**Supplemental Materials**

**The Emergence of Sex Differences in Personality Traits in Early Adolescence: A Cross-Sectional, Cross-Cultural Study**

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**Measurement Invariance Testing**

Researchers have delineated several levels of MI ranging from basic configural invariance to full uniqueness variance (Cheung, 2008; van de Schoot, Lugtig, & Hox, 2012). *Configural invariance* is exhibited when the same number of constructs or factors, and the same pattern of salient loadings, defines the structure of the instrument across groups. *Metric invariance* implies equivalent scale intervals and is present when factor loadings for variables that define the construct are equal across groups. *Scalar invariance* implies that scales have the same origin or zero point across groups and is present when factor loadings and variable intercepts are equal across groups. *Full uniqueness invariance* is demonstrated when factor loadings, variable intercepts and error variances are equal across groups. Although scalar equivalence should be demonstrated across groups to allow a straightforward interpretation of latent means and correlations, it has been argued that valid inferences about the differences between latent means in a model can be made, as long as there are at least two loadings and intercepts that are constrained equal across groups (Byrne et al., 1989). To be able to compare the sum scores or comparable observed means, the observed variables should measure the construct with the same degree of measurement error across groups (i.e., *full uniqueness invariance*, Lugtig, Boeije, & Lensvelt-Mulders, 2011).

In the present study, we used multiple group confirmatory factor analyses to test for MI (Cheung, 2008; van de Schoot, Lugtig, & Hox, 2012). More specifically, MI was tested separately for each personality domain, using the facet scores as indicators of the respective domain. To test for configural equivalence (Model 1) of N across sex, for instance, a CFA model with the 6 observed facets of N as indicators of the latent variable ‘N’ was fitted in males and females simultaneously, without any equality constraints. To examine metric equivalence (Model 2) across sex, only the factor loadings were set equal across sex, and intercepts were allowed to differ between males and females. To asses for scalar equivalence (Model 3) across sex, factor loadings and intercepts were constrained to be equal across sex. To test whether the factors were measured with the same degree of measurement error (Model 4) across groups, error variances were additionally constrained to be equal across groups. Similar models were fitted to the data to examine MI across age groups, cultures and measures. In all multigroup CFAs, parameterization was obtained by fixing the factor variance equal to one, and the factor mean equal to zero.

To evaluate goodness of fit, both comparative (i.e., comparative fit index, CFI) and absolute (i.e., standardized root mean square residual, SRMR) indices were examined. CFI values above .90 indicate a good fit and values above .95 indicate excellent fit (Steiger, 1990). SRMR scores below .10 are considered acceptable and scores below .05 are indicative of good fit (Ullman, 2001). To specify the level of MI, change in model fit was examined between each pair of subsequent models with increasing equality constraints. More specifically, to evaluate metric and scalar equivalence, change in model fit of Model 1 versus Model 2 and Model 2 versus Model 3 was examined, respectively. To examine whether factors are measured with the same degree of measurement error across groups, the fit of Model 4 was compared to that of Model 3. Evaluation of change in model fit is traditionally done by performing a chi square-difference test (Bollen, 1989, Cheung & Rensvold, 2002). However, because such test is susceptible to sample size, change in CFI and SRMR was inspected (Chen, 2007; Cheung & Rensvold, 2002). If the difference in CFI is lower than or equal to .01 and the fit of the more highly constrained model is still adequate, then the more highly constrained model is preferred. Conversely, if the change in CFI exceeds .01, then at least one of the constrained parameters is non-invariant. As SRMR is more sensitive to loading invariance than to the other two levels of invariance, different values are recommended for different levels of invariance tests. More specifically, when testing loading invariance, the change in SRMR should not exceed .030; when testing invariance at the intercept and residual variance levels, the change in SRMR should not exceeds .010 (Chen, 2007). If change in CFI or change in SRMR indicated that model fit worsened significantly, possible sources of misfit were identified by inspecting the modification indices. The parameter constraint found to contribute most to model misfit was released and the model was subsequently re-estimated and re-evaluated. This procedure was repeated until model fit was found to be adequate and change in CFI and SRMR dropped below the cutoff.

