**Supplementary File 1a**

*Multi-dimensional Experience sampling (mDES)*

|  |  |  |  |
| --- | --- | --- | --- |
| Questions | Label | Low | High |
| My thoughts were focused on an external task or activity: | Focus | Not at all | Completely |
| My thoughts involved future events: | Future | Not at all | Completely |
| My thoughts involved past events: | Past | Not at all | Completely |
| My thoughts involved myself: | Self | Not at all | Completely |
| My thoughts involved other people: | Other | Not at all | Completely |
| The emotion of my thoughts was: | Emotion | Negative | Positive |
| My thoughts involved images | Images | Not at all | Completely |
| My thoughts were detailed and specific: | Detailed | Not at all | Completely |
| My thoughts were: | Deliberate | Spontaneous | Deliberate |
| I was thinking about solutions to problems (or goals): | Problem | Not at all | Completely |
| My thoughts were intrusive: | Intrusive | Not at all | Completely |
| My thoughts contained information I already knew (e.g., knowledge or memories): | Knowledge | Not at all | Completely |
| I was absorbed in the contents of my thoughts | Absorption | Not at all | Completely |
| My thoughts were distracting me from what I am doing | Distracting | Not at all | Completely |
| My thoughts involved words | Words | Not at all | Completely |
| My thoughts involved sounds | Sounds | Not at all | Completely |

**Supplementary File 1b**

|  |
| --- |
| *Percent variance explained by principal components by movie* |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Movie** | PC1 | PC2 | PC3 | PC4 | Total |
| ***Citizenfour*** | 14.01% | 14.97% | 12.85% | 8.51% | 50.34% |
| ***Little Miss Sunshine*** | 14.93% | 13.02% | 13.67% | 9.77% | 51.43% |
| ***500 Days of Summer*** | 18.22% | 11.26% | 12.28% | 9.61% | 51.38% |
| **Combined Dataset** | 26.07% | 10.45% | 7.73% | 6.77% | 51.03% |

**Supplementary File 1c**

*Linear Mixed Models of Variance in Thoughts across Movies*

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Model 1 |  |  |  |  |  |  |  |
|  |  | Sum Sq. | Mean Sq. | Num DF | Den DF | F value | p-value |
|  | Movie | 16.83 | 8.41 | 2 | 2015.30 | 5.41 | 0.005 |
| Model 1 lsmeans |  |  |  |  |  |  |
|  |  | Contrasts | lsmean | SE | df | t-value | p-value |
|  |  | c4 - lms | -0.02 | .10 | 159 | 1.31 | .392 |
|  |  | c4 - summer | -0.11 | .10 | 159 | -1.97 | .121 |
|  |  | lms - summer | 0.11 | .10 | 160 | -3.27 | .003 |
|  |  |  |  |  |  |  |  |
| Model 2 |  |  |  |  |  |  |  |
|  |  | Sum Sq. | Mean Sq. | Num DF | Den DF | F value | p-value |
|  | Movie | 186.92 | 93.46 | 2 | 2015.30 | 77.84 | < .001 |
| Model 2 lsmeans |  |  |  |  |  |  |
|  |  | Contrasts | lsmean | SE | df | t-value | p-value |
|  |  | c4 - lms | 0.56 | .06 | 2015 | 9.66 | < .001 |
|  |  | c4 - summer | 0.68 | .06 | 2016 | 11.66 | < .001 |
|  |  | lms - summer | 0.12 | .06 | 2016 | 2.03 | .106 |
|  |  |  |  |  |  |  |  |
| Model 3 |  |  |  |  |  |  |  |
|  |  | Sum Sq. | Mean Sq. | Num DF | Den DF | F value | p-value |
|  | Movie | 34.29 | 17.15 | 2 | 2015.40 | 12.90 | < .001 |
| Model 3 lsmeans |  |  |  |  |  |  |
|  |  | Contrasts | lsmean | SE | df | t-value | p-value |
|  |  | c4 - lms | 0.30 | .06 | 2015 | 5.14 | < .001 |
|  |  | c4 - summer | 0.21 | .06 | 2016 | 2.58 | .001 |
|  |  | lms - summer | -0.09 | .06 | 2016 | -1.54 | .271 |
|  |  |  |  |  |  |  |  |
| Model 4 |  |  |  |  |  |  |  |
|  |  | Sum Sq. | Mean Sq. | Num DF | Den DF | F value | p-value |
|  | Movie | 149.90 | 74.95 | 2 | 2015.70 | 82.69 | < .001 |
| Model 4 lsmeans |  |  |  |  |  |  |
|  |  | Contrasts | lsmean | SE | df | t-value | p-value |
|  |  | c4 - lms | -0.31 | .05 | 2015 | -6.07 | < .001 |
|  |  | c4 - summer | -0.65 | .05 | 2016 | -12.85 | < .001 |
|  |  | lms - summer | -0.34 | .05 | 2016 | -6.81 | < .001 |

