Supplementary Material

Identifying distinctive brain regions related to consumer choice behaviors on branded foods using activation likelihood estimation and machine learning

**Table S1(a)**. **Branded** **foods studies included in the meta-analysis.**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Experiment** | **Subject** | **Foci** | **Experiment stimuli** | **Detailed information** |
| McClure et al.(2004) | 16 | 7 | Brand logos/Carbonated drinks(Coke/Pepsi) | Culturally Familiar Drinks |
| Deppe et al.(2005b) | 22 | 16 | Package images with brand logos | Beer/Coffee |
| 2 |
| 8 |
| 11 |
| Koeneke et al.(2008) | 19 | 28 | Real products | Chochorate bars |
| Plassmann et al.(2008) | 20 | 8 | Wine | Intake |
| 10 |
| 12 |
| 6 |
| 2 |
| 5 |
| 8 |
| 1 |
| Kato et al.(2009) | 40 | 18 | Advertising with brand logos | Coke Ad/Pepsi Ad |
| 8 |
| 3 |
| 26 |
| Schaefer et al.(2011) | 12 | 2 | Package images with brand logos | Chochorates |
| Grabenhorst et al.(2013) | 13 | 2 | Fooods with Taste label/Health label |  |
| 4 |
| 2 |
| 2 |
| 1 |
| 3 |
| 4 |
| Bruce et al.(2014) | 17 | 7 | Brand logos | foods(60):pizzahut,kfc,etc./non foods(60):lego,spongebob,windows,etc. |
| 5 |
| 4 |
| Burger and Stice(2014) | 9 | 10 | Product with logo | Coke Ad/Non food Ad |
| 25 | 12 | Product & logo ad |
| 37 |
| 8 |
| 11 |
| 4 |
| Enax et al.(2015) | 40 | 9 | Food images with FT certified marks | Various food categories (chocolate, coffee, rice, etc..) |
| 5 |
| 7 |
| 10 |
| 4 |
| 4 |
| 6 |
| 3 |
| 2 |
| Jung et al.(2018) | 34 | 21 | Food images with logo (social/conventional enterprises) | Confectionery(i.e., cookies, chocolate, bread, and Korean traditional rice cake) |
| 15 |
| 9 |
| 8 |
| 11 |
| 4 |
| 4 |
| 25 |
| 1 |
| 21 |
| Goedegebure et al.(2022) | 30 | 1 | Foods package images with brand logos | 180 food products were presented under the 3 conditions (normal., social, and quality focus) |
| 4 |
| 3 |
| 6 |
| 2 |
| 19 |
| 5 |
| 11 |
| 13 |
| 3 |
| 5 |
| 5 |
| 5 |
| 2 |
| 12 |

Abbreviations; FT, fairtrade

**Table S1(b)**. **Unbranded** **foods studies included in the meta-analysis.**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Experiment** | **Subject** | **Foci** | **Experiment stimuli** | **Detailed information** |
| McClure et al.(2004) | 15 | 2 | Carbonated drinks(No branded) | Intake |
| O'Doherty et al.(2006) | 13 | 6 | Flavored drinks | Intake |
| Bray et al. (2008) | 23 | 3 | Food (liquid drink) | Intake |
| Plassmann et al.(2008) | 20 | 1 | Wine | Intake |
| 10 |
| 2 |
| Chib et al.(2009) | 19 | 1 | money/trinkets/snacks |  |
| 1 |
| 1 |
| 1 |
| Van der Laan et al.(2012) | 20 | 8 | Food packages and products(images) |  |
| 2 |
| 10 |
| Kang and Camerer(2013) | 27 | 17 | Food images |  |
| Lee et al.(2013) | 23 | 3 | Food images |  |
| Jimura et al.(2013) | 43 | 7 | Food (liquid drink) | Intake |
| 5 |
| 2 |
| 4 |
| Burger and Stice.(2014) | 9 | 11 | Milkshake |  |
| He Q et al.(2014) | 30 | 5 | Food images | High-calorie food(chocolate bars, cookies, ice cream, and potato chips) /Low-calorie food(celery, broccoli, and carrots.) |
| 1 |
| 7 |
| 1 |
| Giuliani and Pfeifer(2015) | 60 | 16 | Food images | Energy density(ED) and low ED foods(e.g., chocolate, cookies, carrots, corn etc..) |
| 12 |
| 3 |
| 16 |
| 15 |
| 2 |
| 8 |
| 9 |
| Petit et al.(2016) | 22 | 7 | Food images | Various food categories(e.g., junk food, healthy snacks) |
| 2 |
| 5 |
| 6 |
| 17 |
| 4 |
| Stuke et al(2016) | 38 | 5 | Drink images | Alcohol dirnks/Non-alcohol drinks |
| 4 |
| Tapp et al.(2017) | 8 | 4 | Food images | Beef steaks |
| 7 |
| 7 |
| 5 |
| 8 |
| Hege et al.(2018) | 23 | 3 | Food images | Meals |
| 1 |
| 1 |
| 1 |
| Huijsmans et al.(2019) | 47 | 1 | Food images | 144 different supermarket food items |
| 1 |
| Masterson TD et al(2019) | 41 | 10 | Food images | Energy dense foods  (e.g., Low:vegetables and fruit/High: candy and ice-cream) |
| 6 |
| 4 |
| Muñoz-Leiva et al.(2019) | 24 | 7 | Food images | Meals(restaurant dishes) |
| 5 |
| 12 |
| 13 |
| Setton et al(2019) | 16 | 26 | Food images(package) | Snack items |
| 43 |
| 9 |
| 26 |
| 13 |
| 3 |
| Tijssen et al.(2019) | 34 | 3 | Package images | Daily drinks |
| 7 |
| 1 |