*Measurement Invariance Tests Across Sex*

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Personality Factor | Model | Test | Unconstrained versus Constrained Models | χ2 | df | CFI | ΔCFI | SRMR | ΔSRMR |
| N | 1 | Configural equivalence |  | 691.071 | 17 | .934 |  | .051 |  |
|  | 2 | Metric equivalence | 1 versus 2 | 695.570 | 23 | .935 | -.001 | .052 | -.001 |
|  | 3 | Scalar equivalence | 2 versus 3 | 487.045 | 28 | .955 | -.020 | .052 | .000 |
|  | 4 | Full uniqueness equivalence | 3 versus 4 | 491.068 | 34 | .956 | -.001 | .052 | .000 |
| E | 1 | Configural equivalence |  | 675.083 | 17 | .934 |  | .040 |  |
|  | 2 | Metric equivalence | 1 versus 2 | 686.327 | 23 | .934 | .000 | .043 | -.003 |
|  | 3 | Scalar equivalence | 2 versus 3 | 993.483 | 29 | .904 | .030 | .063 | -.020 |
|  | 3bis | Partial scalar equivalence  (Releasing intercept E5: Excitement-Seeking and intercept E2: Gregariousness) | 2 versus 3bis | 743.758 | 27 | .928 | .006 | .053 | -.010 |
|  | 4 | Full uniqueness equivalence | 3bis versus 4 | 753.955 | 33 | .928 | .000 | .054 | -.001 |
| O | 1 | Configural equivalence |  | 147.860 | 17 | .966 |  | .027 |  |
|  | 2 | Metric equivalence | 1 versus 2 | 169.235 | 23 | .962 | .004 | .032 | -.005 |
|  | 3 | Scalar equivalence | 2 versus 3 | 694.045 | 29 | .825 | .137 | .071 | -.039 |
|  | 3bis | Partial scalar equivalence  (Releasing intercept O2: Aesthetics) | 2 versus 3bis | 367.860 | 28 | .911 | .051 | .049 | -.017 |
|  | 3bis2 | Partial scalar equivalence  (Releasing intercept O2: Aesthetics and intercept O3: Feelings) | 2 versus 3bis2 | 193.491 | 27 | .956 | .006 | .035 | -.003 |
|  | 4 | Full uniqueness equivalence | 3bis2 versus 4 | 215.001 | 33 | .952 | .004 | .038 | -.003 |
| A | 1 | Configural equivalence |  | 645.935 | 17 | .933 |  | .047 |  |
|  | 2 | Metric equivalence | 1 versus 2 | 652.505 | 23 | .933 | .000 | .048 | -.001 |
|  | 3 | Scalar equivalence | 2 versus 3 | 756.229 | 29 | .923 | .010 | .057 | -.009 |
|  | 4 | Full uniqueness equivalence | 3 versus 4 | 760.952 | 35 | .923 | .000 | .058 | -.001 |
| C | 1 | Configural equivalence |  | 530.247 | 18 | .974 |  | .023 |  |
|  | 2 | Metric equivalence | 1 versus 2 | 537.401 | 24 | .974 | .000 | .024 | -.001 |
|  | 3 | Scalar equivalence | 2 versus 3 | 730.083 | 30 | .965 | .009 | .061 | -.037 |
|  | 4 | Full uniqueness equivalence | 3 versus 4 | 734.692 | 36 | .965 | .000 | .061 | .000 |

*Note*. N = Neuroticism; E = Extraversion; O = Openness to Experience; A = Agreeableness; C = Conscientiousness.

In all models of N, the error variance between N2: Angry Hostility and N5: Impulsiveness was estimated (though fixed across groups) and in model 3 and 4, the error variance between N5: Impulsiveness and N6: Vulnerability was additionally estimated (though fixed across groups). In all models of E, the error variance between E3: Assertiveness and E4: Activity was estimated (though fixed across groups). In all models of O, the error variance between O2: Aesthetics and O5: Ideas was estimated (though fixed across groups). In all models of A, the error variance between A3: Altruism and A6: Tender-Mindedness was estimated (though fixed across groups).

