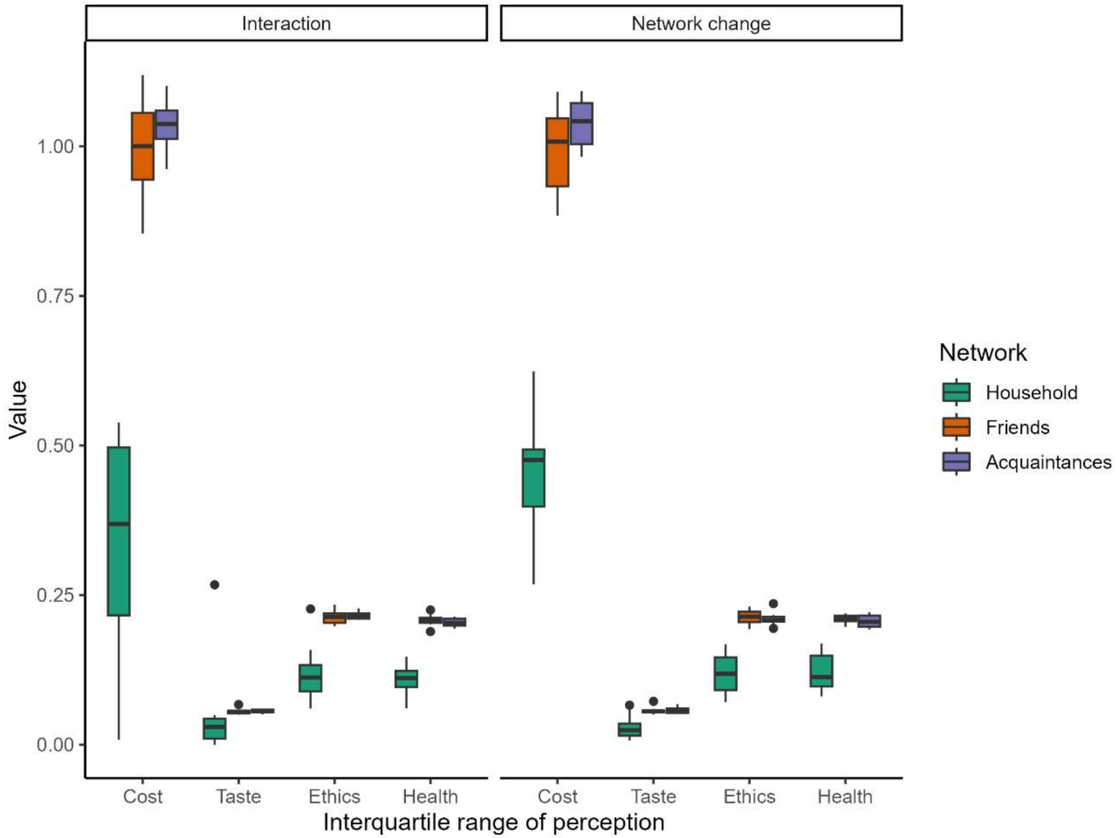


Figure A8. Network homophily across models including only interaction (left) and interaction and acquaintances network structural change (right). Data show IQRs of each perception, with distributions across 10 replicates at baseline parameterization.

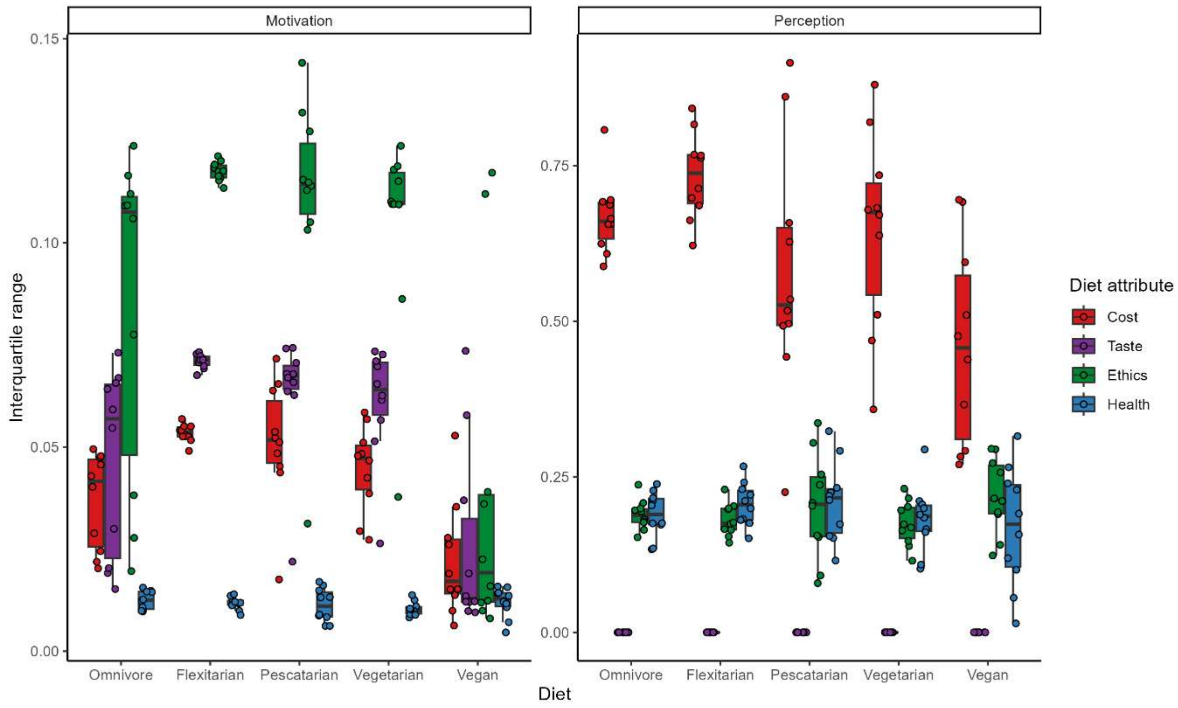


Figure A9. Homophily of motivations and perceptions across consumers following same diet. Data show IQRs of each perception, with distributions across 10 replicates at baseline parameterization.