**Supplementary Material**

Supplemental Table S1. Descriptive data for maternal fatty acid concentrations, Alberta, Canada, 2009-2012.

|  |  |
| --- | --- |
| Fatty Acid Characteristics | Mean (SD, range) |
| C20:4n6 a Fatty Acids (ug/mL) (*n* = 291) | 116.1 (46.4; 24.0 – 284.3) |
| C20:5n3 b Fatty Acids (ug/mL) (*n* = 291) | 8.6 (7.3; 1.0 – 55.6) |
| C22:5n3 c Fatty Acids (ug/mL) (*n* = 291) | 7.5 (4.2; 1.2 – 23.8) |
| C22:6n3 d Fatty Acids (ug/mL) (*n* = 291) | 43.0 (25.3; 6.3 – 177.9) |
| Total Omega-6 Fatty Acids (ug/mL) (*n* = 291) | 503.5 (158.1; 167.8 – 1095.72) |
| Total Omega-3 Fatty Acids (ug/mL) (*n* = 291) | 71.6 (37.3; 13.6 – 279.1) |
| Total Long Chain (ug/mL) (*n* = 291) | 292.1 (100.5; 78.8 – 643.8) |

a C20:4n6 = arachidonic acid (ARA)

b C20:5n3 = eicosapentaenoic acid (EPA)

c C22:5n3 = docosapentaenoic acid (DPA)

d C22:6n3 = docosahexaenoic acid (DHA)

Supplemental Table S2. Correlation analyses for the fatty acids considered as covariates for the regression analyses, Alberta, Canada, 2009-2012.

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
|  | C20:4n6 a Fatty Acids (ug/mL) | C20:5n3 b Fatty Acids (ug/mL) | C22:5n3 c Fatty Acids (ug/mL) | C22:6n3 d Fatty Acids (ug/mL) | Total Omega-6 Fatty Acids (ug/mL) | Total Omega-3 Fatty Acids (ug/mL) | Total Long Chain (ug/mL) |
| C20:5n3 b Fatty Acids (ug/mL) | 0.41 (p<0.001) |  |  |  |  |  |  |
| C22:5n3 c Fatty Acids (ug/mL) | 0.77 (p<0.001) | 0.70 (p<0.001) |  |  |  |  |  |
| C22:6n3 d Fatty Acids (ug/mL) | 0.83 (p<0.001) | 0.68 (p<0.001) | 0.88 (p<0.001) |  |  |  |  |
| Total Omega-6 Fatty Acids (ug/mL) | 0.88 (p<0.001) | 0.33 (p<0.001) | 0.70 (p<0.001) | 0.76 (p<0.001) |  |  |  |
| Total Omega-3 Fatty Acids (ug/mL) | 0.80 (p<0.001) | 0.76 (p<0.001) | 0.92 (p<0.001) | 0.98 (p<0.001) | 0.76 (p<0.001) |  |  |
| Total Long Chain (ug/mL) | 0.90 (p<0.001) | 0.51 (p<0.001) | 0.79 (p<0.001) | 0.85 (p<0.001) | 0.85 (p<0.001) | 0.84 (p<0.001) |  |

a C20:4n6 = arachidonic acid (ARA)

b C20:5n3 = eicosapentaenoic acid (EPA)

c C22:5n3 = docosapentaenoic acid (DPA)

d C22:6n3 = docosahexaenoic acid (DHA)

Supplemental Table S3. E-values for the point estimates of the associations between the predictor variables and outcome variables at 3-4 years of age, Alberta, Canada, 2009-2017.

|  |  |
| --- | --- |
| Predictors and Outcomes | Point Estimate E-Value |
| WPPSI-IVCND Fluid Reasoning Index (FRI) |
|  Maternal Folate Status | 1.12 |
| NEPSY-II Phonological Processing |
|  Maternal Folate Status | 1.31 |
| NEPSY-II Speeded Naming |
|  Maternal Choline Status | 1.25 |
| Dimensional Change Card Sort (DCCS) |
|  Maternal Folate Status | 2.44 |
|  Maternal Choline Intake | 2.94 |
|  Folate X Choline | 3.90 |

