Tables

Table 1: Means (SD) of raw scores for overall mindfulness, mindfulness subscales and symptoms of insomnia, depression and anxiety

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|  | Means (SD) | | | | | |
|  | Total | Males | Females | MZ | DZ | Siblings |
| Overall Mindf. | 35.70 (10.37) | 34.23 (10.90)\* | 36.46 (10.01)\* | 35.88 (10.47) | 36.19 (10.74) | 34.67 (9.68) |
| ‘Nonreactivity’ | 9.40 (4.54) | 8.00 (4.39) | 10.12 (4.45) | 9.77 (4.72) | 9.44 (4.57) | 8.96 (4.35) |
| ‘Observing’ | 9.53 (3.59) | 9.42 (3.54) | 9.59 (3.61) | 9.47 (3.75) | 9.49 (3.67) | 9.60 (3.29) |
| ‘Acting with Awareness’ | 5.27 (3.21) | 5.37 (3.27) | 5.21 (3.18) | 5.07 (3.15) | 5.30 (3.39) | 5.42 (2.95) |
| ‘Describing’ | 6.69 (3.66) | 6.70 (3.79) | 6.69 (3.60) | 6.85 (3.88) | 6.93 (3.60) | 6.16 (3.60) |
| ‘Nonjudging’ | 4.83 (3.73) | 4.79 (3.68) | 4.85 (3.76) | 4.74 (3.77) | 5.04 (3.91) | 4.54 (3.30) |
| Insomnia Symptoms | 6.48 (5.22) | 5.65 (4.89)\* | 6.92 (5.33)\* | 6.09 (4.97) | 6.68 (5.38) | 6.61 (5.19) |
| Depression Symptoms | 5.31 (5.30) | 4.68 (4.73)\* | 5.64 (5.55)\* | 5.34 (5.44) | 5.73 (5.73) | 4.54 (4.21) |
| Anxiety Symptoms | 22.13 (14.81) | 17.31 (13.19)\* | 24.65 (14.99)\* | 23.93 (15.03) | 22.32 (15.32) | 20.11 (13.32) |

Note: MZ = monozygotic twin; DZ = dizygotic twins; Siblings = non-twin sibling pairs; \* sex differences were found; Means and SD were obtained from SPSS and are based on the raw data (untransformed, including outliers, etc., but reverse coded for overall mindfulness and ‘Nonjudging’). Overall Mindf. = overall score of mindfulness (FFMQ), reverse coded, but not transformed in any other way, higher score indicating lower mindfulness; ‘Nonreactivity’ = subscale of mindfulness (FFMQ), reverse coded, higher scores indication stronger reaction to inner experience; ‘Observing’ = subscale of mindfulness (FFMQ), reverse coded, higher scores indicating lower ability to observe, notice, attend to sensations, perceptions, thoughts and feelings; ‘Acting with A.’ = subscale of mindfulness (FFMQ), reverse coded, higher scores indicating acting less aware; ‘Describing’ = subscale of mindfulness (FFMQ), reverse coded, higher scores indicating lower ability to describe or label feelings, thoughts, beliefs, expectations, etc.; ‘Nonjudging’ = subscale of mindfulness (FFMQ), reverse coded, higher score indicating more judging of inner experience; Insomnia Symptoms = insomnia symptoms (ISQ), higher scores indicating more insomnia symptoms; Depression = symptoms of depression (MFQ), higher scores indicating more symptoms of depression; Anxiety = symptoms of anxiety (RCADS), higher scores indicating more anxiety symptoms

Table 2: Phenotypic correlations for overall mindfulness, subscales of mindfulness, symptoms of insomnia, depression and anxiety

