|  |
| --- |
| **Supplementary Table 1. Correlations between dietary fatty acid patterns and food categories** |
| **Food Categories** | **Dietary fatty acid patterns** |
| **Factor 1** | **Factor 2** | **Factor 3** | **Factor 4** |
| **Meat, Poultry, & Seafood** |  |  |  |  |
| Red, processed, organ meat | 0.27\*\* | -0.11\*\* | -0.09\*\* | -0.11\*\* |
| Poultry | -0.04\* | -0.09\*\* | 0.29\*\* | -0.09\*\* |
| Seafood | -0.12\*\* | -0.01 | 0.45\*\* | 0.02 |
| Meat, poultry, fish recipes | 0.11\*\* | -0.11\*\* | -0.01 | 0.02 |
| **Dairy & Eggs** |  |  |  |  |
| Milk, cheese, & related products | -0.03\* | 0.39\*\* | -0.06\*\* | -0.10\*\* |
| Milk & cheese recipes | 0.02\* | 0.03\* | 0.01 | -0.03\* |
| Eggs & recipes | 0.13\*\* | -0.04\*\* | 0.12\*\* | 0.02\* |
| **Fats & Oils** |  |  |  |  |
| Animal fat | 0.02 | 0.18\*\* | 0 | -0.02 |
| Margarine & shortening | 0.03\* | -0.01 | -0.06\*\* | 0.11\*\* |
| Oil | -0.05\*\* | -0.02 | -0.01 | 0.14\*\* |
| Salad dressing | 0 | 0.02 | 0.03\* | 0.17\*\* |
| Nuts & nut butters | -0.07\*\* | -0.01 | 0.02 | 0.14\*\* |
| **Fruits & Vegetables** |  |  |  |  |
| Fruits & products/recipes | -0.21\*\* | -0.09\*\* | 0.04\* | -0.19\*\* |
| Vegetables & recipes | -0.16\*\* | -0.09\*\* | 0.05\*\* | 0.06\*\* |
| **Grains** |  |  |  |  |
| Breads, & related products | 0 | -0.06\*\* | -0.07\*\* | -0.18\*\* |
| Sweet baked foods & related products | 0.03\* | 0.04\* | -0.04\* | -0.1\*\* |
| Cold & cooked cereals | -0.13\*\* | 0.07\*\* | 0.01 | -0.07\*\* |
| Grains & flour | -0.04\* | 0 | 0.02 | 0 |
| Pasta & rice (includes recipes) | -0.22\*\* | -0.09\*\* | -0.03\* | 0.10\*\* |
| Snack foods & bars | 0 | 0.05\*\* | -0.04\* | 0.10\*\* |
| Miscellaneous grain recipes without meat, poultry, or fish | 0.07\*\* | 0.11\*\* | -0.05\*\* | -0.05\*\* |
| **Soups, Sauces, and Gravy** |  |  |  |  |
| Soups | -0.01 | -0.05\*\* | 0.04\*\* | -0.12\*\* |
| Gravy & sauces | 0.06\*\* | -0.02 | 0.02\* | -0.03\* |
| **Sweets** |  |  |  |  |
| Desserts (excludes dairy ice cream) | 0.04\* | 0.08\*\* | -0.03\* | -0.05\*\* |
| Candy and sugar | -0.06\*\* | 0.07\*\* | -0.04\* | -0.08\*\* |
| **Beverages** |  |  |  |  |
| Alcohol | -0.05\*\* | -0.08\*\* | 0.02 | -0.13\*\* |
| Regular & diet soda | 0.09\*\* | 0 | -0.05\*\* | -0.12\*\* |
| Coffee & tea | 0.11\*\* | 0.05\*\* | 0.09\*\* | -0.04\* |
| **Other** |  |  |  |  |
| Milk substitutes | -0.07\*\* | -0.08\*\* | 0 | 0.02\* |
| Condiments & spices | 0.02 | 0.03\* | 0.03\* | 0 |
| Supplements & meal replacements | -0.02 | -0.01 | 0 | 0 |
| Commercial entrees | 0.03\* | 0.03\* | -0.02 | 0 |
| Values are partial spearman correlation coefficients adjusted for age, sex, and total energy. Food category intakes were estimated using the mean of two 24-hr recalls among participants with valid data (n=8,435). \**P*<0.05, \*\**P*<0.0001 |

| **Supplementary Table 2. Distribution of cognitive test scores** |
| --- |