Supplemental Table S4. Descriptive data for neurodevelopmental outcomes in children 3 to 4 years of age, Alberta, Canada, 2012-2017.

|  |
| --- |
|  Neurodevelopmental Outcomes Mean (SD; range); n (%) |
| Intelligence |
|  WPPSI-IVCDN a FSIQ b (*n* = 306)  | 105.11 (13.19; 65 – 142) |
|  WPPSI-IVCDN VCI c (*n* = 308)  | 107.30 (13.25, 68 – 135) |
|  WPPSI-IVCDN VSI d (*n* = 305)  | 103.95 (14.29; 63 – 145) |
|  WPPSI-IVCDN FRI e (*n* = 196) f | 99.65 (16.53; 63 – 136) |
|  WPPSI-IVCDN WMI g (*n* = 304)  | 105.82 (14.43; 50 – 146) |
|  WPPSI-IVCDN PSI h (*n* = 194) f  | 100.31 (11.22; 66 – 133) |
| Language |
|  NEPSY-II Phonological Processing (*n* = 302)  | 10.23 (3.19; 1 – 17) |
|  NEPSY-II Speeded Naming (*n* = 301)  | 12.06 (2.83; 2 – 19) |
| Memory |
|  NEPSY-II Memory for Designs (*n* = 301)  | 9.87 (2.82; 2 – 19) |
|  NEPSY-II Narrative Memory (*n* = 299)  | 10.15 (2.98; 2 – 19) |
|  NEPSY-II Sentence Repetition (*n* = 294)  | 11.04 (3.12; 1 – 19) |
| Motor |
|  MABC-II i Total Test (*n* = 301) | 9.51 (2.99; 3 – 19) |
|  MABC-II Manual Dexterity (*n* = 303) | 8.72 (3.26; 1 – 18) |
|  MABC-II Aiming & Catching (*n* = 302)  | 9.63 (3.10; 2 – 19) |
|  MABC-II Balance Standard Score (*n* = 301)  | 10.62 (2.88; 5 – 18) |
| Executive Function |
|  NEPSY-II Statue (*n* = 294)  | 9.96 (3.30; 1 – 16) |
|  Boy-Girl Stroop (*n* = 300)  | 10.94 (4.75; 0 – 16)  |
|  Spatial Span (*n* = 303) | 2.70 (1.07; 0 – 6) |
|  DCCS j (*n* = 304) Pass Fail | 200 (65.79)104 (34.21) |

a WPPSI-IV = Wechsler Preschool and Primary Scales of Intelligence - 4th Edition: Canadian

b FSIQ = Full Scale IQ

c VCI = Verbal Comprehension Index

d VSI = Visual Spatial Index

e FRI = Fluid Reasoning Index

f Includes only children who are 4:0 to 4:11 years of age

g WMI = Working Memory Index

h PSI=Processing Speed Index

I MABC-II = Movement Assessment Battery for Children – Second Edition

j DCCS = Dimensional Change Card Sort

Supplemental Table S5. Unadjusted regression models (95% confidence intervals, *p* values) for the associations between maternal prenatal folate and choline and WPPSI-IVCND scores in children 3 to 4 years of age, Alberta, Canada, 2009-2017.