*Measurement Invariance Tests Across Age Groups*

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Personality Factor | Model | Test | Unconstrained versus Constrained Models | χ2 | df | CFI | ΔCFI | SRMR | ΔSRMR |
| N | 1 | Configural equivalence |  | 707.552 | 53 | .936 |  | .052 |  |
|  | 2 | Metric equivalence | 1 versus 2 | 744.866 | 83 | .935 | -.001 | .059 | -.007 |
|  | 3 | Scalar equivalence | 2 versus 3 | 651.318 | 112 | .947 | -.012 | .063 | -.004 |
|  | 4 | Full uniqueness equivalence | 3 versus 4 | 692.341 | 142 | .946 | -.001 | .066 | -.003 |
| E | 1 | Configural equivalence |  | 681.984 | 53 | .935 |  | .042 |  |
|  | 2 | Metric equivalence | 1 versus 2 | 705.114 | 83 | .936 | .001 | .047 | -.005 |
|  | 3 | Scalar equivalence | 2 versus 3 | 789.519 | 113 | .930 | -.006 | .054 | -.007 |
|  | 4 | Full uniqueness equivalence | 3 versus 4 | 832.969 | 143 | .929 | -.001 | .058 | -.004 |
| O | 1 | Configural equivalence |  | 205.783 | 53 | .960 |  | .032 |  |
|  | 2 | Metric equivalence | 1 versus 2 | 270.144 | 83 | .950 | .010 | .044 | -.012 |
|  | 3 | Scalar equivalence | 2 versus 3 | 477.442 | 113 | .903 | .047 | .060 | -.016 |
|  | 3bis | Partial scalar equivalence (Release intercept O1: Fantasy) | 2 versus 3bis | 371.250 | 108 | .930 | .020 | .054 | -.010 |
|  | 3bis2 | Partial scalar equivalence (Release intercept O1: Fantasy and intercept O6: Values) | 2 versus 3bis2 | 326.215 | 103 | .941 | .009 | .050 | -.006 |
|  | 4 | Full uniqueness equivalence | 3bis2 versus 4 | 443.256 | 133 | .938 | .003 | .066 | -.016 |
| A | 1 | Configural equivalence |  | 660.713 | 53 | .935 |  | .048 |  |
|  | 2 | Metric equivalence | 1 versus 2 | 699.535 | 83 | .934 | .001 | .054 | -.006 |
|  | 3 | Scalar equivalence | 2 versus 3 | 845.685 | 113 | .922 | .012 | .064 | -.010 |
|  | 3bis | Partial scalar equivalence (Release intercept A1: Trust) | 2 versus 3bis | 772.034 | 108 | .929 | .005 | .062 | -.008 |
|  | 4 | Full uniqueness equivalence | 3bis versus 4 | 814.407 | 138 | .928 | .001 | .065 | -.003 |
| C | 1 | Configural equivalence |  | 592.581 | 54 | .973 |  | .025 |  |
|  | 2 | Metric equivalence | 1 versus 2 | 632.387 | 84 | .972 | .001 | .032 | -.007 |
|  | 3 | Scalar equivalence | 2 versus 3 | 709.739 | 114 | .970 | .002 | .051 | -.019 |
|  | 4 | Full uniqueness equivalence | 3 versus 4 | 785.930 | 144 | .968 | .002 | .055 | -.004 |

*Note*. N = Neuroticism; E = Extraversion; O = Openness to Experience; A = Agreeableness; C = Conscientiousness.

In all models of N, the error variance between N2: Angry Hostility and N5: Impulsiveness was estimated (though fixed across groups) and in model 3 and 4, the error variance between N5: Impulsiveness and N6: Vulnerability was additionally estimated (though fixed across groups). In all models of E, the error variance between E3: Assertiveness and E4: Activity was estimated (though fixed across groups). In all models of O, the error variance between O2: Aesthetics and O5: Ideas was estimated (though fixed across groups). In all models of A, the error variance between A3: Altruism and A6: Tender-Mindedness was estimated (though fixed across groups).