| **Cognitive test** | **Mean**† | **Percentiles**† |
| **5th** | **25th** | **50th** | **75th** | **95th** |
| Global Cognitive Function Score‡ | 0.029 ± 0.018 | -1.31 ± 0.0262 | -0.554 ± 0.0216 | -0.0357 ± 0.0209 | 0.523 ± 0.0223 | 1.26 ± 0.0307 |
| Word Fluency Test | 18.5 ± 0.15 | 6.91 ± 0.272 | 12.8 ± 0.171 | 17.5 ± 0.173 | 22.8 ± 0.222 | 30.4 ± 0.327 |
| Digit Symbol Substitution Test | 34.1 ± 0.312 | 13.2 ± 0.41 | 24.1 ± 0.372 | 33.1 ± 0.378 | 42.5 ± 0.309 | 56.5 ± 0.497 |
| B-SEVLT-Sum | 22.6 ± 0.114 | 12.8 ± 0.2 | 18.1 ± 0.152 | 22 ± 0.145 | 26 ± 0.134 | 31.3 ± 0.187 |
| B-SEVLT-Recall | 8.15 ± 0.0547 | 2.62 ± 0.208 | 5.85 ± 0.0751 | 7.76 ± 0.0678 | 9.67 ± 0.07 | 12.1 ± 0.0882 |
| †Values are mean ± SE or percentile ± SE and estimated using proc survey means in SAS.‡Global cognitive function was calculated as the average z-score of the individuals tests (word fluency, digit symbol substitution, B-SEVLT-Sum, B-SEVLT-Recall)  |

|  |
| --- |
| **Supplementary Table 3. Associations between dietary fatty acid patterns and global cognitive function score excluding those with CVD (n=8,393)** |
|  | **Dietary Fatty Acid Factor Score (Quintile)** ‡,§ |  |  |  |
|  | **1** | **2** | **3** | **4** | **5** |  |  |  |
| **Dietary Fatty Acid Patterns**† | **n=1678** | **n=1679** | **n=1679** | **n=1679** | **n=1678** |  |  |  |
| **Mean ± SE** | **Mean ± SE** | **Mean ± SE** | **Mean ± SE** | **Mean ± SE** | ***P*F-test** | **β ± SE**§,¶ | ***P*** |
| **Factor 1** | -0.062 ± 0.18 | -0.046 ± 0.18 | -0.017 ± 0.19 | -0.048 ± 0.19 | 0.0056 ± 0.18 | 0.24 | 0.015 ± 0.012 | 0.20 |
| **Factor 2** | -0.040 ± 0.18a | -0.034 ± 0.18a | 0.030 ± 0.18a,b | 0.009 ± 0.18a,b | 0.077 ± 0.18b | 0.01 | 0.041 ± 0.013 | 0.002 |
| **Factor 3** | -0.018 ± 0.17 | 0.067 ± 0.17 | 0.053 ± 0.17 | -0.022 ± 0.17 | -0.033 ± 0.17 | 0.01|| | -0.01 ± 0.017 | 0.55 |
| **Factor 4** | -0.120 ± 0.19 | -0.089 ± 0.19 | -0.014 ± 0.19 | -0.047 ± 0.19 | -0.049 ± 0.19 | 0.05 | 0.021 ± 0.012 | 0.09 |
| †Dietary fatty acid patterns were characterized by: long chain (13 to 20 C) SFA and MUFA, as well as animal-based MUFA and TFA (**Factor 1**); short (<6 C) and medium chain SFA (6-12 C) (**Factor 2**); animal-based omega-3 PUFA (EPA, DPA, and DHA), but also the omega-6 PUFA arachidonic acid (**Factor 3**); and long-chain plant-based MUFA, as well as PUFA found in plant food sources (linoleic and linolenic acid) (**Factor 4**). ‡Values represent the adjusted mean ± SE neurocognitive test z-score by factor score quintile. Differences in cognitive function score between factor score quintiles were examined using survey linear regression with factor scores treated categorically and neurocognitive test scores continuously. Tukey’s post-hoc tests were used for pairwise comparisons. Values with different letters are significantly different (*P*<0.05). §Models are adjusted for age (years), sex (M/F), energy intake (kcals/d), physical