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | Overall Mindf. | ‘Nonreact.’ | ‘Observing’ | ‘Acting with A.’ | ‘Describing’ | ‘Nonjudging’ | Insomnia Symptoms | Depression  Symptoms | Anxiety  Sympt. |
| Overall Mindfulness | 1 |  |  |  |  |  |  |  |  |
| ‘Nonreactivity’ | .62\*\* | 1 |  |  |  |  |  |  |  |
| ‘Observing’ | .32\*\* | .16\*\* | 1 |  |  |  |  |  |  |
| ‘Acting with Awareness’ | .54\*\* | .08 | -10\* | 1 |  |  |  |  |  |
| ‘Describing’ | .63\*\* | .17\*\* | .11\* | .28\*\* | 1 |  |  |  |  |
| ‘Nonjudging’ | .54\*\* | .12\* | -.17\*\* | .40\*\* | .24\*\* | 1 |  |  |  |
| Insomnia Symptoms | .22\*\* | .01 | -.13\*\* | .31\*\* | .17\*\* | .34\*\* | 1 |  |  |
| Depression | .48\*\* | .25\*\* | -.08 | .42\*\* | .26\*\* | .54\*\* | .49\*\* | 1 |  |
| Anxiety | .46\*\* | .29\*\* | -.16\*\* | .37\*\* | .26\*\* | .55\*\* | .46\*\* | .62\*\* | 1 |

Note: \* p < .05; \*\* p < .01. Correlations were calculated on transformed data, using twin 1 only to control for non-independence of observations. Overall Mindfulness = overall score of mindfulness (FFMQ), reverse coded, higher score indicating lower mindfulness; ‘Nonreact.’ = subscale of mindfulness (FFMQ), reverse coded, higher scores indication stronger reaction to inner experience; ‘Observing’ = subscale of mindfulness (FFMQ), reverse coded, higher scores indicating lower ability to observe, notice, attend to sensations, perceptions, thoughts and feelings; ‘Acting with A.’= subscale of mindfulness (FFMQ), reverse coded, higher scores indicating acting less aware; ‘Describing’ = subscale of mindfulness (FFMQ), reverse coded, higher scores indicating lower ability to describe or label feelings, thoughts, beliefs, expectations, etc.; ‘Nonjudging’ = subscale of mindfulness (FFMQ), reverse coded, higher score indicating more judging of inner experience; Insomnia Symptoms = insomnia symptoms (ISQ), higher scores indicating more insomnia symptoms; Depression Symptoms= symptoms of depression (MFQ), higher scores indicating more symptoms of depression; Anxiety Sympt. = symptoms of anxiety (RCADS), higher scores indicating more symptoms of anxiety

Table 3: Phenotypic correlations for each subscale of mindfulness with symptoms of insomnia, depression and anxiety

after partialling out all other subscales

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  | ‘Nonreactivity’ | ‘Observing’ | ‘Acting with Awareness’ | ‘Describing’ | ‘Nonjudging’ |
| Insomnia Symptoms | -.04 | -.07 | **.18\*\*** | .06 | **.23\*\*** |
| Depression Symptoms | .21\*\* | -.03 | .23\*\* | .07 | **.43\*\*** |
| Anxiety Symptoms | .29\*\* | -.15\*\* | .19\*\* | .07 | **.44\*\*** |

Note: \* p < .05; \*\* p < .01; Insomnia Symptoms = insomnia symptoms (ISQ), higher scores indicating more insomnia symptoms; Depression

= symptoms of depression (MFQ), ‘Nonreactivity’ = subscale of mindfulness (FFMQ), reverse coded, higher scores indication stronger

reaction to inner experience; ‘Observing’ = subscale of mindfulness (FFMQ), reverse coded, higher scores indicating lower ability to observe,

notice, attend to sensations, perceptions, thoughts and feelings; ‘Acting with A.’ = subscale of mindfulness (FFMQ), reverse coded, higher scores

indicating acting less aware; ‘Describing’ = subscale of mindfulness (FFMQ), reverse coded, higher scores indicating lower ability to describe or

label feelings, thoughts, beliefs, expectations, etc.; ‘Nonjudging’ = subscale of mindfulness (FFMQ), reverse coded, higher score indicating more

judging of inner experience; the subscale highest correlating with insomnia symptoms, depression and anxiety is highlighted in bold, if no significant

difference in correlation was found to the second highest correlating subscale then more than one value is highlighted in bold.)

