

Information customization and food choice

Article

Accepted Version

Balcombe, K., Fraser, I., Lowe, B. and Souza Monteiro, D.
(2016) Information customization and food choice. *American
Journal of Agricultural Economics*, 98 (1). pp. 54-73. ISSN
0002-9092 doi: 10.1093/ajae/aav033 Available at
<https://centaur.reading.ac.uk/40135/>

It is advisable to refer to the publisher's version if you intend to cite from the work. See [Guidance on citing](#).

To link to this article DOI: <http://dx.doi.org/10.1093/ajae/aav033>

Publisher: Oxford University Press

All outputs in CentAUR are protected by Intellectual Property Rights law, including copyright law. Copyright and IPR is retained by the creators or other copyright holders. Terms and conditions for use of this material are defined in the [End User Agreement](#).

www.reading.ac.uk/centaur

CentAUR

Central Archive at the University of Reading

Reading's research outputs online

AJAE appendix for
Information Customization and Food Choice.

Authors: Kelvin Balcombe (k.g.balcombe@reading.ac.uk); Iain Fraser (i.m.fraser@kent.ac.uk); Ben Lowe (b.lowe@kent.ac.uk); Diogo Souza Monteiro (Diogo.Souza-Monteiro@newcastle.ac.uk) .

Date: April 2015

Note: The material contained herein is supplementary to the article named in the title and published in the American Journal of Agricultural Economics (AJAE).

Appendix

Analysis of Association Between ANA and AIR Data and Time Taken to Complete the Survey

We investigated this question by a series of regressions for the AIR data and beta distributed regressions for the probability of ANA. In each case a function of time taken to complete the survey, measured discretely ($t = 1, 2, 3, \dots, T$), was used as an explanatory variable for either mean AIR or probability of ANA ($f(t) = \mu_0 + \mu_1 t + \mu_2 t^2$). For each attribute, we took the mean rank or proportion of ANA for those completing the survey within a given time interval. In the case of AIR, the mean rank for those completing at t ($\bar{r}(t)$) was modelled as $\bar{r}(t) = f(t) + e_t$ where e_t is an error term and its variance was assumed inversely proportional to the square root of the number completing at time t (thus reflecting the approximate accuracy of $\bar{r}(t)$). For the case of ANA we modelled the two distributions of the proportions replying that they ignored an attribute as a beta distribution where the two parameters of the beta distribution were functions of time. In only one regression out of ten, (mean ranking of Diet) did we obtain a highly significant effect of time. Note, as we employed Bayesian methods significance means that a parameter is at least twice the size of the associated standard deviation. Moreover, the difference in time taken to complete the survey did not differ significantly between the group that replied consistently (with respect to ANA and AIR) compared to those who did not. Our overall conclusion, therefore, is that time taken to complete the survey was not a likely candidate for explaining ANA or AIR. However, time taken to complete the survey may still explain the level of noise in decision making and we investigate this further below.

Table 1A: Standard Mixed Logit Results (Models 1N, 1L, 1NT and 1LT)

Model 1N	Mean α	St Dev α	Mean Var	St Dev Var
Appearance	-0.139	0.077	0.195	0.049
Nutrition	0.244	0.092	0.493	0.143
Allergy	0.867	0.093	0.918	0.312
Diet	0.662	0.093	0.877	0.222
Price	1.118	0.081	1.304	0.216
ASC NB	0.377	0.250	31.91	3.553
Model 1L	Mean α	St Dev α	Mean Var	St Dev Var
Appearance	-0.243	0.081	0.180	0.054
Nutrition	0.439	0.102	0.654	0.123
Allergy	0.996	0.101	0.976	0.181
Diet	0.878	0.102	1.009	0.195
Price	-0.229	0.450	15.35	2.699
ASC NB	-2.900	0.625	29.25	8.838
Model 1NT	Mean α	St Dev α	Mean Var	St Dev Var
Appearance	-0.120	0.077	0.198	0.055
Nutrition	0.237	0.081	0.467	0.114
Allergy	0.901	0.089	0.859	0.151
Diet	0.681	0.090	0.896	0.152
Price	-1.120	0.080	1.246	0.173
ASC NB	0.380	0.258	34.33	3.773
Hetero (ϕ)	0.395	0.048		
Model 1LT	Mean α	St Dev α	Mean Var	St Dev Var
Appearance	-0.158	0.078	0.185	0.055
Nutrition	0.372	0.087	0.641	0.131
Allergy	0.993	0.086	0.977	0.172
Diet	0.841	0.110	1.072	0.204
Price	-0.813	0.472	11.03	3.052
ASC NB	-1.849	0.986	46.79	11.71
Hetero (ϕ)	0.383	0.052		

