**Supplementary Table S1**. MIIV-2SLS estimates for latent variable and measurement models testing negative causal effects of the latent variable “nutritional investment in brain tissues” on the latent “nutritional investment in lean body tissues,” and of the brain latent on measured fat mass using complete cases (n=67).

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **Measurement model** | Coefficients: | |  |  | Sargan test2: | | |
| Estimate | Std.Err1 | Lower CI | Upper CI | Statistic | df | *p* |
| Body measured by:  Organs  Skeletal muscle | 1.00  0.61 | 0.07 | 0.47 | 0.76 | 1.16 | 2 | 1.00 |
| Brain measured by:  Intracranial volume  Cerebrum  Cerebellum | 1.00  5.82  0.35 | 0.88  0.13 | 3.67  0.11 | 7.24  0.63 | 5.24  2.19 | 2  2 | 0.36  1.00 |
| **Latent variable model** |  |  |  |  |  |  |  |
| Body regressed on:  Height  Brain | 2.73  -0.27 | 0.52  0.35 | 1.72  -0.99 | 3.80  0.37 | 0.002 | 1 | 1.00 |
| Brain regressed on:  Height | 0.56 | 0.17 | 0.22 | 0.89 |  |  |  |
| Fat mass regressed on:  Height  Brain | 0.84  -0.29 | 1.38  1.24 | -1.74  -2.36 | 3.64  2.57 | 1.97 | 1 | 0.64 |
| Intercepts:  Body  Brain  Cerebellum  Cerebrum  Fat mass  Skeletal muscle | -20.09  3.94  8.22  11.47  10.53  2.91 | 7.81  2.74  1.70  11.31  20.27  1.47 | -34.19  -1.51  4.60  -6.83  -30.44  -0.10 | -3.13  9.43  11.35  38.87  49.61  5.75 |  |  |  |

1Bootstrapped standard errors based on 5000 repetitions

2Sargan tests for latent variable and measurement model equations test hypothesis that MIIVs are

uncorrelated with equation error, p>0.05 indicates failure to reject the null hypothesis of no correlation

CI, confidence interval

**Supplementary Table S2**. Traditional SEM maximum likelihood estimates1 for latent variable and measurement models testing effects of the latent variable “nutritional investment in brain tissues” on the latent “nutritional investment in lean body tissues,” and of the brain latent on measured fat mass (n=70).

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Measurement model** |  | |  |  |
| Estimate | Standard Error | Lower CI | Upper CI |
| Body measured by:  Organs  Skeletal muscle | 1.00  0.65 | 0.10 | 0.45 | 0.85 |
| Brain measured by:  Intracranial volume  Cerebrum  Cerebellum | 1.00  6.16  0.48 | 0.42  0.12 | 5.34  0.24 | 6.98  0.72 |
| **Latent variable model** |  |  |  |  |
| Body regressed on:  Height  Brain | 2.47  0.13 | 0.55  0.33 | 1.39  -0.52 | 3.55  0.78 |
| Brain regressed on:  Height | 0.55 | 0.17 | 0.22 | 0.88 |
| Fat mass regressed on:  Height  Brain | 1.24  -0.64 | 1.29  0.83 | -1.29  -2.27 | 3.77  0.99 |
| Intercepts:  Organs  Skeletal muscle  Intracranial volume  Cerebrum  Cerebellum  Fat mass | -20.54  -11.27  4.11  32.42  8.52  5.90 | 8.30  5.52  2.81  17.68  1.69  19.58 | -36.81  -22.09  -1.40  -2.23  5.21  -32.48 | -4.27  -0.45  9.62  67.07  11.83  44.28 |
| Variances:  Intracranial volume2  Organs  Skeletal muscle  Cerebrum  Cerebellum  Fat mass  Body  Brain | 0.000  1.95  1.11  12.52  0.97  43.22  5.66  0.90 | 1.17  0.51  2.12  0.16  7.31  1.47  0.15 | -0.34  0.11  8.36  0.66  28.89  2.78  0.61 | 4.24  2.11  16.68  1.28  57.53  8.54  1.19 |

1Set missing = “fiml” within the sem function of R package lavaan; no other arguments were specified

2Value fixed to zero

CI, confidence interval