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Variable**  | **FSIQ a*****β (95% CI)*** | **VCI b*****β (95% CI)*** | **VSI c*****β (95% CI)*** | **FRI d*****β (95% CI)*** | **WMI e*****β (95% CI)*** | **PSI f*****β (95% CI)*** |
| Predictors |  |  |  |  |  |  |
| Maternal Folate Status | 0.11 (-0.02, 0.23)g | 0.04 (-0.08, 0.17) | 0.12 (-0.01, 0.25)g | 0.21 (0.04, 0.37) h | 0.07 (-0.06, 0.20)  | 0.005 (-0.15, 0.16) |
| Maternal Choline Intake | -0.06 (-0.17, 0.06) | -0.03 (-0.14, 0.09) | -0.03 (-0.15, 0.09) | 0.02 (-0.13, 0.17) | -0.06 (-0.18, 0.06) | -0.01 (-0.15, 0.13) |
| Maternal Nutrients |  |  |  |  |  |  |
| Ferritin  | -0.07 (-0.19, 0.06) | -0.04 (-0.17, 0.08) | 0.04 (-0.09, 0.17) | -0.10 (-0.24, 0.07) | -0.03 (-0.16, 0.10) | -0.04 (-0.19, 0.11) |
| Vitamin B12 | -0.03 (-0.16, 0.10) | -0.02 (-0.15, 0.10) | -0.08 (-0.21, 0.06) | -0.06 (-0.23, 0.11) | 0.01 (-0.12, 0.15) | 0.07 (-0.09, 0.23) |
| Hemoglobin | -0.06 (-0.18, 0.06) | -0.10(-0.23,0.02)g | 0.03 (-0.10, 0.16) | -0.14(-0.31,0.02)g | -0.06 (-0.19, 0.07) | 0.07 (-0.08, 0.23) |
| Omega-3 Fatty Acids | -0.02 (-0.15, 0.10) | 0.02 (-0.11, 0.15) | 0.01 (-0.12, 0.14) | -0.17(-0.30,0.01)g | 0.06 (-0.07, 0.19) | -0.003(-0.15, 0.14) |
| Magnesium | 0.01 (-0.12, 0.14) | 0.08 (-0.04, 0.21)g | -0.12(-0.25,0.02)g | 0.004(-0.17, 0.18) | -0.004(-0.14,0.13) | 0.26 (0.09, 0.41) h |
| Copper | 0.05 (-0.08, 0.19) | 0.08 (-0.04, 0.23)g | 0.04 (-0.10, 0.18) | 0.04 (-0.15, 0.24) | 0.09 (-0.05, 0.24)g | -0.01 (-0.20, 0.17) |
| Zinc | 0.01 (-0.13, 0.14) | -0.03 (-0.17, 0.11) | 0.03 (-0.11, 0.18) | -0.01 (-0.20, 0.19) | 0.06 (-0.09, 0.20) | -0.18(-0.38,-0.02) h |