Table 2A: Mixed Logit and ANA (Models 2N, 2L, 2NT and 2LT)

Model 2N	Mean α	St Dev α	Mean Var	St Dev Var
Appearance	-0.139	0.092	0.143	0.049
Nutrition	0.373	0.099	0.649	0.143
Allergy	1.429	0.127	1.883	0.312
Diet	1.060	0.111	1.276	0.222
Price	1.315	0.094	1.596	0.215
ASC NB	0.446	0.252	33.79	3.553
ANA Coeff ($\bar{\rho}$)	0.258	0.031		
Model 2L	Mean α	St Dev α	Mean Var	St Dev Var
Appearance	-0.186	0.088	0.184	0.062
Nutrition	0.432	0.095	0.811	0.157
Allergy	1.553	0.121	1.815	0.315
Diet	1.114	0.106	1.390	0.249
Price	-1.075	0.186	5.491	1.023
ASC NB	-0.094	0.371	53.38	5.767
ANA Coeff ($\bar{\rho}$)	0.249	0.036		
Model 2NT	Mean α	St Dev α	Mean Var	St Dev Var
Appearance	-0.114	0.080	0.147	0.049
Nutrition	0.366	0.103	0.599	0.144
Allergy	1.435	0.123	1.713	0.305
Diet	1.088	0.111	1.243	0.219
Price	-1.322	0.095	1.545	0.213
ASC NB	0.438	0.263	36.384	3.861
Hetero (ϕ)	0.385	0.050		
ANA Coeff ($\bar{\rho}$)	0.269	0.029		
Model 2LT	Mean α	St Dev α	Mean Var	St Dev Var
Appearance	-0.148	0.087	0.178	0.068
Nutrition	0.437	0.094	0.812	0.165
Allergy	1.5589	0.123	1.676	0.313
Diet	1.144	0.106	1.335	0.233
Price	-0.978	0.181	4.884	0.892
ASC NB	-0.037	0.369	56.86	6.195
Hetero (ϕ)	0.398	0.053		
ANA Coeff ($\bar{\rho}$)	0.269	0.036		

Table 3A: Mixed Logit and AIR (Model 3)

Model 3N	Mean α	St Dev α	Mean Var	St Dev Var
Appearance	-0.225	0.141	0.400	0.150
Nutrition	0.483	0.129	1.019	0.241
Allergy	1.946	0.167	2.726	0.475
Diet	1.452	0.169	3.004	0.523
Price	1.469	0.099	1.663	0.233
ASC NB	0.344	0.244	30.10	3.253
AIR Coeff ($\tilde{\rho}$)	0.896	0.030		
Model 3L	Mean α	St Dev α	Mean Var	St Dev Var
Appearance	-0.306	0.126	0.324	0.136
Nutrition	0.623	0.123	1.276	0.265
Allergy	2.099	0.158	2.663	0.503
Diet	1.661	0.171	3.293	0.678
Price	-0.730	0.255	7.483	1.730
ASC NB	-0.939	0.575	46.53	6.293
AIR Coeff ($\tilde{\rho}$)	0.897	0.029		
Model 3NT	Mean α	St Dev α	Mean Var	St Dev Var
Appearance	-0.274	0.136	0.425	0.158
Nutrition	0.485	0.128	0.959	0.222
Allergy	1.912	0.161	2.474	0.452
Diet	1.487	0.160	2.851	0.499
Price	-1.457	0.099	1.569	0.231
ASC NB	0.336	0.244	31.57	3.463
Hetero (ϕ)	0.339	0.048		
AIR Coeff ($\tilde{\rho}$)	0.891	0.029		
Model 3LT	Mean α	St Dev α	Mean Var	St Dev Var
Appearance	-0.244	0.131	0.391	0.140
Nutrition	0.621	0.120	1.264	0.280
Allergy	2.033	0.156	2.559	0.494
Diet	1.669	0.165	3.174	0.631
Price	-0.745	0.221	6.052	1.259
ASC NB	-0.597	0.499	51.23	6.853
Hetero (ϕ)	0.352	0.053		
AIR Coeff ($\tilde{\rho}$)	0.884	0.030		