Table 4: Twin/ sibling correlations (within-trait and across-traits) for overall mindfulness and symptoms of insomnia, depression and anxiety

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
|  | Twin 1 |  |  | |  |  |  |
| Twin 2 |  | | Overall Mindf. | Insomnia Symptoms | | Depression  Symptoms | Anxiety  Symptoms |
| Overall Mindf. | MZ | .27 (.07 - .44) | - | | - | - |
| DZ | .20 (.05 - .34) | - | | - | - |
| Sib | .14 (-.14 - .38) | - | | - | - |
|  | Insomnia Symptoms | MZ | .09 (-.05 - .22) | .37 (.19 - .53) | | - | - |
|  | DZ | .07 (-.04 - .18) | .21 (.05 - .35) | | - | - |
|  | Sib | .18 (-.01 - .34) | .12 (-.13 - .34) | | - | - |
|  | Depression  Symptoms | MZ | .23 (.08 - .35) | .32 (.18 - .45) | | .36 (.17 - .52) | - |
|  | DZ | .08 (-.04 - .19) | .10 (-.02 - .21) | | .20 (.05 - .33) | - |
|  | Sib | .09 (-.11 - .28) | .05 (-.14 - .24) | | -.03 (-.27 - .21) | - |
|  | Anxiety  Symptoms | MZ | .16 (.01 - .28) | .32 (.18 - .44) | | .31 (.16 - .43) | .41 (.24 - .54) |
|  | DZ | .09 (-.02 - .20) | .09 (-.02 - .20) | | .11 (-.01 - .22) | .21 (.07 - .34) |
|  | Sib | .24 (-.01 - .42) | .17 (-.05 - .35) | | .18 (-.08 - .37) | .35 (-.01 - .56) |

Note: The 95% confidence intervals are presented in brackets. MZ = monozygotic twins; DZ = dizygotic twins; Sib = sibling pairs; Overall Mindf. = overall score of mindfulness (FFMQ), reverse coded, higher score indicating

lower mindfulness; Insomnia Symptoms = insomnia symptoms (ISQ), higher scores indicating more insomnia symptoms; Depression = symptoms of depression (MFQ), higher scores indicating more symptoms of depression; Anxiety Symptoms = symptoms of anxiety (RCADS), higher scores indicating more symptoms of anxiety. Within-trait correlations are highlighted in grey.

Table 5: Fit statistics of all univariate genetic model fitting analyses

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| *Variable*/  Model | ep | -2LL | df | AIC | ∆ -2LL | ∆ df | *p* | *Parameter Estimates* | | |
| *A (CI)* | *C (CI)* | *E (CI)* |
| *Overall Mindfulness* | | |  |  |  |  |  |  |  |  |
| Saturated | 15 | 6165.79 | 818 | 4519.77 | - | - | - |  |  |  |
| ACE | 4 | 6166.07 | 829 | 4508.07 | 10.29 | 11 | .50 | .17 (0 – .45) | .11 (0 – .32) | .72 (.06 – .88) |
| E | 2 | 6181.56 | 831 | 4519.56 | 15.48 | 2 | < .01 |  |  |  |
| *‘Nonreactivity’* | | | | | | | | | | |
| Saturated | 15 | 4835.75 | 821 | 3193.75 | - | - | - |  |  |  |
| ACE | 4 | 4845.43 | 832 | 3181.43 | 9.68 | 11 | .56 | 0 (0 – .28) | .13 (0 – .24) | .87 (.72 – .98) |
| E | 2 | 4850.46 | 834 | 3182.46 | 14.71 | 2 | .08 |  |  |  |
| *‘Observing’* | | | | | | | | | | |
| Saturated | 15 | 4505.53 | 823 | 2859.54 | - | - | - |  |  |  |
| ACE | 4 | 4516.76 | 834 | 2848.76 | 11.22 | 11 | .32 | .16 (0 – .31) | 0 (0 – .16) | .84 (.69 – 1) |
| E | 2 | 4520.42 | 836 | 2848.42 | 3.66 | 2 | .16 |  |  |  |
| *‘Acting with Awareness’* | | | | | | | | | | |
| Saturated | 15 | 4244.63 | 819 | 2609.63 | - | - | - |  |  |  |
| ACE | 4 | 4260.19 | 830 | 2600.19 | 15.56 | 11 | .16 | .09 (0 – .40) | .12 (0 – .28) | .79 (.60 – .93) |
| E | 2 | 4269.73 | 832 | 2605.73 | 9.54 | 2 | .01 |  |  |  |
| *‘Describing’* | | | | | | | | | |  |
| Saturated | 15 | 4524.38 | 824 | 2876.38 | - | - | - |  |  |  |
| ACE | 4 | 4533.24 | 835 | 2863.24 | 8.86 | 11 | .63 | .28 (.06 – .42) | 0 (0 – .13) | .72 (.58 – .88) |
| E | 2 | 4544.54 | 837 | 2870.54 | 11.30 | 2 | < .01 |  |  |  |
| *‘Nonjudging of inner experience’* | | | | | | | | | | |
| Saturated | 15 | 4503.57 | 820 | 2869.86 | - | - | - |  |  |  |
| ACE | 4 | 4522.29 | 831 | 2860.29 | 18.72 | 11 | .07 | .18 (0 – .33) | 0 (0 – .21) | .82 (.67 – .99) |
| E | 2 | 4526.87 | 833 | 2860.87 | 4.58 | 2 | .10 |  |  |  |
| *Insomnia Symptoms* |  |  |  |  |  |  |  |  |  |  |
| Saturated | 15 | 5033.03 | 819 | 3395.03 | - | - | - |  |  |  |
| ACE | 4 | 5041.81 | 830 | 3381.81 | 8.78 | 11 | .64 | .36 (0 – .50) | 0 (0 – .30) | .64 (.50 – .84) |
| E | 2 | 5059.69 | 832 | 3395.69 | 17.88 | 2 | < .01 |  |  |  |
| *Depression Symptoms* |  |  |  |  |  |  |  |  |  |  |
| Saturated | 15 | 724.47 | 829 | -933.53 | - | - | - |  |  |  |
| ACE | 4 | 736.00 | 840 | -944.00 | 11.53 | 11 | .40 | .33 (.01 – .48) | 0 (0 – .20) | .67 (.52 – .83) |
| E | 2 | 752.27 | 842 | -931.73 | 16.27 | 2 | < .01 |  |  |  |
| *Anxiety Symptoms* |  |  |  |  |  |  |  |  |  |  |
| Saturated | 15 | 6632.89 | 820 | 4992.89 | - | - | - |  |  |  |
| ACE | 4 | 6653.79 | 831 | 4991.79 | 20.89 | 11 | .03 | .36 (0 – .53) | .04 (0 – .33) | .60 (.47 – .77) |
| E | 2 | 6682.30 | 833 | 5016.30 | 28.51 | 2 | < .01 |  |  |  |

