**SUPPLEMENTAL MATERIAL**

**Technical Note**

The study data represent a very large, unbalanced panel, with large N (the number of individuals) and highly variable T (the number of assessments per individual). Let $y\_{it}$ be the total score of self–reported mental wellbeing of individual *i* for assessment *t*.We model these continuous data using a random intercept linear model with

$i=1,2, …$ N

$t=1,2, …T$

$ε\_{it}/u\_{i}\~N(0,θ)$ $u\_{i}\~N(0,φ)$

$$y\_{it}=β\_{0}+β\_{1}env\_{it}+β\_{2}age\_{i}+β\_{3}gender\_{i}+β\_{4}occup\_{i}+β\_{5}mh\\_baseline\_{i}+β\_{6}env\_{it}\*impulse\_{i}+ε\_{it}+u\_{i}$$

where ~ means ‘is distributed as’. On the continuous scale, the total score of mental well –being $y\_{it} $is a linear combination of the following terms. A constant term $β\_{0}$,$ $a random intercept $ u\_{i} $which represents the between subject error term and $ε\_{it}$ represents the within subject error term. In addition,$ env\_{it}$ represents the self-reported environmental features of participant *i* at assessment *t*, $ age\_{i}$ represents the age of participant *i,*$ gender\_{i}$ represents the gender of participant *i,* $occup\_{i}$ represents the occupational status of participant *i*$,$ $mh\\_baseline\_{i}$ represents mental wellbeing of participant *i* over previous two weeks from the start of using the Urban Mind tool, and $env\_{i}\*impulse\_{i}$ represents an interaction term of self-reported environmental features with trait impulsivity of participant *i*, and $β\_{1},β\_{2},β\_{3}, β\_{4},β\_{5},β\_{6} $are the corresponding respective fixed effects terms$. $

***Table S1. Pearson and Goodman & Kruskal’s gamma correlation coefficients between covariates in our statistical models. \*Pearson correlation coefficient; \*\* Goodman & Kruskal's gamma correlation coefficient.***

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|   | Mental wellbeing over previous two weeks | Age | Gender | Occupational status |
| Mental wellbeing over the previous two weeks | 1 |   |   |   |
| Age | -0.04\* | 1 |   |   |
| Gender |  0.11\*\* | 0.17\*\* | 1 |   |
| Occupational status | -0.17\*\* | -0.13\*\* | 0.02\*\* | 1 |
| Are you indoors or outdoors?   | 0.04\*\* | 0.09\*\* | 0.06\*\* | -0.07\*\* |
| Can you see trees? | 0.06\*\* | 0.03\*\* | -0.006\*\* | -0.002\*\* |
| Can you hear birds singing? | -0007\*\* | 0.09\*\* | 0.013\*\* | 0.06\*\* |
| Can you see or hear water? | 0.09\*\* | -0.13\*\* | 0.04\*\* | -0.003\*\* |
| Can you see the sky? | 0.03\*\* | 0.03\*\* | -0.05\*\* | 0.10\*\* |
| Do you feel in contact with nature?  | 0.008\*\* | -0.05\*\* | 0.10\*\* | 0.03\*\* |

***Table S2. Associations between momentary mental wellbeing score in relation to self-reported environmental features adjusted for age, gender, occupational status and mental wellbeing over the previous two weeks for different thresholds of completed assessments (> 33%, >50%, and >66%). Mean Difference (MD) and 95% Confidence Intervals (CI) represent a mean difference in momentary mental wellbeing score per category increase.***

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|  | MD (95% CI) | *p-value* | MD (95% CI) | *p-value* | MD (95% CI) | *p-value* |
|  |  |  |  |  |  |  |