| Selenium | 0.12 (-0.02, 0.27)g | 0.17 (0.03, 0.32) h | 0.10 (-0.04, 0.25)g | 0.03 (-0.18, 0.24) | -0.07 (-0.23, 0.07) | -0.17 (-0.39,0.01)g |
| Other Covariates |  |  |  |  |  |  |
| Ethnicity i | 0.01 (-0.13, 0.15) | -0.06 (-0.21, 0.07) | -0.03 (-0.17, 0.12) | 0.10 (-0.08, 0.28)  | -0.08 (-0.22, 0.06) | -0.04 (-0.20, 0.13;) |
| Education j | 0.15 (0.02, 0.27) h | 0.16 (0.04, 0.29) h | 0.11 (-0.02, 0.23)g | 0.12 (-0.05, 0.27)g | 0.01 (-0.12, 0.14) | 0.03 (-0.12, 0.18) |
| Income k | 0.18 (0.06, 0.29) h | 0.22 (0.09, 0.33) h | 0.14 (0.01, 0.26) h | 0.10 (-0.06, 0.24) | 0.09 (-0.04, 0.21)g | 0.25 (0.09, 0.37) h |
| Parity l | 0.07 (-0.06, 0.21) | 0.03 (-0.10, 0.17) | 0.03 (-0.11, 0.17) | -0.001(-0.18,0.18) | 0.11 (-0.03, 0.25)g | 0.13 (-0.04, 0.30) g |
| Delivery Mode m | -0.02 (-0.14, 0.10) | -0.08(-0.20,0.04)g | 0.01 (-0.12, 0.13) | -0.02 (-0.18, 0.14) | 0.06 (-0.07, 0.18) | 0.07 (-0.08, 0.22) |
| Child Birthweight | 0.01 (-0.12, 0.14) | -0.03 (-0.16, 0.10) | -0.01 (-0.15, 0.12) | 0.07 (-0.11, 0.24) | -0.04 (-0.17, 0.10) | 0.02 (-0.14, 0.18) |
| Maternal Age at Birth | -0.06 (-0.20, 0.07) | -0.07 (-0.20, 0.07) | 0.02 (-0.12, 0.16) | -0.02 (-0.19, 0.16) | -0.03 (-0.17, 0.12) | -0.10 (-0.26, 0.07) |
| Pre-Pregnancy BMI n | -0.20(-0.34,0.08)h | -0.16(-0.30,-0.04h | -0.17(-0.32,0.04)h | -0.12(-0.29,0.05)g | -0.22(-0.37, -.09)h | -0.16(-0.31, .004)g |
| Child Sex o  | 0.10 (-0.02, 0.22)g | 0.11 (-0.01, 0.24)g | 0.06 (-0.06, 0.19) | 0.09 (-0.08, 0.25) | 0.10 (-0.02, 0.23)g | 0.28 (0.12, 0.43)h |