Table A4: Sub-Sample Marginal Log Likelihoods

Model Specifications	MargLL
Model 1N: Mixed Logit (Normal)	-3093.71
Model 1L: Mixed Logit (Log-normal)	-3019.88
Model 1NT: Mixed Logit (Normal) + Time	-3093.43
Model 1LT: Mixed Logit (Log-Normal) + Time	-3024.74
Model 2N: Mixed Logit and ANA (Normal)	-2996.59
Model 2L: Mixed Logit and ANA (Log-normal)	-2935.54
Model 2NT: Mixed Logit and ANA (Normal) + Time	-2994.81
Model 2LT: Mixed Logit and ANA (Log-normal) + Time	-2936.92
Model 3N: Mixed Logit and AIR (Normal)	-2948.91
Model 3L: Mixed Logit and AIR (Log-Normal)	-2891.17
Model 3NT: Mixed Logit and AIR (Normal) + Time	-2949.01
Model 3LT: Mixed Logit and AIR (Log-Normal) + Time	-2890.79

Note: Models in bold are best by model type (1,2 and 3)

Table 5A: Sub-Sample - Standard Mixed Logit Results (Models 1N, 1L, 1NT and 1LT)

Model 1N	Mean α	St Dev α	Mean Var	St Dev Var
Appearance	-0.170	0.125	0.304	0.113
Nutrition	0.359	0.132	0.476	0.157
Allergy	1.281	0.150	1.360	0.283
Diet	0.904	0.153	1.774	0.340
Price	-1.555	0.135	1.768	0.330
ASC NB	0.920	-.348	33.678	5.033
Model 1L	Mean α	St Dev α	Mean Var	St Dev Var
Appearance	-0.115	0.113	0.303	0.127
Nutrition	0.454	0.133	0.764	0.242
Allergy	1.425	0.153	1.621	0.363
Diet	1.203	0.213	2.343	0.538
Price	-0.265	0.655	9.141	2.780
ASC NB	-1.321	1.379	53.358	17.083
Model 1NT	Mean α	St Dev α	Mean Var	St Dev Var
Appearance	-0.173	0.119	0.287	0.102
Nutrition	0.387	0.129	0.498	0.157
Allergy	1.265	0.153	1.388	0.285
Diet	0.892	0.159	1.809	0.346
Price	-1.547	0.139	1.761	0.336
ASC NB	0.937	0.354	34.016	5.143
Hetero (ϕ)	-0.037	0.080		
Model 1LT	Mean α	St Dev α	Mean Var	St Dev Var
Appearance	-0.111	0.110	0.324	0.151
Nutrition	0.447	0.120	0.764	0.252
Allergy	1.428	0.155	1.667	0.393
Diet	1.185	0.200	2.382	0.532
Price	-0.353	0.570	9.185	2.711
ASC NB	-1.257	1.245	56.093	15.425
Hetero (ϕ)	-0.054	0.087		

Table 6A: Sub-Sample - Mixed Logit and ANA (Models 2N, 2L, 2NT and 2LT)