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|  | N=108 (33%) |  | N=64 (50%) |  | N=25 (66%) |  |
| Are you indoors or outdoors? | 2.90 (1.48, 4.33) | <0.001 | 2.41 (1.43, 3.39) | <0.001 | 2.31 (1.52, 3.11) | <0.001 |
| Can you see trees? | 1.31 (0.16, 2.46) | 0.025 | 1.82 (1.06, 2.57) | <0.001 | 1.78 (1.14, 2.42) | <0.001 |
| Can you hear birds singing? | 2.49 (-0.31, 5.29) | 0.081 | 3.71 (1.75,5.68) | <0.001 | 3.82 (2.21, 5.43) | <0.001 |
| Can you see or hear water? | 3.24 (0.14, 6.33) | 0.040 | 1.20 (-1.07,3.48) | 0.30 | 1.33 (-0.55, 3.21) | 0.166 |
| Can you see the sky? | 0.94 (-0.30,2.19) | 0.136 | 1.63 (0.79,2.46) | <0.001 | 1.42 (0.69,2.14) | <0.001 |
| Do you feel in contact with nature? | 1.28 (-1.31,3.86) | 0.333 | 3.51 (1.62,5.41) | <0.001 | 3.77 (2.20, 5.34) | <0.001 |

|  |
| --- |
|  |

***Table S3. Associations of momentary mental wellbeing score in relation to self-reported environmental characteristics adjusted for age, gender, occupation and mental wellbeing over the previous two weeks with the use of Multiple Imputation with Chained Equations*** (***MICE) procedure. Mean Difference (MD) and 95% Confidence Intervals (CI) represent a mean difference in momentary mental wellbeing score per category increase.***

|  |  |  |  |
| --- | --- | --- | --- |
|   |   | MD (95% CI) | *p-value* |
| Are you indoors or outdoors?   |  L0± | 2.45 (0.86,4.04) | 0.003 |
| L1± | 1.41 (-0.18,3.00) | 0.083 |
| L2± | -0.85 (-2.42,0.71) | 0.286 |
| L3 | 0.41 (-1.24,2.06) | 0.630 |
| Can you see trees?  | L0 | 1.26 (-0.01,2.53) | 0.052 |
| L1 | 1.62 (0.31,2.92) | 0.015 |
| L2 | -0.76 (-2.08,0.56) | 0.261 |
| L3 | -0.31 (-1.70,1.07) | 0.654 |
| Can you hear birds singing?  | L0 | 4.02 (1.39,6.66) | 0.008 |
| L1 | 1.47 (-0.99,3.93) | 0.206 |
| L2 | 1.18 (-0.54,2.89) | 0.166 |
| L3 | 0.86 (-0.42,2.15) | 0.187 |
| Can you see or hear water? | L0 | 1.72 (-1.34,4.78) | 0.229 |
| L1 | 0.86 (-0.81,2.53) | 0.306 |
| L2 | -0.12 (-1.97,1.74) | 0.896 |
| L3 | 0.37 (-1.53,2.27) | 0.691 |
| Can you see the sky?  | L0 | 1.06 (-0.47, 2.59) | 0.170 |
| L1 | 1.46 (0.13,2.80) | 0.031 |
| L2 | -0.38 (-1.68,0.92) | 0.570 |
| L3 | -0.85 (-2.32,0.63) | 0.258 |
| Do you feel in contact with nature?  | L0 | 3.49 (1.75,5.23) | 0.001 |
| L1 | 1.64 (-0.52,3.79) | 0.120 |
| L2 | 1.70 (0.31,3.10) | 0.018 |
| L3 | 0.53 (-2.34,3.41) | 0.671 |

± As the interval between successive ecological momentary assessments was 2 hours and 25 minutes on average, one-lagged effects (L1) would indicate that the impact of a self-reported environmental feature of interest was still evident after 2 hours and 25 minutes; two-lagged effects (L2) would indicate that the impact of a feature of interest was still evident after 4 hours and 50 minutes; and three-lagged effects (L3) would indicate that the impact of a feature of interest was still evident after 7 hours and 15 minutes.