activity (MET-min/d), education (< high school, high school or equivalent, > high school), Hispanic/Latino background (Central American, Cuban, Dominican, Mexican, Puerto Rican, South American, and multiple/other/missing), field site (Bronx, Chicago, Miami, San Diego), CES-D score, diabetes (y/n), current smoker (y/n), hypertension (y/n), household income (< $30,000 or not), and dietary intakes of fruits (servings/d/kcal), vegetables (servings/d/kcal), alcohol (servings/d/kcal), added sugar (% of energy/d), B12 (mg/d/kcal), B6 (mg/d/kcal), and niacin (mg/d/kcal). ||In post-hoc analyses, we did not observe significant differences in global cognitive function score between Factor 3 Dietary Fatty Acid Pattern quintiles, however there was a suggestion of differences comparing quintile 1 vs 2 (*P*=0.07), and quintiles 2 (*P*=0.06) and 4 (*P*=0.09) vs quintile 5. ¶Values are adjusted β ± SE and can be interpreted as the SD change in neurocognitive test score per SD change in factor score. |

|  |
| --- |
| **Supplementary Table 4. Associations between dietary fatty acid patterns and global cognitive function score among individuals attaining a high school education or greater (n=5,204)** |
|  | **Dietary Fatty Acid Factor Score (Quintile)** ‡**,**§ |  |  |  |
|  | **1** | **2** | **3** | **4** | **5** |  |  |  |
| **Dietary Fatty Acid Pattern**† | **n=1678** | **n=1679** | **n=1679** | **n=1679** | **n=1678** |  |  |  |
| **Mean ± SE** | **Mean ± SE** | **Mean ± SE** | **Mean ± SE** | **Mean ± SE** | ***P*F-test** | **β ± SE**§**,**|| | ***P*** |
| **Factor 1** | 0.22 ± 0.19 | 0.24 ± 0.18 | 0.29 ± 0.18 | 0.25 ± 0.18 | 0.30 ± 0.18 | 0.26 | 0.02 ± 0.016 | 0.21 |
| **Factor 2** | 0.23 ± 0.18a | 0.24 ± 0.18a | 0.29 ± 0.18a,b | 0.30 ± 0.18a,b | 0.38 ± 0.18b | 0.009 | 0.057 ± 0.017 | 0.001 |
| **Factor 3** | 0.26 ± 0.18 | 0.34 ± 0.18 | 0.32 ± 0.18 | 0.28 ± 0.18 | 0.23 ± 0.17 | 0.06 | -0.01 ± 0.018 | 0.57 |
| **Factor 4** | 0.15 ± 0.19 | 0.21 ± 0.19 | 0.24 ± 0.19 | 0.25 ± 0.19 | 0.26 ± 0.19 | 0.14 | 0.034 ± 0.015 | 0.02 |
| †Dietary fatty acid patterns were characterized by: long chain (13 to 20 C) SFA and MUFA, as well as animal-based MUFA and TFA (**Factor 1**); short (<6 C) and medium chain SFA (6-12 C) (**Factor 2**); animal-based omega-3 PUFA (EPA, DPA, and DHA), but also the omega-6 PUFA arachidonic acid (**Factor 3**); and long-chain plant-based MUFA, as well as PUFA found in plant food sources (linoleic and linolenic acid) (**Factor 4**). ‡Values represent the adjusted mean ± SE neurocognitive test z-score by factor score quintile. Differences in cognitive function score between factor score quintiles were examined using survey linear regression with factor scores treated categorically and neurocognitive test scores continuously. Tukey’s post-hoc tests were used for pairwise comparisons. Values with different letters are significantly different (*P*<0.05). §Models are adjusted