Model 2N	Mean α	St Dev α	Mean Var	St Dev Var
Appearance	-0.118	0.133	0.230	0.096
Nutrition	0.493	0.141	0.521	0.190
Allergy	2.090	0.199	2.677	0.593
Diet	1.577	0.191	2.471	0.503
Price	-1.825	0.155	2.106	0.399
ASC NB	1.000	0.342	34.497	4.944
ANA Coeff ($\bar{\rho}$)	0.279	0.035		
Model 2L	Mean α	St Dev α	Mean Var	St Dev Var
Appearance	-0.131	0.129	0.253	0.109
Nutrition	0.648	0.144	1.041	0.318
Allergy	2.288	0.204	2.966	0.688
Diet	1.695	0.194	3.022	0.667
Price	-0.494	0.222	4.440	1.051
ASC NB	0.564	0.518	61.334	8.932
ANA Coeff ($\bar{\rho}$)	0.275	0.040		
Model 2NT	Mean α	St Dev α	Mean Var	St Dev Var
Appearance	-0.127	0.139	0.239	0.103
Nutrition	0.507	0.144	0.529	0.198
Allergy	2.079	0.199	2.695	0.598
Diet	1.587	0.186	2.511	0.524
Price	-1.829	0.157	2.130	0.410
ASC NB	0.998	0.346	34.632	4.887
Hetero (ϕ)	-0.051	0.083		
ANA Coeff ($\bar{\rho}$)	0.279	0.034		
Model 2LT	Mean α	St Dev α	Mean Var	St Dev Var
Appearance	-0.152	0.125	0.247	0.117
Nutrition	0.642	0.138	0.983	0.314
Allergy	2.305	0.214	3.059	0.717
Diet	1.705	0.190	2.967	0.637
Price	-0.476	0.221	4.376	1.081
ASC NB	0.557	0.530	60.931	9.064
Hetero (ϕ)	-0.049	0.088		
ANA Coeff ($\bar{\rho}$)	0.269	0.039		

Table 7A: Sub-Sample - Mixed Logit and AIR (Model 3)

Model 3N	Mean α	St Dev α	Mean Var	St Dev Var
Appearance	-0.250	0.201	0.881	0.364
Nutrition	0.646	0.185	1.1311	0.350
Allergy	2.826	0.249	3.869	0.867
Diet	2.047	0.274	5.653	1.184
Price	1.984	0.162	2.020	0.401
ASC NB	0.904	0.335	31.933	4.478
AIR Coeff ($\tilde{\rho}$)	0.897	0.033		
Model 3L	Mean α	St Dev α	Mean Var	St Dev Var
Appearance	-0.159	0.205	1.026	0.531
Nutrition	0.780	0.181	1.696	0.536
Allergy	3.059	0.265	4.138	0.980
Diet	2.361	0.305	7.282	1.821
Price	-0.236	0.262	5.417	1.357
ASC NB	-0.062	0.679	55.837	9.171
AIR Coeff ($\tilde{\rho}$)	0.886	0.032		
Model 3NT	Mean α	St Dev α	Mean Var	St Dev Var
Appearance	-0.242	0.216	0.890	0.360
Nutrition	0.645	0.179	1.135	0.345
Allergy	2.823	0.263	3.874	0.934
Diet	2.058	0.278	5.802	1.175
Price	-1.998	0.164	2.051	0.414
ASC NB	0.887	0.341	32.420	4.672
Hetero (ϕ)	-0.148	0.077		
AIR Coeff ($\tilde{\rho}$)	0.898	0.032		
Model 3LT	Mean α	St Dev α	Mean Var	St Dev Var
Appearance	-0.101	0.218	1.346	0.790
Nutrition	0.740	0.180	1.700	0.525
Allergy	3.098	0.257	4.078	1.018
Diet	2.372	0.302	7.275	1.912
Price	-0.210	0.256	5.310	1.342
ASC NB	-0.082	0.682	55.626	8.845
Hetero (ϕ)	-0.166	0.085		
AIR Coeff ($\tilde{\rho}$)	0.882	0.031		