***Table S4. Associations between momentary mental wellbeing and the interaction between trait impulsivity score and self-reported environmental features, adjusted for age, gender, occupation and mental wellbeing over the previous two weeks for > 50% completed assessments. Mean Difference (MD) and 95% Confidence Intervals (CI) represent a mean difference in momentary mental wellbeing score per category increase.***

|  |  |  |
| --- | --- | --- |
|  | MD (95% CI) | *P for interaction term* |
| Are you indoors or outdoors?   | -0.02 (-0.31, -0.12) | .037 |
| Can you see trees?  | -0.24 (-0.45, -0.03) | .026 |
| Can you hear birds singing? | 0.72 (0.11, -1.32) | .021 |
| Can you see the sky?  | -0.09 (-0.81, -0.63) | .805 |
| Can you see or hear water | -0.40 (-0.63, -0.17) | .001 |
| Do you feel in contact with nature?  | 0.45 (0.22, -0.92) | 0.02 |

**Scale S1. Warwick-Edinburgh Mental Well-being Scale Used for Baseline Assessment of Mental Wellbeing.**

***Next are some statements about feelings and thoughts. Please indicate your experience of each over the last 2 weeks by tapping on the relevant number/answer.***

1. I feel optimistic about the future.
2. I feel useful.
3. I feel relaxed.
4. I feel interested in other people.
5. I feel I have energy to spare.
6. I deal with problems well.
7. I think clearly.
8. I feel good about myself.
9. I feel close to other people.
10. I feel confident.
11. I am able to make up my own mind about things.
12. I feel loved.
13. I am interested in new things.
14. I feel cheerful.

***Responses and associated scores:***

I very much disagree (score: 1)

I slightly disagree (score: 2)

Not sure (score: 3)

I slightly agree (score: 4)

I very much agree (score: 5)

***Total Scoring:***

Total score is computed by adding the scores for individual items.

**Scale S2. Trait Rash Impulsivity Scale Used for Baseline Assessment of Trait Impulsivity.**

***Please read each statement and indicate to what extent it applies to you by tapping the appropriate number/answer. Answer quickly and honestly, without spending too much time on any statement.***

1. I am focused, seeing things through to the end.
2. I plan work tasks and activities in my free time carefully.
3. I plan events and activities well ahead of time.
4. I think carefully before doing and saying things.
5. I find it easy to exercise self-control.
6. I encounter problems because I do things without stopping to think.
7. I become involved with things that I later wish I could get out of.
8. I tend to jump from one interest to another.
9. I tend to act ‘on impulse’.

***Responses and associated scoring:***

“Rarely / Never” equals a score of 1 for questions 6, 7, 8 & 9; and a score of 4 for questions 1, 2, 3, 4 & 5)

“Occasionally” equals a score of 2 for questions 6, 7, 8 & 9; and a score of 3 for questions 1, 2, 3, 4 & 5)

“Often” equals a score of 3 for questions 6, 7, 8 & 9; and a score of 2 for questions 1, 2, 3, 4 & 5)

“Almost / Always” equals a score of 4 for questions 6, 7, 8 & 9; and a score of 1 for questions 1, 2, 3, 4 & 5)

***Total Scoring:***

Total score is computed by adding the scores for individual items.

**Scale S3. Adapted version of the Warwick-Edinburgh Mental Well-being Scale Used for Ecological Momentary Assessment of Mental Wellbeing.**

***Next are some statements about feelings and thoughts. Please indicate your agreement with each of them by tapping on the relevant number/answer.***

1. Right now I feel optimistic about the future.
2. Right now I feel useful.
3. Right now I feel relaxed.
4. Right now I feel interested in other people.
5. Right now I feel I have energy to spare.
6. Right now I deal with problems well.
7. Right now I think clearly.
8. Right now I feel good about myself.
9. Right now I feel close to other people.
10. Right now I feel confident.
11. Right now I am able to make up my own mind about things.
12. Right now I feel loved.
13. Right now I am interested in new things.
14. Right now I feel cheerful.

***Possible responses and associated scores:***

I very much disagree (score: 1)

I slightly disagree (score: 2)

Not sure (score: 3)

I slightly agree (score: 4)

I very much agree (score: 5)

***Total Scoring:***

Total score is computed by adding the scores for individual items.