a FSIQ = Full Scale Intelligence Quotient

b VCI = Verbal Comprehension Index

c VSI = Visual Spatial Index

d FRI = Fluid Reasoning Index

e WMI = Working Memory Index

f PSI = Processing Speed Index

g *p* ≤ 0.20

h *p* ≤ 0.05

i White as reference group

j Less than high school diploma/completed high school diploma/trade/technical as reference group

k Income < $70K as reference group

l No prior children as reference group

m Vaginal delivery as reference group

n BMI = Body Mass Index

o Male as reference group

Supplemental Table S6. Unadjusted regression models (95% confidence intervals, *p* values) for the associations between maternal prenatal folate and choline and language and memory scores on the NEPSY-II in children 3 to 4 years of age, Alberta, Canada, 2009-2017.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Variable**  | **Phonological Processing** ***β (95% CI)*** | **Speeded Naming*****β (95% CI)*** | **Memory for Designs*****β (95% CI)*** | **Narrative Memory*****β (95% CI)*** | **Sentence Repetition*****β (95% CI)*** |
| Predictors |  |  |  |  |  |
| Maternal Folate Status | 0.20 (0.07, 0.33) a | 0.08 (-0.05, 0.21) | 0.13 (-0.002, 0.27) b | 0.05 (-0.09, 0.19) | 0.01 (-0.12, 0.14) |
| Maternal Choline Intake | 0.003 (-0.12, 0.13) | -0.13 (-0.25, -0.005) a | -0.11 (-0.24, 0.02) b | -0.04 (-0.17, 0.08) | -0.02 (-0.14, 0.11) |
| Maternal Nutrients |  |  |  |  |  |
| Ferritin  | -0.04 (-0.17, 0.09) | -0.01 (-0.14, 0.12) | -0.02 (-0.16, 0.12) | -0.03 (-0.17, 0.11) | -0.03 (-0.16, 0.11) |
| Vitamin B12 | 0.01 (-0.13, 0.14) | 0.09 (-0.04, 0.23) b | -0.02 (-0.16, 0.12) | <0.00 (-0.14, 0.14) | 0.06 (-0.08, 0.20) |
| Hemoglobin | -0.01 (-0.14, 0.12) | 0.004 (-0.13, 0.13) | <0.00 (-0.14, 0.13) | -0.08 (-0.22, 0.05) | -0.01 (-0.14, 0.13) |
| Omega-3 Fatty Acids | -0.06 (-0.19, 0.07) | 0.01 (-0.12, 0.14) | -0.04 (-0.18, 0.10) | 0.03 (-0.11, 0.17) | -0.003 (-0.14, 0.13) |
| Magnesium | 0.01 (-0.12, 0.14) | 0.002 (-0.13, 0.14) | 0.02 (-0.12, 0.16) | -0.05 (-0.19, 0.09) | 0.11 (-0.03, 0.24) b |
| Copper | 0.05 (-0.09, 0.19) | 0.06 (-0.07, 0.21) | 0.08 (-0.06, 0.24) | 0.07 (-0.07, 0.22) | 0.04 (-0.10, 0.19) |
| Zinc | 0.08 (-0.07, 0.22) | -0.04 (-0.19, 0.10) | 0.06 (-0.08, 0.22) | -0.01 (-0.16, 0.14) | -0.02 (-0.17, 0.12) |
| Selenium | -0.01 (-0.16, 0.14) | 0.09 (-0.06, 0.24) | -0.12 (-0.28, 0.03) b | 0.05 (-0.11, 0.21) | -0.003 (-0.16, 0.15) |
| Other Covariates |  |  |  |  |  |
| Ethnicity c | 0.01 (-0.13, 0.16) | 0.10 (-0.04, 0.25) b | 0.05 (-0.09, 0.21) | -0.03 (-0.18, 0.12) | -0.08 (-0.24, 0.06) |
| Education d | 0.11 (-0.02, 0.24) b | 0.12 (-0.01, 0.24) b | 0.05 (-0.08, 0.19) | 0.05 (-0.08, 0.19) | 0.07 (-0.06, 0.20) |
| Income e | 0.04 (-0.08, 0.16) | 0.17 (0.04, 0.29) a | 0.04 (-0.09, 0.17) | 0.14 (0.02, 0.28) a | 0.12 (-0.01, 0.25) b |
| Parity f | 0.02 (-0.12, 0.16) | -0.01 (-0.15, 0.13) | 0.04 (-0.11, 0.18) | 0.18 (0.04, 0.34) a | 0.12 (-0.02, 0.27) b |
| Delivery Mode g | <0.000 (-0.13, 0.13) | -0.03 (-0.16, 0.10) | -0.13 (-0.27, -0.003) a | -0.04 (-0.17. 0.10) | -0.08 (-0.22, 0.04) b |
| Child Birthweight | 0.13 (-0.01, 0.26) b | 0.03 (-0.10, 0.17) | -0.08 (-0.22, 0.06) | -0.02 (-0.16, 0.12) | 0.07 (-0.07, 0.21) |
| Maternal Age at Birth | 0.001 (-0.14, 0.14) | -0.01 (-0.16, 0.12) | -0.05 (-0.20, 0.09) | -0.08 (-0.23; 0.07) | -0.10 (-0.25, 0.04) b |
| Pre-Pregnancy BMI h | -0.10 (-0.24, 0.04) b | -0.02 (-0.16, 0.12) | -0.11 (-0.27, 0.02) b | -0.10 (-0.26, 0.03b | -0.13 (-0.28, <0.00) a |
| Child Sex i  | 0.17 (0.04, 0.30) a | 0.11 (-0.02, 0.24) b | -0.004 (-0.14, 0.13) | 0.03 (-0.11, 0.16) | 0.21 (0.08, 0.34) a |