**Supplementary File 1d**

*Movie Comprehension Questions*

|  |  |  |
| --- | --- | --- |
| Movie | Question | Answer |
| *Citizenfour* | What animal is seen on screen in the first scene? | Dog |
| *Citizenfour* | What president is being discussed in the phone call with David? | Barack Obama |
| *Citizenfour* | After 4 years in the military, who directly entered the NSA with 37 years of combined service? | William |
| *Citizenfour* | According to the movie, what historical event triggered the government to begin spying on citizens? | 11-Sep |
| *Little Miss Sunshine* | What breakfast item did Olive order a la mode? | Waffles |
| *Little Miss Sunshine* | What colour is the Volkswagen Transporter that the family drives? | Yellow |
| *Little Miss Sunshine* | How does the family get into their car after taking it to the repair shop? | Pushing it |
| *Little Miss Sunshine* | What type of language does Richard claim is “the refuge of losers”? | Sarcasm |
| *500 Days of Summer* | What event are both Summer and Tom attending? | Wedding |
| *500 Days of Summer* | What piece of jewelry is Summer showing her friend when Tom abruptly leaves her party? | Engagement ring |
| *500 Days of Summer* | On day 440, what time does Tom’s alarm clock go off? | 7:00 AM |
| *500 Days of Summer* | What book is Tom reading on the train, which he also gifts to Summer at her party? | Architecture of happiness |

**Supplementary File 1e**

*Linear Mixed Models of Comprehension model*

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|  | Sum Sq. | Mean Sq. | Num Df | Den Df | F-value | p-value |
| Movie | 47.32 | 23.66 | 2 | 254.12 | 49.33 | < .001 |
| PCA\_1 | 0.64 | 0.64 | 1 | 338.84 | 1.32 | .376 |
| PCA\_2 | 4.45 | 4.45 | 1 | 324.31 | 8.27 | .011 |
| PCA\_3 | 0.01 | 0.01 | 1 | 332.52 | 0.03 | .865 |
| PCA\_4 | 3.98 | 3.98 | 1 | 341.44 | 8.30 | .013 |
| Movie\*PCA\_1 | 4.28 | 2.14 | 2 | 268.96 | 3.36 | .013 |
| Movie\*PCA\_2 | 1.18 | 0.89 | 2 | 259.95 | 1.85 | .286 |
| Movie\*PCA\_3 | 1.01 | 0.51 | 2 | 264.49 | 1.05 | .450 |
| Movie\*PCA\_4 | 0.32 | 0.16 | 2 | 269.18 | 0.33 | .810 |

*Pairwise Comparisons for significant main effect of movie*

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Contrasts | Estimate | SE | Df | t-value | p-value |
| c4 - lms | -0.93 | .10 | 249 | -9.16 | < .001 |
| c4 - summer | -0.91 | .11 | 273 | -8.33 | < .001 |
| lms - summer | 0.02 | .10 | 242 | 0.18 | .982 |

*Note.*The abbreviation ‘c4’ refers to *Citizenfour*, ‘lms’ refers to *Little Miss Sunshine*, and ‘summer’ refers to *500 Days of Summer*.