*Measurement Invariance Tests Across Cultures*

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Personality Factor | Model | Test | Unconstrained versus Constrained Models | χ2 | df | CFI | ΔCFI | SRMR | ΔSRMR |
| N | 1 | Configural equivalence |  | 1141.638 | 206 | .917 |  | .066 |  |
|  | 2 | Metric equivalence | 1 versus 2 | 1384.726 | 338 | .907 | .010 | .090 | -.024 |
|  | 3 | Scalar equivalence | 2 versus 3 | 1384.726 | 470 | .918 | .009 | .090 | .000 |
|  | 4 | Full uniqueness equivalence | 3 versus 4 | 1878.853 | 602 | .886 | .032 | .091 | -.001 |
| E | 1 | Configural equivalence |  | 868.008 | 205 | .938 |  | .047 |  |
|  | 2 | Metric equivalence | 1 versus 2 | 784.393 | 335 | .958 | -.020 | .077 | -.030 |
|  | 3 | Scalar equivalence | 2 versus 3 | 784.393 | 467 | .970 | -.012 | .077 | .000 |
|  | 4 | Full uniqueness equivalence | 3 versus 4 | 1617.390 | 600 | .905 | .065 | .091 | -.014 |
| O | 1 | Configural equivalence |  | 458.766 | 206 | .942 |  | .048 |  |
|  | 2 | Metric equivalence | 1 versus 2 | 824.714 | 338 | .888 | .054 | .090 | -.042 |
|  | 2bis | Partial metric equivalence (Releasing factor loading of O1: Fantasy for Estonia and Argentina) | 1 versus 2bis | 790.664 | 336 | .895 | .047 | .088 | -.040 |
|  | 2bis2 | Partial metric equivalence (Releasing factor loading of O1: Fantasy for Estonia and Argentina and factor loading O6: Values for USA and Portugal) | 1 versus 2bis2 | 767.668 | 334 | .935 | .007 | .086 | -.038 |
|  | 3 | Scalar equivalence | 2bis2 versus 3 | 767.668 | 466 | .930 | .005 | .086 | .000 |
|  | 4 | Full uniqueness equivalence |  | 1018.627 | 598 | .903 | .027 | .087 | -.001 |
| A | 1 | Configural equivalence |  | 975.315 | 206 | .923 |  | .056 |  |
|  | 2 | Metric equivalence | 1 versus 2 | 993.267 | 337 | .935 | -.012 | .083 | -.027 |
|  | 3 | Scalar equivalence | 2 versus 3 | 993.267 | 469 | .948 | -.013 | .083 | .000 |
|  | 4 | Full uniqueness equivalence | 3 versus 4 | 1323.700 | 601 | .928 | .020 | .085 | -.002 |
| C | 1 | Configural equivalence |  | 1019.216 | 207 | .961 |  | .032 |  |
|  | 2 | Metric equivalence | 1 versus 2 | 1138.933 | 339 | .962 | -.001 | .050 | -.018 |
|  | 3 | Scalar equivalence | 2 versus 3 | 1138.933 | 471 | .968 | -.006 | .050 | .000 |
|  | 4 | Full uniqueness equivalence | 3 versus 4 | 1610.927 | 603 | .952 | .016 | .054 | -.004 |

*Note*. N = Neuroticism; E = Extraversion; O = Openness to Experience; A = Agreeableness; C = Conscientiousness.

In all models of N, the error variance between N2: Angry Hostility and N5: Impulsiveness was estimated (though fixed across groups). In all models of E, the error variance between E1: Warmth and E6: Excitement Seeking and between E3: Assertiveness and E4: Activity was estimated (though fixed across groups), and in models 2-4, the error variance between E1: Warmth and E5: Excitement Seeking, and between E4: Activity and E6: Excitement Seeking was additionally estimated (though fixed across groups). In all models of O, the error variance between O2: Aesthetics and O5: Ideas was estimated (though fixed across groups). In all models of A, the error variance between A3: Altruism and A6: Tender-Mindedness was estimated (though fixed across groups), and in models 2-4, the error variance between A1: Trust and A3: Altruism was additionally estimated (though fixed across groups).

