Supplementary material

| Supplementary Table 1.1. Age distribution and frequencies | | | | | | | |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **Age** | | **Counts** | | **% of Total** | | **Cumulative %** | |
| 9 |  | 38 |  | 15.2 % |  | 15.2 % |  |
| 10 |  | 52 |  | 20.8 % |  | 36.0 % |  |
| 11 |  | 72 |  | 28.8 % |  | 64.8 % |  |
| 12 |  | 27 |  | 10.8 % |  | 75.6 % |  |
| 18 |  | 5 |  | 2.0 % |  | 77.6 % |  |
| 19 |  | 6 |  | 2.4 % |  | 80.0 % |  |
| 20 |  | 6 |  | 2.4 % |  | 82.4 % |  |
| 21 |  | 10 |  | 4.0 % |  | 86.4 % |  |
| 22 |  | 9 |  | 3.6 % |  | 90.0 % |  |
| 23 |  | 10 |  | 4.0 % |  | 94.0 % |  |
| 24 |  | 4 |  | 1.6 % |  | 95.6 % |  |
| 25 |  | 2 |  | 0.8 % |  | 96.4 % |  |
| 26 |  | 4 |  | 1.6 % |  | 98.0 % |  |
| 27 |  | 2 |  | 0.8 % |  | 98.8 % |  |
| 33 |  | 1 |  | 0.4 % |  | 99.2 % |  |
| 45 |  | 1 |  | 0.4 % |  | 99.6 % |  |
| 52 |  | 1 |  | 0.4 % |  | 100.0 % |  |
|  | | | | | | | |

Supplementary Table 1.2. Factor loadings

|  |
| --- |
| **Factor 1 2 3 4** |
| **01\_vision\_bonfire** .405 .408 .053 .196 |
| **02\_vision\_sunset** .405 .424 .125 .115 |
| **03\_vision\_cat**  .328 .327 .027 .431 |
| **04\_sound\_car** .550 .058 .028 -.134 |
| **05\_sound\_applause** .539 .183 .114 -.054 |
| **06\_sound\_sirene** .593 .069 .070 -.171 |
| **07\_smell\_grass** .491 -.310 .443 .037 |
| **08\_smell\_wood** .513 -.244 .144 .058 |
| **09\_smell\_rose** .332 -.148 .376 -.016 |
| **10\_taste\_pepper** .527 -.249 -.431 .149 |
| **11\_taste\_lemon** .620 -.199 -.067 .002 |
| **12\_taste\_mustard** .503 -.252 -.229 .184 |
| **13\_touch\_fur** .409 .237 -.133 -.327 |
| **14\_touch\_sand** .563 .030 -.101 -.197 |
| **15\_touch\_towel** .485 .208 -.168 -.196 |