**Table S2**. **One-hot vector corresponded to (20 40 -5).** Please take a look at the other attached Excel file.

**Table S3**. **Loading values in each coordinate variable.**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **X** | | **Y** | | **Z** | |
| **Cordinate** | **Loading values** | **Cordinate** | **Loading values** | **Cordinate** | **Loading values** |
| **Component 1** | | | | | |
| X\_9 | 0.379 | Y\_m85 | 0.333 | Z\_19 | 0.316 |
| X\_3 | 0.304 | Y\_m88 | 0.305 | Z\_m5 | 0.309 |
| X\_6 | 0.285 | Y\_m73 | 0.241 | Z\_13 | 0.283 |
| X\_43 | 0.153 | Y\_m91 | 0.219 | Z\_m8 | 0.223 |
| X\_18 | 0.136 | Y\_47 | 0.206 | Z\_7 | 0.202 |
| X\_m3 | 0.131 | Y\_m61 | 0.187 | Z\_31 | 0.173 |
| X\_48 | 0.106 | Y\_2 | 0.176 | Z\_49 | 0.145 |
| X\_m18 | 0.095 | Y\_m31 | 0.163 | Z\_m21 | 0.124 |
| X\_56 | 0.087 | Y\_m74 | 0.138 | Z\_37 | 0.123 |
| X\_63 | 0.086 | Y\_m12 | 0.122 | Z\_29 | 0.108 |
| X\_49 | 0.083 | Y\_m94 | 0.107 | Z\_16 | 0.106 |
| X\_m45 | 0.082 | Y\_m80 | 0.097 | Z\_8 | 0.105 |
| X\_m42 | 0.082 | Y\_m97 | 0.090 | Z\_m14 | 0.104 |
| X\_25 | 0.078 | Y\_23 | 0.082 | Z\_1 | 0.100 |
| X\_m53 | 0.074 | Y\_m24 | 0.079 | Z\_34 | 0.082 |
| X\_17 | 0.072 | Y\_43 | 0.072 | Z\_m19 | 0.077 |
| X\_m69 | 0.072 | Y\_m55 | 0.072 | Z\_m11 | 0.074 |
| X\_m41 | 0.068 | Y\_m25 | 0.071 | Z\_43 | 0.065 |
| X\_30 | 0.068 | Y\_m44 | 0.067 | Z\_m27 | 0.065 |
| X\_16 | 0.059 | Y\_m13 | 0.055 | Z\_m23 | 0.062 |
| X\_60 | 0.055 | Y\_40 | 0.054 | Z\_m28 | 0.059 |
| X\_11 | 0.054 | Y\_m1 | 0.042 | Z\_39 | 0.058 |
| X\_14 | 0.043 | Y\_m43 | 0.038 | Z\_m38 | 0.055 |
| X\_m7 | 0.042 | Y\_m78 | 0.036 | Z\_20 | 0.036 |
| X\_m5 | 0.032 | Y\_m96 | 0.034 | Z\_75 | 0.022 |
| X\_m11 | 0.032 | Y\_38 | 0.019 | Z\_40 | 0.022 |
| X\_66 | 0.027 | Y\_m83 | 0.017 | Z\_m22 | 0.021 |
| X\_55 | 0.025 | Y\_68 | 0.007 | Z\_57 | 0.019 |
| X\_64 | 0.024 | Y\_m9 | 0.005 | Z\_m39 | 0.018 |
| X\_m57 | 0.023 | Y\_51 | 0.004 | Z\_m16 | 0.016 |
| X\_19 | 0.023 | Y\_m40 | 0.001 | Z\_m44 | 0.016 |
| X\_41 | 0.022 | Y\_m52 | 0.000 | Z\_m29 | 0.015 |
| X\_m49 | 0.022 | Y\_31 | -0.001 | Z\_m31 | 0.012 |
| X\_m64 | 0.013 | Y\_m34 | -0.002 | Z\_56 | 0.009 |
| X\_m60 | 0.004 | Y\_m100 | -0.003 | Z\_61 | 0.008 |
| X\_m20 | 0.003 | Y\_7 | -0.003 | Z\_m12 | -0.016 |