*Measurement Invariance* *Tests Across Measures (NEO-PI-R versus NEO-PI-3)*

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Personality Factor | Model | Test | Unconstrained versus Constrained Models | χ2 | df | CFI | ΔCFI | SRMR | ΔSRMR |
| N | 1 | Configural equivalence |  | 1369.320 | 17 | .930 |  | .053 |  |
|  | 2 | Metric equivalence | 1 versus 2 | 1385.819 | 23 | .929 | .001 | .055 | -.002 |
|  | 3 | Scalar equivalence | 2 versus 3 | 1385.819 | 29 | .929 | .000 | .055 | .000 |
|  | 4 | Full uniqueness equivalence | 3 versus 4 | 1409.287 | 35 | .929 | .000 | .055 | .000 |
| E | 1 | Configural equivalence |  | 1257.396 | 17 | .936 |  | .040 |  |
|  | 2 | Metric equivalence | 1 versus 2 | 1260.813 | 23 | .936 | .000 | .041 | -.001 |
|  | 3 | Scalar equivalence | 2 versus 3 | 1260.813 | 29 | .936 | .000 | .041 | .000 |
|  | 4 | Full uniqueness equivalence | 3 versus 4 | 1263.887 | 35 | .936 | .000 | .041 | .000 |
| O | 1 | Configural equivalence |  | 555.917 | 18 | .923 |  | .035 |  |
|  | 2 | Metric equivalence | 1 versus 2 | 558.370 | 24 | .923 | .000 | .036 | -.001 |
|  | 3 | Scalar equivalence | 2 versus 3 | 558.370 | 30 | .924 | -.001 | .036 | .000 |
|  | 4 | Full uniqueness equivalence | 3 versus 4 | 559.864 | 36 | .925 | -.001 | .036 | .000 |
| A | 1 | Configural equivalence |  | 1839.17 | 18 | .905 |  | .052 |  |
|  | 2 | Metric equivalence | 1 versus 2 | 1846.41 | 24 | .905 | .000 | .053 | -.001 |
|  | 3 | Scalar equivalence | 2 versus 3 | 1846.410 | 30 | .905 | .000 | .053 | .000 |
|  | 4 | Full uniqueness equivalence | 3 versus 4 | 1859.043 | 36 | .905 | .000 | .053 | .000 |
| C | 1 | Configural equivalence |  | 966.969 | 18 | .976 |  | .022 |  |
|  | 2 | Metric equivalence | 1 versus 2 | 971.538 | 24 | .976 | .000 | .023 | -.001 |
|  | 3 | Scalar equivalence | 2 versus 3 | 971.538 | 30 | .976 | .000 | .023 | .000 |
|  | 4 | Full uniqueness equivalence | 3 versus 4 | 989.997 | 36 | .975 | .001 | .023 | .000 |

*Note*. N = Neuroticism; E = Extraversion; O = Openness to Experience; A = Agreeableness; C = Conscientiousness.

In all models of N, the error variance between N2: Angry Hostility and N5: Impulsiveness was estimated (though fixed across groups). In all models of E, the error variance between E3: Assertiveness and E4: Activity was estimated (though fixed across groups).