a *p* ≤ 0.05

b *p* ≤ 0.20

c White as reference group

d Less than high school diploma/completed high school diploma/trade/technical as reference group

e Income < $70K as reference group

f No prior children as reference group

g Vaginal delivery as reference group

h BMI = Body Mass Index

i Male as reference group

Supplemental Table S7. Unadjusted regression models (95% confidence intervals, *p* values) for the associations between maternal prenatal folate and choline and executive functioning tasks in children 3 to 4 years of age, Alberta, Canada, 2009-2017.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Variable**  | **NEPSY-II Statue** ***β (95% CI)*** | **Boy Girl Stroop*****β (95% CI)*** | **Spatial Span*****β (95% CI)*** | **DCCS a*****OR (95% CI)*** |
| Predictors |  |  |  |  |
| Maternal Folate Status | 0.11 (-0.02, 0.23) b | -0.03 (-0.16, 0.10) | 0.06 (-0.07, 0.18) | 0.90 (0.66, 1.23) |
| Maternal Choline Intake | 0.06 (-0.06, 0.18) | 0.01 (-0.11, 0.13) | -0.11 (-0.21, 0.02) b | 0.90 (0.67, 1.19) |
| Maternal Nutrients |  |  |  |  |
| Ferritin  | -0.01 (-0.13, 0.11) | 0.08 (-0.06, 0.20) | 0.03 (-0.10, 0.15) | 1.11 (0.81, 1.54) |
| Vitamin B12 | 0.13 (0.004, 0.26) c | 0.04 (-0.09, 0.17) | -0.01, (-0.14, 0.12) | 1.07 (0.79, 1.45) |
| Hemoglobin | -0.17 (-0.29, -0.05) c | -0.12 (-0.25, 0.001) b | -0.04 (-0.16, 0.09) | 0.85 (0.63, 1.15) |
| Omega-3 Fatty Acids | -0.04 (-0.17, 0.08) | 0.08 (-0.04, 0.21) b | -0.01 (-0.14, 0.11) | 0.93 (0.69, 1.27) |
| Magnesium | 0.16 (0.03, 0.28) c | 0.01 (-0.12, 0.14) | 0.10 (-0.04, 0.22) b | 1.19 (0.88, 1.61) |
| Copper | 0.18 (0.05, 0.32) c | 0.16 (0.04, 0.32) c | 0.06 (-0.07, 0.20) | 0.99 (0.72, 1.37) |
| Zinc | 0.01 (-0.13, 0.14) | 0.06 (-0.08, 0.20) | -0.04 (-0.17, 0.10) | 0.82 (0.59, 1.41) |
| Selenium | 0.07 (-0.07, 0.23) | -0.01 (-0.15, 0.14) | 0.14 (-0.002, 0.28) b | 0.86 (0.61, 1.21) |
| Other Covariates |  |  |  |  |
| Ethnicity d | -0.18 (-0.32, -0.04) c | -0.06 (-0.20, 0.07) | 0.01 (-0.13, 0.14) | 0.97 (0.69, 1.46) |
| Education e | 0.004 (-0.12, 0.12) | 0.06 (-0.06, 0.19) | 0.04 (-0.09, 0.16) | 1.05 (0.78, 1.42) |
| Income f | 0.14 (0.02, 0.24) c | 0.07 (-0.05, 0.19) | 0.08 (-0.05, 0.19) | 1.27 (0.95, 1.68) b |
| Parity g | 0.14 (0.01, 0.27) c | 0.09 (-0.04, 0.23) b | 0.04 (-0.10, 0.17) | 1.64 (1.17, 2.29) b |
| Delivery Mode h | 0.11 (-0.01, 0.23) b | -0.06 (-0.18, 0.07) | -0.10 (-0.22, 0.02) b | 0.86 (0.64, 1.16) |
| Child Birthweight | -0.001 (-0.12, 0.12) | -0.04 (-0.18, 0.08) | 0.11 (-0.02, 0.23) b | 1.11 (0.81, 1.52) |
| Maternal Age at Birth | -0.08 (-0.21, 0.06) | -0.08 (-0.22, 0.06) | -0.003 (-0.14, 0.13) | 0.90 (0.65, 1.26) |
| Pre-Pregnancy BMI i | -0.12 (-0.25, 0.01) b | -0.19 (-0.33, -0.06) c | -0.11 (-0.24, 0.02) b | 0.75 (0.55, 1.03) b |
| Child Age |  | 0.36 (0.24, 0.49) c | 0.18 (0.05, 0.29) c | 1.96 (1.44, 2.67) c |
| Child Sex j | 0.17 (0.04, 0.28) c | 0.02 (-0.11, 0.14) | 0.04 (-0.08, 0.16) | 1.24 (0.92, 1.66) b |

a DCCS = Dimensional Change Card Sort

b *p* ≤ 0.20

c *p* ≤ 0.05

d White as reference group

e Less than high school diploma/completed high school diploma/trade/technical as reference group

f Income < $70K as reference group

g No prior children as reference group

h Vaginal delivery as reference group

i BMI = Body Mass Index

j Male as reference group

Supplemental Table S8. Unadjusted regression models (95% confidence intervals, *p* values) for the associations between maternal prenatal folate and choline and motor measures on the MABC-2 in children 3 to 4 years of age, Alberta, Canada, 2009-2017