| X\_m15 | 0.002 | Y\_1 | -0.003 | Z\_46 | -0.016 |
| X\_39 | -0.004 | Y\_37 | -0.006 | Z\_42 | -0.016 |
| X\_m21 | -0.008 | Y\_m18 | -0.008 | Z\_60 | -0.024 |
| X\_m28 | -0.015 | Y\_m19 | -0.012 | Z\_69 | -0.024 |
| X\_2 | -0.034 | Y\_15 | -0.019 | Z\_48 | -0.025 |
| X\_m55 | -0.039 | Y\_m59 | -0.023 | Z\_m40 | -0.027 |
| X\_31 | -0.047 | Y\_m22 | -0.026 | Z\_65 | -0.033 |
| X\_m19 | -0.047 | Y\_49 | -0.027 | Z\_67 | -0.036 |
| X\_7 | -0.047 | Y\_m15 | -0.033 | Z\_74 | -0.041 |
| X\_m27 | -0.051 | Y\_56 | -0.045 | Z\_23 | -0.042 |
| X\_m66 | -0.052 | Y\_55 | -0.046 | Z\_50 | -0.045 |
| X\_m39 | -0.055 | Y\_m8 | -0.046 | Z\_15 | -0.046 |
| X\_m56 | -0.055 | Y\_m75 | -0.047 | Z\_44 | -0.051 |
| X\_m48 | -0.061 | Y\_42 | -0.065 | Z\_21 | -0.058 |
| X\_27 | -0.062 | Y\_m63 | -0.067 | Z\_9 | -0.067 |
| X\_35 | -0.066 | Y\_m57 | -0.069 | Z\_m50 | -0.088 |
| X\_m43 | -0.066 | Y\_10 | -0.072 | Z\_m18 | -0.088 |
| X\_m62 | -0.074 | Y\_m33 | -0.082 | Z\_68 | -0.088 |
| X\_m30 | -0.090 | Y\_12 | -0.087 | Z\_54 | -0.088 |
| X\_42 | -0.097 | Y\_45 | -0.090 | Z\_58 | -0.091 |
| X\_m14 | -0.111 | Y\_m68 | -0.098 | Z\_41 | -0.091 |
| X\_m10 | -0.112 | Y\_m38 | -0.101 | Z\_63 | -0.110 |
| X\_m31 | -0.119 | Y\_20 | -0.123 | Z\_33 | -0.111 |
| X\_10 | -0.136 | Y\_16 | -0.123 | Z\_m10 | -0.113 |
| X\_32 | -0.143 | Y\_m26 | -0.126 | Z\_m52 | -0.114 |
| X\_m32 | -0.151 | Y\_21 | -0.128 | Z\_27 | -0.128 |
| X\_m22 | -0.153 | Y\_m36 | -0.145 | Z\_18 | -0.131 |
| X\_28 | -0.161 | Y\_24 | -0.158 | Z\_m15 | -0.142 |
| X\_m13 | -0.179 | Y\_57 | -0.180 | Z\_m24 | -0.143 |
| X\_m34 | -0.185 | Y\_60 | -0.205 | Z\_m46 | -0.180 |
| X\_50 | -0.213 | Y\_m3 | -0.210 | Z\_m7 | -0.198 |
| X\_m46 | -0.218 | Y\_9 | -0.218 | Z\_3 | -0.206 |
| X\_0 | -0.269 | Y\_m48 | -0.220 | Z\_26 | -0.208 |
| X\_26 | -0.275 | Y\_m72 | -0.226 | Z\_0 | -0.315 |
| **Component 2** | | | | | |
| X\_41 | 0.250 | Y\_m23 | 0.237 | Z\_20 | 0.299 |
| X\_17 | 0.244 | Y\_m83 | 0.230 | Z\_36 | 0.220 |
| X\_14 | 0.243 | Y\_m90 | 0.212 | Z\_m34 | 0.212 |
| X\_m20 | 0.230 | Y\_44 | 0.206 | Z\_25 | 0.197 |
| X\_m16 | 0.218 | Y\_m96 | 0.198 | Z\_m16 | 0.193 |
| X\_60 | 0.183 | Y\_m103 | 0.180 | Z\_0 | 0.179 |
| X\_8 | 0.168 | Y\_m66 | 0.153 | Z\_56 | 0.176 |
| X\_m64 | 0.166 | Y\_26 | 0.150 | Z\_75 | 0.176 |