**Supplementary File 1f**

*FSL FEAT Query Parameter Estimates*

|  |  |  |  |
| --- | --- | --- | --- |
| **All Movies** |  |  |  |
|  | Mean | LCI | UCI |
| Episodic Knowledge | 0.62 | 0.27 | 0.97 |
| Intrusive Distraction | -0.78 | -1.37 | -0.20 |
| Verbal Detail | -1.64 | -2.11 | -1.18 |
| Sensory Engagement | 1.26 | 0.81 | 1.71 |
|  |  |  |  |
| ***500 Days of Summer*** |  |  |  |
|  | Mean | LCI | UCI |
| Episodic Knowledge | -0.23 | -0.58 | 0.12 |
| Intrusive Distraction | -2.34 | -2.89 | -1.80 |
| Verbal Detail | -0.87 | -1.25 | -0.48 |
| Sensory Engagement | 0.18 | -0.02 | 0.39 |
|  |  |  |  |
| ***Citizenfour*** |  |  |  |
|  | Mean | LCI | UCI |
| Episodic Knowledge | 1.49 | 1.06 | 1.91 |
| Intrusive Distraction | 0.26 | -0.26 | 0.78 |
| Verbal Detail | -2.98 | -3.64 | -2.31 |
| Sensory Engagement | 2.77 | 2.27 | 3.26 |
|  |  |  |  |
| ***Little Miss Sunshine*** |  |  |  |
|  | Mean | LCI | UCI |
| Episodic Knowledge | 0.88 | -0.15 | 1.90 |
| Intrusive Distraction | 1.29 | -0.75 | 3.33 |
| Verbal Detail | -0.25 | -1.00 | 0.51 |
| Sensory Engagement | 0.29 | -0.60 | 1.19 |

**Supplementary File 1g**

*Grand average of Gradient score by movie*

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  | **Gradient 1 mean** | **Gradient 2 mean** | **Gradient 3 mean** | **Gradient 4 mean** | **Gradient 5 mean** |
| *500 Days of Summer* | -0.00100 | 0.00264 | 0.00201 | 0.00134 | -0.00112 |
| *Citizenfour* | 0.00301 | -0.00191 | 0.00097 | 0.00160 | 0.00000 |
| *Little Miss Sunshine* | 0.00332 | 0.00138 | -0.00099 | 0.00057 | 0.00130 |