Supplementary Figure 1.1. Factors





| Supplementary Table 1.3. Mental imagery as a function of modality for each age group separately | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | | **vision** | | | | | | | | | | **sound** | | | | | | | | | | **touch** | | | | | | | | | | **taste** | | | | | | | | | | **smell** | | | | | | | | | |
|  | | **9-year-olds** | | **10-year-olds** | | **11-year-olds** | | **12-year-olds** | | **Adults** | | **9-year-olds** | | **10-year-olds** | | **11-year-olds** | | **12-year-olds** | | **Adults** | | **9-year-olds** | | **10-year-olds** | | **11-year-olds** | | **12-year-olds** | | **Adults** | | **9-year-olds** | | **10-year-olds** | | **11-year-olds** | | **12-year-olds** | | **Adults** | | **9-year-olds** | | **10-year-olds** | | **11-year-olds** | | **12-year-olds** | | **Adults** | |
| **Valid** |  | 38 |  | 53 |  | 72 |  | 27 |  | 61 |  | 38 |  | 53 |  | 72 |  | 27 |  | 61 |  | 38 |  | 53 |  | 72 |  | 27 |  | 61 |  | 38 |  | 52 |  | 72 |  | 27 |  | 61 |  | 38 |  | 53 |  | 72 |  | 27 |  | 61 |  |
| **Mean** |  | 3.658 |  | 3.384 |  | 3.523 |  | 3.420 |  | 3.984 |  | 3.526 |  | 3.849 |  | 4.028 |  | 3.753 |  | 3.989 |  | 3.553 |  | 3.648 |  | 3.949 |  | 3.519 |  | 3.548 |  | 2.796 |  | 3.109 |  | 3.023 |  | 3.025 |  | 3.033 |  | 2.807 |  | 2.931 |  | 3.009 |  | 2.617 |  | 2.820 |  |
| **Median** |  | 3.667 |  | 3.333 |  | 3.667 |  | 3.667 |  | 4.000 |  | 4.000 |  | 4.000 |  | 4.000 |  | 4.000 |  | 4.333 |  | 3.667 |  | 3.667 |  | 4.167 |  | 3.667 |  | 3.667 |  | 2.733 |  | 3.167 |  | 3.000 |  | 3.333 |  | 3.000 |  | 3.000 |  | 3.000 |  | 3.000 |  | 2.667 |  | 2.667 |  |
| **Std. Deviation** |  | 0.8750 |  | 0.8829 |  | 0.9719 |  | 1.104 |  | 0.6453 |  | 1.122 |  | 0.7805 |  | 0.8083 |  | 0.9983 |  | 0.7817 |  | 1.014 |  | 0.8408 |  | 0.9668 |  | 1.111 |  | 0.6636 |  | 1.171 |  | 0.8935 |  | 1.167 |  | 1.320 |  | 0.8181 |  | 1.053 |  | 1.026 |  | 0.9754 |  | 1.020 |  | 0.8290 |  |
| **Minimum** |  | 1.000 |  | 1.333 |  | 1.000 |  | 1.333 |  | 2.000 |  | 1.000 |  | 1.667 |  | 1.000 |  | 1.000 |  | 2.000 |  | 1.000 |  | 1.667 |  | 1.333 |  | 1.333 |  | 1.667 |  | 1.000 |  | 1.000 |  | 1.000 |  | 1.000 |  | 1.333 |  | 1.000 |  | 1.000 |  | 1.000 |  | 1.000 |  | 1.333 |  |
| **Maximum** |  | 5.000 |  | 5.000 |  | 5.000 |  | 5.000 |  | 5.000 |  | 5.000 |  | 5.000 |  | 5.000 |  | 5.000 |  | 5.000 |  | 5.000 |  | 5.000 |  | 5.000 |  | 5.000 |  | 4.667 |  | 4.667 |  | 5.000 |  | 5.000 |  | 5.000 |  | 4.667 |  | 4.667 |  | 5.000 |  | 5.000 |  | 4.333 |  | 5.000 |  |
|  | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

We did not have a hypothesis about gender differences in imagery across age groups but on request of the editor this information is included below.

Supplementary Tables 1.4. Mental imagery as a function of gender for each age group separately

| Descriptive statistics gender: Adults | | | | | | | | | | | |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | | Group | | N | | Mean | | SD | | SE | |
| vision |  | female |  | 46 |  | 4.000 |  | 0.652 |  | 0.096 |  |
|  |  | male |  | 15 |  | 3.933 |  | 0.645 |  | 0.167 |  |
| sound |  | female |  | 46 |  | 3.891 |  | 0.820 |  | 0.121 |  |
|  |  | male |  | 15 |  | 4.289 |  | 0.576 |  | 0.149 |  |
| touch |  | female |  | 46 |  | 3.560 |  | 0.692 |  | 0.102 |  |
|  |  | male |  | 15 |  | 3.511 |  | 0.589 |  | 0.152 |  |
| taste |  | female |  | 46 |  | 2.877 |  | 0.841 |  | 0.124 |  |
|  |  | male |  | 15 |  | 3.511 |  | 0.517 |  | 0.134 |  |
| smell |  | female |  | 46 |  | 2.848 |  | 0.848 |  | 0.125 |  |
|  |  | male |  | 15 |  | 2.733 |  | 0.789 |  | 0.204 |  |
|  | | | | | | | | | | | |