for age (years), sex (M/F), energy intake (kcals/d), physical activity (MET-min/d), Hispanic/Latino background (Central American, Cuban, Dominican, Mexican, Puerto Rican, South American, and multiple/other/missing), field site (Bronx, Chicago, Miami, San Diego), CES-D score, diabetes (y/n), CVD (y/n), current smoker (y/n), hypertension (y/n), household income (< $30,000 or not), and dietary intakes of fruits (servings/d/kcal), vegetables (servings/d/kcal), alcohol (servings/d/kcal), added sugar (% of energy/d), B12 (mg/d/kcal), B6 (mg/d/kcal), and niacin (mg/d/kcal). ||Values are adjusted β ± SE and can be interpreted as the SD change in neurocognitive test score per SD change in factor score. |

|  |
| --- |
| **Supplementary Table 5. Associations between dietary fatty acid patterns and individual neurocognitive tests excluding those with CVD (n=8,393)** |
| **Dietary Fatty Acid Pattern**† | **Neurocognitive Test** | **β ± SE**‡ | **PT-test** |
| **Factor 1** | Word Fluency | 0.024 ± 0.017 | 0.15 |
|  | Digit Symbol | 0.036 ± 0.014 | 0.01 |
|  | B-SEVLT-Sum | 0.011 ± 0.021 | 0.59 |
|  | B-SEVLT-Recall | -0.012 ± 0.017 | 0.49 |
|  |  |  |  |
| **Factor 2** | Word Fluency | 0.041 ± 0.017 | 0.017 |
|  | Digit Symbol | 0.051 ± 0.016 | 0.0015 |
|  | B-SEVLT-Sum | 0.04 ± 0.02 | 0.046 |
|  | B-SEVLT-Recall | 0.035 ± 0.018 | 0.06 |
|  |  |  |  |
| **Factor 3** | Word Fluency | -0.0023 ± 0.028 | 0.93 |
|  | Digit Symbol | -0.018 ± 0.018 | 0.31 |
|  | B-SEVLT-Sum | -0.0032 ± 0.02 | 0.87 |
|  | B-SEVLT-Recall | -0.016 ± 0.021 | 0.43 |
|  |  |  |  |
| **Factor 4** | Word Fluency | 0.021 ± 0.016 | 0.19 |
|  | Digit Symbol | 0.054 ± 0.014 | 0.0002 |
|  | B-SEVLT-Sum | 0.0045 ± 0.017 | 0.79 |
|  | B-SEVLT-Recall | 0.0034 ± 0.018 | 0.85 |
| †Dietary fatty acid patterns were characterized by: long chain (13 to 20 C) SFA and MUFA, as well as animal-based MUFA and TFA (**Factor 1**); short (<6 C) and medium chain SFA (6-12 C) (**Factor 2**); animal-based omega-3 PUFA (EPA, DPA, and DHA), but also the omega-6 PUFA arachidonic acid (**Factor 3**); and long-chain plant-based MUFA, as well as PUFA found in plant food sources (linoleic and linolenic acid) (**Factor 4**). ‡Survey linear regression was used to examine associations with factor and neurocognitive test scores treated as continuous variables. Models are adjusted for age (years), sex (M/F), energy intake (kcals/d), physical activity (MET-min/d), education (< high school, high school or equivalent, > high school), Hispanic/Latino background (Central American, Cuban, Dominican, Mexican, Puerto Rican, South American, and multiple/other/missing), field site (Bronx, Chicago, Miami, San Diego), CES-D score, type 2 diabetes (y/n), current smoker (y/n), hypertension (y/n), household income (< $30,000 or not), and dietary intakes of fruits (servings/d/kcal), vegetables (servings/d/kcal), alcohol (servings/d/kcal), added sugar (% of energy/d), B12 (mg/d/kcal), B6 (mg/d/kcal), and niacin (mg/d/kcal).  |