**Supplementary File 1h**

*Functional Connectivity Cluster Analysis (FLAME)*

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Episodic Knowledge Functional Connectivity |  |  |  |  |  |  |
| Cluster Index | Voxels | *p* | log *p* | Z-MAX | Z-MAX X (mm) | Z-MAX Y (mm) | Z-MAX Z (mm) | Z-COG X (mm) | Z-COG Y (mm) | Z-COG Z (mm) |
| 3 | 286 | 3.04E-06 | 5.52 | 4.47 | -8 | -100 | 14 | -8.53 | -97.3 | 13.4 |
| 2 | 184 | 0.000197 | 3.71 | 3.93 | 6 | -92 | 14 | 11.3 | -93.5 | 17.5 |
| 1 | 101 | 0.0109 | 1.96 | 3.84 | -58 | -16 | 6 | -58.2 | -15.2 | 6.22 |
|  |  |  |  |  |  |  |  |  |  |  |
| Intrusive Distraction Functional Connectivity |  |  |  |  |  |  |
| Cluster Index | Voxels | *p* | log *p* | Z-MAX | Z-MAX X (mm) | Z-MAX Y (mm) | Z-MAX Z (mm) | Z-COG X (mm) | Z-COG Y (mm) | Z-COG Z (mm) |
| 4 | 547 | 1.11E-09 | 8.95 | 4.8 | -34 | -58 | 50 | -36 | -52.6 | 46.4 |
| 3 | 408 | 5.96E-08 | 7.22 | 4.3 | -46 | 8 | 26 | -45.9 | 6.9 | 29.3 |
| 2 | 289 | 4.89E-06 | 5.31 | 4.04 | 42 | -46 | 44 | 38.4 | -51.3 | 45.6 |
| 1 | 130 | 0.00338 | 2.47 | 4.08 | 46 | 48 | -4 | 45 | 48.7 | 1.19 |
|  |  |  |  |  |  |  |  |  |  |  |
| Verbal Detail Functional Connectivity |  |  |  |  |  |  |  |
| Cluster Index | Voxels | *p* | log *p* | Z-MAX | Z-MAX X (mm) | Z-MAX Y (mm) | Z-MAX Z (mm) | Z-COG X (mm) | Z-COG Y (mm) | Z-COG Z (mm) |
| 4 | 1895 | 7.05E-24 | 23.2 | 5.24 | -60 | -16 | 6 | -56.3 | -23.3 | 4.47 |
| 3 | 1010 | 2.10E-15 | 14.7 | 4.74 | 58 | -8 | 4 | 58.3 | -18.4 | 3.45 |
| 2 | 105 | 0.00967 | 2.01 | 3.82 | 12 | -88 | 10 | 10.6 | -86.9 | 11 |
| 1 | 75 | 0.05 | 1.3 | 3.74 | -52 | -76 | 6 | -50.3 | -76.6 | 4.32 |
|  |  |  |  |  |  |  |  |  |  |  |
| Sensory Engagement Functional Connectivity |  |  |  |  |  |  |
| Cluster Index | Voxels | *p* | log *p* | Z-MAX | Z-MAX X (mm) | Z-MAX Y (mm) | Z-MAX Z (mm) | Z-COG X (mm) | Z-COG Y (mm) | Z-COG Z (mm) |
| 5 | 4566 | 7.43E-44 | 43.1 | 5.23 | 6 | -92 | 16 | 9.59 | -80.2 | 1.36 |
| 4 | 340 | 4.77E-07 | 6.32 | 4.22 | -46 | -80 | 2 | -46.4 | -76.7 | 5.65 |
| 3 | 330 | 6.56E-07 | 6.18 | 4.46 | 62 | -8 | 4 | 61.3 | -10.7 | 7.1 |
| 2 | 290 | 2.92E-06 | 5.53 | 4.59 | -64 | -12 | 6 | -61.1 | -13.4 | 5.4 |
| 1 | 156 | 0.000754 | 3.12 | 3.68 | -8 | -60 | 66 | -6.45 | -56.5 | 58.4 |

**Supplementary File 1i**

*Neurosynth Decoder Analysis*

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Episodic Knowledge |  | Intrusive Distraction |  | Verbal Detail |  | Sensory Engagement |  |
| association term |  | association term |  | association term |  | association term |  |
| *r* | *r* | *r* | *r* |
| cuneus | 0.17 | working | 0.33 | auditory cortex | 0.65 | v1 | 0.40 |
| v1 | 0.17 | working memory | 0.33 | sounds | 0.65 | visual | 0.35 |
| primary visual | 0.13 | intraparietal | 0.31 | auditory | 0.64 | visual cortex | 0.34 |
| sighted | 0.11 | intraparietal sulcus | 0.30 | primary auditory | 0.62 | primary visual | 0.32 |
| pointing | 0.08 | parietal cortex | 0.30 | heschl | 0.61 | occipital | 0.27 |
| visual | 0.08 | tasks | 0.29 | sound | 0.61 | extrastriate | 0.25 |
| occipital | 0.07 | task | 0.27 | heschl gyrus | 0.60 | early visual | 0.25 |
| videos | 0.07 | posterior parietal | 0.27 | speech | 0.60 | mt | 0.24 |
| occipital gyrus | 0.06 | sulcus ips | 0.25 | listening | 0.59 | sighted | 0.23 |
| visual stream | 0.05 | parietal | 0.25 | pitch | 0.59 | motion | 0.21 |
| prefrontal | -0.02 | resting state | -0.18 | prefrontal | -0.16 | prefrontal | -0.08 |
| cerebellum | -0.02 | resting | -0.18 | prefrontal cortex | -0.13 | cingulate | -0.08 |
| premotor | -0.02 | amygdala | -0.11 | cingulate | -0.06 | prefrontal cortex | -0.07 |
| memory | -0.02 | controls | -0.11 | medial | -0.05 | cerebellum | -0.05 |
| movements | -0.02 | emotional | -0.11 | parietal | -0.04 | motor | -0.05 |
| motor | -0.02 | disorder | -0.10 | memory | -0.04 | sensorimotor | -0.05 |
| primary motor | -0.02 | orbitofrontal | -0.08 | cerebellum | -0.04 | primary motor | -0.05 |
| movement | -0.02 | stimulation | -0.06 | cerebellar | -0.04 | memory | -0.05 |
| parietal | -0.02 | cingulate | -0.06 | disorder | -0.04 | movement | -0.05 |
| pain | -0.02 | disorders | -0.05 | task | -0.03 | motor cortex | -0.05 |