| Student's t-test:  Adults female vs male | | | | | | |
| --- | --- | --- | --- | --- | --- | --- |
|  | | t | | df | | p |
| vision |  | 0.345 |  | 59.00 |  | 0.731 |  |
| sound |  | -1.739 |  | 59.00 |  | 0.087 |  |
| touch |  | 0.245 |  | 59.00 |  | 0.807 |  |
| taste |  | -2.746 |  | 59.00 |  | 0.008 |  |
| smell |  | 0.461 |  | 59.00 |  | 0.646 |  |
|  | | | | | | |
|  | | | | | | |

| Descriptive statistics: 12 year old | | | | | | | | | | | |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | | Group | | N | | Mean | | SD | | SE | |
| vision |  | female |  | 11 |  | 3.333 |  | 1.164 |  | 0.351 |  |
|  |  | male |  | 16 |  | 3.479 |  | 1.095 |  | 0.274 |  |
| sound |  | female |  | 11 |  | 3.455 |  | 0.583 |  | 0.176 |  |
|  |  | male |  | 16 |  | 3.958 |  | 1.179 |  | 0.295 |  |
| touch |  | female |  | 11 |  | 2.788 |  | 0.910 |  | 0.274 |  |
|  |  | male |  | 16 |  | 4.021 |  | 0.962 |  | 0.241 |  |
| taste |  | female |  | 11 |  | 2.394 |  | 1.261 |  | 0.380 |  |
|  |  | male |  | 16 |  | 3.458 |  | 1.212 |  | 0.303 |  |
| smell |  | female |  | 11 |  | 2.727 |  | 0.941 |  | 0.284 |  |
|  |  | male |  | 16 |  | 2.542 |  | 1.095 |  | 0.274 |  |
|  | | | | | | | | | | | |

| Student's t-test:  12 year old female vs male. | | | | | | |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
|  | | t | | df | | p |  |
| vision |  | -0.331 |  | 25.00 |  | 0.743 |  |  |
| sound |  | -1.306 |  | 25.00 |  | 0.203 |  |  |
| touch |  | -3.343 |  | 25.00 |  | 0.003 |  |  |
| taste |  | -2.206 |  | 25.00 |  | 0.037 |  |  |
| smell |  | 0.458 |  | 25.00 |  | 0.651 |  |  |
|  | | | | | | |  |
|  | | | | | | |  |

| Descriptive statistics: 11 year old | | | | | | | | | | | |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | | Group | | N | | Mean | | SD | | SE | |
| vision |  | female |  | 41 |  | 3.512 |  | 0.995 |  | 0.155 |  |
|  |  | male |  | 31 |  | 3.538 |  | 0.957 |  | 0.172 |  |
| sound |  | female |  | 41 |  | 3.870 |  | 0.767 |  | 0.120 |  |
|  |  | male |  | 31 |  | 4.237 |  | 0.826 |  | 0.148 |  |
| touch |  | female |  | 41 |  | 3.911 |  | 0.983 |  | 0.154 |  |
|  |  | male |  | 31 |  | 4.000 |  | 0.958 |  | 0.172 |  |
| taste |  | female |  | 41 |  | 2.956 |  | 1.162 |  | 0.181 |  |
|  |  | male |  | 31 |  | 3.113 |  | 1.187 |  | 0.213 |  |
| smell |  | female |  | 41 |  | 3.016 |  | 0.980 |  | 0.153 |  |
|  |  | male |  | 31 |  | 3.000 |  | 0.985 |  | 0.177 |  |
|  | | | | | | | | | | | |