| X\_m57 | 0.159 | Y\_m44 | 0.147 | Z\_m4 | 0.151 |
| X\_20 | 0.157 | Y\_m52 | 0.147 | Z\_m28 | 0.151 |
| X\_56 | 0.148 | Y\_50 | 0.141 | Z\_61 | 0.139 |
| X\_55 | 0.144 | Y\_m54 | 0.140 | Z\_39 | 0.135 |
| X\_m11 | 0.126 | Y\_m78 | 0.123 | Z\_m9 | 0.134 |
| X\_16 | 0.124 | Y\_19 | 0.119 | Z\_m44 | 0.124 |
| X\_64 | 0.119 | Y\_m105 | 0.115 | Z\_34 | 0.119 |
| X\_34 | 0.114 | Y\_m17 | 0.114 | Z\_m39 | 0.109 |
| X\_19 | 0.112 | Y\_m40 | 0.099 | Z\_m31 | 0.108 |
| X\_25 | 0.110 | Y\_38 | 0.095 | Z\_m29 | 0.101 |
| X\_m41 | 0.099 | Y\_m4 | 0.091 | Z\_m38 | 0.099 |
| X\_m60 | 0.088 | Y\_54 | 0.081 | Z\_3 | 0.097 |
| X\_66 | 0.086 | Y\_m12 | 0.078 | Z\_35 | 0.095 |
| X\_m69 | 0.082 | Y\_17 | 0.073 | Z\_40 | 0.091 |
| X\_m18 | 0.076 | Y\_53 | 0.034 | Z\_m11 | 0.091 |
| X\_m53 | 0.074 | Y\_m84 | 0.029 | Z\_m23 | 0.070 |
| X\_m36 | 0.071 | Y\_m20 | 0.029 | Z\_m19 | 0.052 |
| X\_54 | 0.070 | Y\_m45 | 0.020 | Z\_m22 | 0.047 |
| X\_m52 | 0.068 | Y\_m1 | 0.020 | Z\_32 | 0.039 |
| X\_m49 | 0.066 | Y\_46 | 0.017 | Z\_38 | 0.038 |
| X\_m5 | 0.058 | Y\_29 | 0.016 | Z\_43 | 0.026 |
| X\_m8 | 0.043 | Y\_m7 | 0.015 | Z\_8 | 0.012 |
| X\_26 | 0.039 | Y\_40 | 0.014 | Z\_59 | 0.003 |
| X\_48 | 0.025 | Y\_14 | 0.008 | Z\_m7 | -0.004 |
| X\_49 | 0.023 | Y\_m58 | 0.003 | Z\_48 | -0.005 |
| X\_4 | 0.015 | Y\_m76 | 0.003 | Z\_m1 | -0.011 |
| X\_m58 | 0.009 | Y\_m27 | -0.003 | Z\_7 | -0.014 |
| X\_22 | 0.008 | Y\_45 | -0.009 | Z\_4 | -0.021 |
| X\_m42 | 0.008 | Y\_m85 | -0.028 | Z\_m33 | -0.031 |
| X\_12 | 0.007 | Y\_m39 | -0.031 | Z\_41 | -0.032 |
| X\_39 | -0.002 | Y\_59 | -0.034 | Z\_21 | -0.032 |
| X\_m48 | -0.002 | Y\_m59 | -0.037 | Z\_44 | -0.038 |
| X\_33 | -0.003 | Y\_m2 | -0.044 | Z\_m36 | -0.038 |
| X\_45 | -0.004 | Y\_57 | -0.047 | Z\_m3 | -0.039 |
| X\_38 | -0.015 | Y\_m42 | -0.048 | Z\_27 | -0.041 |
| X\_40 | -0.022 | Y\_35 | -0.066 | Z\_74 | -0.044 |
| X\_m62 | -0.024 | Y\_58 | -0.066 | Z\_m50 | -0.045 |
| X\_m12 | -0.026 | Y\_15 | -0.067 | Z\_14 | -0.051 |
| X\_m3 | -0.029 | Y\_64 | -0.068 | Z\_58 | -0.051 |
| X\_m39 | -0.195 | Y\_1 | -0.194 | Z\_53 | -0.205 |
| X\_9 | -0.255 | Y\_m77 | -0.231 | Z\_15 | -0.303 |

Notes: The term “m” represents “minus”. Each loading value is described in subjected to ascending orders.