**Supplementary File 1j**

*Linear Mixed Models of Gradients 1-5 Fixed Effects for each Thought Pattern*

|  |  |  |  |
| --- | --- | --- | --- |
| **DV: Episodic Knowledge** |  |  |  |
|  | Estimate | Std. Error | Df | t-value | p-value |
| (Intercept) | 0.01 | 0.09 | 118.6 | 0.07 | .940 |
| gradient1 | -0.01 | 0.03 | 2043 | -0.26 | .796 |
| gradient2 | -0.04 | 0.04 | 2043 | -0.94 | .579 |
| gradient3 | -0.03 | 0.04 | 2042 | -0.69 | .613 |
| gradient4 | 0.18 | 0.06 | 2046 | 3.02 | .013 |
| gradient5 | -0.18 | 0.08 | 2045 | -2.24 | .063 |
|  |  |  |  |  |  |
|  |  |  |  |  |  |
| **DV: Intrusive Distraction** |  |  |  |
|  | Estimate | Std. Error | Df | t-value | p-value |
| (Intercept) | -0.01 | 0.08 | 118.8 | -0.08 | .934 |
| gradient1 | 0.02 | 0.03 | 2045 | 0.68 | .500 |
| gradient2 | 0.05 | 0.04 | 2045 | 1.34 | .412 |
| gradient3 | -0.04 | 0.03 | 2043 | -1.16 | .412 |
| gradient4 | 0.12 | 0.05 | 2048 | 2.17 | .152 |
| gradient5 | -0.06 | 0.07 | 2046 | -0.89 | .470 |
|  |  |  |  |  |  |
|  |  |  |  |  |  |
|  |  |  |  |  |  |
| **DV: Verbal Detail** |  |  |  |  |
|  | Estimate | Std. Error | Df | t-value | p-value |
| (Intercept) | 0.01 | 0.09 | 119 | 0.05 | .963 |
| gradient1 | -0.01 | 0.03 | 2043 | -0.27 | .787 |
| gradient2 | -0.04 | 0.04 | 2043 | -1.03 | .382 |
| gradient3 | 0.03 | 0.03 | 2042 | 1.03 | .382 |
| gradient4 | 0.09 | 0.05 | 2046 | 1.71 | .217 |
| gradient5 | -0.15 | 0.07 | 2045 | -2.06 | .199 |
|  |  |  |  |  |  |
|  |  |  |  |  |  |
| **DV: Sensory Engagement** |  |  |  |
|  | Estimate | Std. Error | Df | t-value | p-value |
| (Intercept) | 0.01 | 0.07 | 119.15 | 0.16 | .870 |
| gradient1 | -0.09 | 0.03 | 2046 | -3.26 | .006 |
| gradient2 | 0.03 | 0.03 | 2046 | 0.78 | .432 |
| gradient3 | 0.03 | 0.03 | 2044 | 1.17 | .404 |
| gradient4 | 0.07 | 0.05 | 2049 | 1.55 | .204 |
| gradient5 | 0.05 | 0.06 | 2048 | 0.86 | .432 |