| Student's t-test:  11 year old female vs male. | | | | | | | |
| --- | --- | --- | --- | --- | --- | --- | --- |
|  | | t | | df | | p | |
| vision |  | -0.109 |  | 70.00 |  | 0.913 |  |
| sound |  | -1.943 |  | 70.00 |  | 0.056 |  |
| touch |  | -0.386 |  | 70.00 |  | 0.700 |  |
| taste |  | -0.563 |  | 70.00 |  | 0.575 |  |
| smell |  | 0.070 |  | 70.00 |  | 0.945 |  |
|  | | | | | | | |
|  | | | | | | | |

| Descriptive statistics: 10 year old | | | | | | | | | | | |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | | Group | | N | | Mean | | SD | | SE | |
| vision |  | female |  | 29 |  | 2.977 |  | 0.660 |  | 0.123 |  |
|  |  | male |  | 23 |  | 3.870 |  | 0.897 |  | 0.187 |  |
| sound |  | female |  | 29 |  | 3.552 |  | 0.837 |  | 0.155 |  |
|  |  | male |  | 23 |  | 4.188 |  | 0.530 |  | 0.111 |  |
| touch |  | female |  | 29 |  | 3.460 |  | 0.866 |  | 0.161 |  |
|  |  | male |  | 23 |  | 3.841 |  | 0.765 |  | 0.159 |  |
| taste |  | female |  | 28 |  | 2.702 |  | 0.871 |  | 0.165 |  |
|  |  | male |  | 23 |  | 3.551 |  | 0.662 |  | 0.138 |  |
| smell |  | female |  | 29 |  | 2.782 |  | 1.142 |  | 0.212 |  |
|  |  | male |  | 23 |  | 3.058 |  | 0.833 |  | 0.174 |  |
|  | | | | | | | | | | | |

| Student's t-test:  10 year old female vs male | | | | | | | |
| --- | --- | --- | --- | --- | --- | --- | --- |
|  | | t | | df | | p | |
| vision |  | -4.132 |  | 50.00 |  | 0.001 |  |
| sound |  | -3.174 |  | 50.00 |  | 0.003 |  |
| touch |  | -1.658 |  | 50.00 |  | 0.104 |  |
| taste |  | -3.846 |  | 49.00 |  | 0.001 |  |
| smell |  | -0.973 |  | 50.00 |  | 0.335 |  |
|  | | | | | | | |
|  | | | | | | | |

| Student's t-test:  9 year old female vs male | | | | | | | |
| --- | --- | --- | --- | --- | --- | --- | --- |
|  | | t | | df | | p | |
| vision |  | -1.180 |  | 36.00 |  | 0.246 |  |
| sound |  | -0.495 |  | 36.00 |  | 0.624 |  |
| touch |  | -0.726 |  | 36.00 |  | 0.472 |  |
| taste |  | 0.057 |  | 36.00 |  | 0.955 |  |
| smell |  | 0.118 |  | 36.00 |  | 0.907 |  |
|  | | | | | | | |
|  | | | | | | | |
|  | | | | | | | |

| Descriptive statistics: 9 year old | | | | | | | | | | | |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | | Group | | N | | Mean | | SD | | SE | |
| vision |  | female |  | 21 |  | 3.508 |  | 1.025 |  | 0.224 |  |
|  |  | male |  | 17 |  | 3.843 |  | 0.625 |  | 0.152 |  |
| sound |  | female |  | 21 |  | 3.444 |  | 1.013 |  | 0.221 |  |
|  |  | male |  | 17 |  | 3.627 |  | 1.269 |  | 0.308 |  |
| touch |  | female |  | 21 |  | 3.444 |  | 0.933 |  | 0.204 |  |
|  |  | male |  | 17 |  | 3.686 |  | 1.121 |  | 0.272 |  |
| taste |  | female |  | 21 |  | 2.806 |  | 1.013 |  | 0.221 |  |
|  |  | male |  | 17 |  | 2.784 |  | 1.374 |  | 0.333 |  |
| smell |  | female |  | 21 |  | 2.825 |  | 1.047 |  | 0.228 |  |
|  |  | male |  | 17 |  | 2.784 |  | 1.093 |  | 0.265 |  |
|  | | | | | | | | | | | |