|  |
| --- |
| **Supplementary Table 6. Associations between dietary fatty acid patterns and individual neurocognitive tests excluding individuals with less than a high school education (n=5,204)**  |
| **Dietary Fatty Acid Pattern**† | **Neurocognitive Test** | **β ± SE**‡ | ***P*** |
| **Factor 1** | Word Fluency | 0.034 ± 0.021 | 0.11 |
|  | Digit Symbol | 0.033 ± 0.02 | 0.092 |
|  | B-SEVLT-Sum | 0.011 ± 0.026 | 0.66 |
|  | B-SEVLT-Recall | 0.0014 ± 0.021 | 0.95 |
|  |  |  |  |
| **Factor 2** | Word Fluency | 0.049 ± 0.019 | 0.011 |
|  | Digit Symbol | 0.069 ± 0.022 | 0.0022 |
|  | B-SEVLT-Sum | 0.065 ± 0.026 | 0.013 |
|  | B-SEVLT-Recall | 0.044 ± 0.022 | 0.051 |
|  |  |  |  |
| **Factor 3** | Word Fluency | 0.0073 ± 0.023 | 0.76 |
|  | Digit Symbol | -0.03 ± 0.021 | 0.16 |
|  | B-SEVLT-Sum | -0.0045 ± 0.024 | 0.85 |
|  | B-SEVLT-Recall | -0.012 ± 0.026 | 0.63 |
|  |  |  |  |
| **Factor 4** | Word Fluency | 0.038 ± 0.02 | 0.064 |
|  | Digit Symbol | 0.047 ± 0.018 | 0.008 |
|  | B-SEVLT-Sum | 0.031 ± 0.021 | 0.14 |
|  | B-SEVLT-Recall | 0.02 ± 0.021 | 0.34 |
| †Dietary fatty acid patterns were characterized by: long chain (13 to 20 C) SFA and MUFA, as well as animal-based MUFA and TFA (**Factor 1**); short (<6 C) and medium chain SFA (6-12 C) (**Factor 2**); animal-based omega-3 PUFA (EPA, DPA, and DHA), but also the omega-6 PUFA arachidonic acid (**Factor 3**); and long-chain plant-based MUFA, as well as PUFA found in plant food sources (linoleic and linolenic acid) (**Factor 4**). ‡Survey linear regression was used to examine associations with factor and neurocognitive test scores treated as continuous variables. Models are adjusted for age (years), sex (M/F), energy intake (kcals/d), physical activity (MET-min/d), Hispanic/Latino background (Central American, Cuban, Dominican, Mexican, Puerto Rican, South American, and multiple/other/missing), field site (Bronx, Chicago, Miami, San Diego), CES-D score, type 2 diabetes (y/n), CVD (y/n), current smoker (y/n), hypertension (y/n), household income (< $30,000 or not), and dietary intakes of fruits (servings/d/kcal), vegetables (servings/d/kcal), alcohol (servings/d/kcal), added sugar (% of energy/d), B12 (mg/d/kcal), B6 (mg/d/kcal), and niacin (mg/d/kcal).  |

|  |
| --- |
| **Supplementary Table 7. Associations between fatty acid groupings and global cognitive function†** |
| Fatty Acid Categories (% of energy) | Distribution of Fatty Acids, % of energy | β ± SE§ | *P* |
| (Mean ± SD) |
| Saturated Fatty Acids |  |  |  |
| Short and Medium chain (≤12C) | 0.94 ± 0.28 | 0.13 ± 0.06 | 0.04 |
| Long chain (>12C to <20C) | 9.03 ± 1.2 | 0.006 ± 0.027 | 0.81 |
| Very-long chain (≥20C) | 0.08 ± 0.016 | 0.61 ± 0.96 | 0.52 |
| Monounsaturated Fatty Acids |  |  |  |
| Plant-based | 5.41 ± 1.03 | 0.024 ± 0.015 | 0.11 |
| Animal-based | 6.29 ± 1.06 | -0.016 ± 0.022 | 0.46 |