Note: All analyses focus on transformed variables, regressed out age and sex. ep = estimated parameters; -2LL = -2\*(log likelihood);

df = degrees of freedom; ∆χ2 and ∆*df* = change in chi-square statistic and corresponding degrees of freedom (computed as the difference in

likelihood and df between each model and the saturated model; AIC = Akaike’s Information Criterion statistic (calculated as χ2 – 2df);

Saturated = full model, A = additive genetic, C = shared environmental; E = non-shared environmental. The fit of the ACE model is

relative to saturated model, the fit of the E model relative to ACE model. The 95% confidence intervals are presented in brackets.

Table 6: Fit statistics for the multivariate genetic model fitting analyses

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
|  | ep | -2LL | df | AIC | ∆ -2LL | ∆ df | *p* |
| *Model: Overall mindfulness, symptoms of insomnia, depression and anxiety* | | | | | | | |
| Saturated | 132 | 17496.51 | 3214 | 11068.51 | - | - | - |
| **ACE Correlated Factors Solution** | **34** | **17616.00** | **3312** | **10992.00** | **119.49** | **98** | **.07** |
| ACE Independent Pathway | 28 | 17623.34 | 3318 | 10987.34 | 126.84 | 104 | .06 |
| ACE Common Pathway | 23 | 17650.15 | 3324 | 11002.15 | 153.64 | 110 | < .01 |

Note: All analyses focus on transformed variables, regressing out age and sex. ep = estimated parameters; -2LL = -2\*(log likelihood); df = degrees of

freedom; ∆χ2 and ∆*df* = change in chi-square statistic and corresponding degrees of freedom (computed as the difference in likelihood and df between each

model and the saturated model; AIC = Akaike’s Information Criterion statistic (calculated as χ2 – 2df); Saturated = full model, A = additive genetic, C =

shared environmental; E = non-shared environmental. The fit statistics of the ACE correlated factors model, the ACE independent pathway model and the

ACE common pathway model are relative to the saturated model. *Model:* Phenotypes overall mindfulness (reverse coded, FFMQ), insomnia symptoms (ISQ),

symptoms of depression (MFQ), anxiety (RCADS). The presented model is highlighted in bold.