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Variable**  | **Total Score*****β (95% CI)*** | **Manual Dexterity*****β (95% CI)*** | **Aiming and Catching*****β (95% CI)*** | **Balance*****β (95% CI)*** |
| Predictors |  |  |  |  |
| Maternal Folate Status | 0.04 (-0.10, 0.17) | 0.02 (-0.11, 0.14) | 0.03 (-0.11, 0.17) | 0.07 (-0.07, 0.21) |
| Maternal Choline Intake | -0.01 (-0.14, 0.11) | -0.03 (-0.14, 0.10) | 0.02 (-0.11, 0.15) | -0.04 (-0.17, 0.09) |
| Maternal Nutrients |  |  |  |  |
| Ferritin  | -0.004 (-0.14, 0.13) | -0.06 (-0.18, 0.07) | -0.02 (-0.16, 0.12) | 0.06 (-0.08, 0.20) |
| Vitamin B12 | -0.02 (-0.15, 0.12) | -0.04 (-0.17, 0.09) | 0.01 (-0.13, 0.16) | -0.02 (-0.16, 0.12) |
| Hemoglobin | -0.04 (-0.17, 0.09) | -0.05 (-0.18, 0.07) | 0.02 (-0.11, 0.16) | -0.04 (-0.18, 0.09) |
| Omega-3 Fatty Acids | 0.001 (-0.14, 0.14) | 0.04 (-0.09, 0.17) | 0.005 (-0.14, 0.15) | -0.03 (-0.17, 0.11) |
| Magnesium | 0.02 (-0.12, 0.15) | 0.03 (-0.10, 0.16) | -0.07 (-0.21, 0.07) | 0.10 (-0.04, 0.24) a |
| Copper | 0.07 (-0.06, 0.23) | 0.06 (-0.07, 0.21) | 0.002 (-0.15, 0.15) | 0.12 (-0.01, 0.29) a |
| Zinc | -0.07 (-0.22, 0.08) | -0.10 (-0.25, 0.03) a | -0.04 (-0.20, 0.11) | -0.01 (-0.16, 0.14) |
| Selenium | 0.07 (-0.08, 0.23) | 0.07 (-0.08, 0.21) | 0.11 (-0.04, 0.28) a | -0.07 (-0.24, 0.08) |
| Other Covariates |  |  |  |  |
| Ethnicity b | -0.02 (-0.17, 0.13) | -0.05 (-0.19, 0.09) | 0.08 (-0.07, 0.23) | -0.06 (-0.21, 0.08) |
| Education c | -0.05 (-0.18, 0.08) | 0.01 (-0.11, 0.14) | -0.04 (-0.18, 0.10) | -0.05 (-0.19, 0.09) |
| Income d | 0.10 (-0.03, 0.22) a | 0.12 (-0.004, 0.24) a | -0.04 (-0.17, 0.09) | 0.11 (-0.02, 0.24) a |
| Parity e | -0.09 (-0.23, 0.06) | 0.01 (-0.13, 0.15) | -0.10 (-0.25, 0.04) a | -0.10 (-0.25, 0.05) a |
| Delivery Mode f | 0.03 (-0.10, 0.16) | 0.06 (-0.07, 0.18) | 0.04 (-0.10, 0.18) | -0.06 (-0.20, 0.07) |
| Child Birthweight | 0.05 (-0.09, 0.19) | 0.01 (-0.12, 0.14) | 0.08 (-0.06, 0.22) | -0.02 (-0.16, 0.12) |
| Maternal Age at Birth | 0.001 (-0.14, 0.14) | 0.01 (-0.12, 0.15) | <0.000 (-0.15, 0.15) | 0.02 (-0.12, 0.17) |
| Pre-Pregnancy BMI g | -0.14 (-0.30, -0.01) h | -0.16 (-0.31, -0.03) h | -0.12 (-0.27, 0.02) a | -0.10 (-0.26, 0.04) a |
| Child Sex i  | 0.18 (0.05, 0.32) h | 0.24 (0.11, 0.36) h | 0.02 (-0.12, 0.16) | 0.10 (-0.03, 0.24) a |

a *p* ≤ 0.20

b White as reference group

c Less than high school diploma/completed high school diploma/trade/technical as reference group

d Income < $70K as reference group

e No prior children as reference group

f Vaginal delivery as reference group

g BMI = Body Mass Index

h *p* ≤ 0.05

i Male as reference group

Supplemental Figure S1. Flowchart of participants included in the study

APrON Cohort (N = 2189)

Child WPPSI-IVCND scores at 3-4

years of age (N = 414)

Maternal folate status

2nd trimester (N = 318)

Maternal choline intake 2nd or 3rd

trimester (N = 309)

 309 maternal-child pairs met all of the inclusion criteria