| Polyunsaturated Fatty Acids |  |  |  |
| Linolenic acid‡ | 0.65 ± 0.12 | 0.19 ± 0.11 | 0.08 |
| Omega-3  | 0.066 ± 0.026 | 0.053 ± 0.67 | 0.93 |
| Omega-6  | 6.08 ± 0.93 | -0.027 ± 0.015 | 0.08 |
| *Trans* Fatty Acids |  |  |  |
| Ruminant produced  | 0.016 ± 0.004 | 1.83 ± 2.84 | 0.52 |
| Industrially produced | 1.15 ± 0.28 | 0.11 ± 0.06 | 0.08 |
| **†** Survey linear regression was used to mode the global cognitive function score (z-score) as a function of the fatty acid groupings. All fatty acid groups were expressed as a percent of total energy and included in the model simultaneously. Proportions of energy from protein and alcohol were included as covariates along with age (years), sex (M/F), energy intake (kcals/d), physical activity (MET-min/d), education (< high school, high school or equivalent, > high school), Hispanic/Latino background (Central American, Cuban, Dominican, Mexican, Puerto Rican, South American, and multiple/other/missing), field site (Bronx, Chicago, Miami, San Diego), CES-D score, type 2 diabetes (y/n), CVD (y/n), current smoker (y/n), hypertension (y/n), and dietary intakes of fruits (servings/d/kcal), vegetables (servings/d/kcal), B12 (mg/d/kcal), B6 (mg/d/kcal), and niacin (mg/d/kcal). ‡Linolenic acid includes alpha-linolenic acid and gamma-linolenic acid, an omega-3 and omega-6 fatty acid, respectively. §Regression coefficients represent the predicted change in global cognitive function (z-score) when the fatty acid subgroup increases by 1% of energy at the expense of an equal amount of energy from carbohydrates.  |

|  |
| --- |
| **Supplementary Table 8.** Top foods that contribute to milk, cheese & related products, animal fat, and miscellaneous grain recipes food categories1 |
| **Foods**  | **Contribution to energy, %** |
| **Milk, cheese, & related products** |
| Milk, reduced fat | 26.6 |
| Cheese, regular fat | 17.4 |
| Milk, regular fat | 16.9 |
| Ice cream or shake, regular fat | 11.5 |
| Yogurt, regular fat | 5.3 |
|  |  |
| **Animal fat2** |
| Butter, regular | 92.6 |
| Butter, light | 6.6 |
| Lard | 0.8 |
|  |  |
| **Miscellaneous grain recipes without meat, poultry, and fish** |
| Other masa-based mixed dishes | 34.0 |
| Enchiladas | 9.2 |
| Tamales | 8.9 |
| Chilaquiles | 8.6 |
| Sopes | 2.6 |
| Gorditas | 2.0 |
| Tostadas | 1.3 |
| Pupusas | 0.9 |
| Pizzas/Calzones | 26.7 |
| Quesadillas | 21.0 |
| Burritos | 5.3 |
| Dumplings, turnovers, fritters (includes empanadas) | 5.1 |
| 1Values are the percent contribution to total energy of foods to the following selected food categories: milk, cheese, & related products; animal fats; and miscellaneous grain recipes without meat, poultry, and fish consumption. Food rankings were calculated using estimated intakes from the mean of two 24-hr recalls among participants with valid data (n=8,435).2The animal foods fat category only included 3 animal fat foods.  |