**Mean Differences Between Female and Male Adolescents in 23 Cultures on the Five NEO–PI–3 Domains and 30 Facets**

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| NEO–PI–3 | Argentina |  | Australia |  | Chile |  | China |  | Croatia |  | Czech Republic |  | Estonia |  | Hong Kong |  | Iran |  | Japan |  | Malaysia |  | Peru |  | Poland |  |
| N | .23 |  | .11 |  | .20 |  | -.05 |  | -.04 |  | -.12 |  | .50 | \*\*\* | .30 | \* | .31 | \* | .16 |  | .20 |  | .01 |  | .13 |  |
| E | .38 | \*\* | .21 |  | .25 |  | .19 |  | .10 |  | .41 | \*\* | .05 |  | .12 |  | .18 |  | -.05 |  | -.06 |  | .16 |  | .17 |  |
| O | .33 | \* | .21 |  | .32 | \* | .14 |  | .22 |  | .59 | \*\*\* | .29 | \* | -.05 |  | .48 | \*\*\* | .23 |  | .28 | \* | -.07 |  | .31 | \*\* |
| A | .12 |  | .02 |  | .17 |  | .16 |  | .29 | \* | .33 | \*\* | .36 | \* | .28 |  | -.10 |  | .21 |  | .25 |  | -.08 |  | .03 |  |
| C | .26 |  | .05 |  | .01 |  | .39 | \*\* | .47 | \*\* | .53 | \*\*\* | .09 |  | .25 |  | .15 |  | .19 |  | .29 | \* | .26 |  | .34 | \*\* |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| N1 | .31 | \* | .12 |  | .15 |  | .27 |  | .14 |  | .10 |  | .53 | \*\*\* | .44 | \*\* | .36 | \*\* | .17 |  | .49 | \*\*\* | –.04 |  | .13 |  |
| N2 | .24 |  | .21 |  | .05 |  | –.17 |  | .04 |  | –.12 |  | .38 | \*\* | .20 |  | .36 | \*\* | –.10 |  | .15 |  | .14 |  | .12 |  |
| N3 | .00 |  | –.04 |  | .17 |  | –.03 |  | –.13 |  | –.14 |  | .50 | \*\*\* | .24 |  | .30 | \* | .31 | \* | –.07 |  | –.11 |  | .18 |  |
| N4 | –.05 |  | .04 |  | .03 |  | –.03 |  | –.10 |  | –.12 |  | .33 | \* | .11 |  | .13 |  | .25 | \* | –.01 |  | –.09 |  | .08 |  |
| N5 | .20 |  | .02 |  | .12 |  | –.25 |  | –.12 |  | –.13 |  | .23 |  | .10 |  | .07 |  | –.10 |  | –.03 |  | –.02 |  | .05 |  |
| N6 | .29 | \* | .18 |  | .36 | \* | –.02 |  | –.03 |  | –.10 |  | .32 | \* | .26 |  | .20 |  | .16 |  | .19 |  | .12 |  | –.01 |  |
| E1 | .31 | \* | .12 |  | .26 |  | .47 | \*\* | .30 | \* | .47 | \*\* | .26 |  | .33 | \* | .22 |  | .02 |  | –.02 |  | .14 |  | .15 |  |
| E2 | .47 | \*\* | .29 | \* | .27 |  | .53 | \*\*\* | .31 | \* | .55 | \*\*\* | .21 |  | .33 | \* | .25 |  | .11 |  | .09 |  | .01 |  | .36 | \*\* |
| E3 | .37 | \*\* | .21 |  | .21 |  | .26 |  | .20 |  | .33 | \* | –.26 |  | –.04 |  | .21 |  | –.04 |  | .10 |  | .17 |  | .19 |  |
| E4 | .20 |  | .11 |  | .24 |  | .06 |  | –.01 |  | .16 |  | .14 |  | .20 |  | .02 |  | –.18 |  | –.23 |  | .12 |  | .12 |  |
| E5 | –.16 |  | –.01 |  | –.10 |  | –.41 | \*\* | –.70 | \*\*\* | –.16 |  | –.41 | \*\* | –.38 | \* | –.10 |  | –.26 | \* | –.48 | \*\*\* | –.02 |  | –.23 | \* |
| E6 | .39 | \*\* | .19 |  | .19 |  | .05 |  | .29 | \* | .47 | \*\* | .34 | \* | .12 |  | .14 |  | .08 |  | .23 |  | .25 |  | .15 |  |
| O1 | .28 | \* | .14 |  | .22 |  | .15 |  | .05 |  | .19 |  | .30 | \* | –.21 |  | .15 |  | .27 | \* | –.35 | \* | –.06 |  | –.01 |  |
| O2 | .33 | \* | .57 | \*\*\* | .56 | \*\*\* | .69 | \*\*\* | .47 | \*\* | .80 | \*\*\* | .57 | \*\*\* | .38 | \* | .68 | \*\*\* | .56 | \*\*\* | .48 | \*\*\* | .01 |  | .53 | \*\*\* |
| O3 | .49 | \*\*\* | .36 | \*\* | .27 |  | .19 |  | .51 | \*\*\* | .50 | \*\*\* | .64 | \*\*\* | .41 | \*\* | .59 | \*\*\* | .09 |  | .40 | \*\* | .10 |  | .32 | \*\* |
| O4 | .16 |  | .01 |  | .23 |  | –.04 |  | .16 |  | .36 | \* | –.11 |  | –.02 |  | .12 |  | .12 |  | .01 |  | –.02 |  | .17 |  |
| O5 | –.01 |  | –.30 | \* | –.03 |  | –.32 | \* | –.13 |  | .22 |  | –.17 |  | –.43 | \*\* | –.13 |  | –.31 | \* | .09 |  | –.19 |  | .07 |  |
| O6 | .09 |  | .03 |  | .00 |  | –.20 |  | –.09 |  | .25 |  | –.12 |  | –.25 |  | .27 | \* | .04 |  | –.02 |  | –.05 |  | .08 |  |
| A1 | .20 |  | .12 |  | .04 |  | –.05 |  | .25 |  | .23 |  | .49 | \*\*\* | .16 |  | .03 |  | .01 |  | .08 |  | –.05 |  | .16 |  |
| A2 | .12 |  | –.11 |  | .03 |  | .01 |  | .19 |  | –.11 |  | .21 |  | .22 |  | .01 |  | .10 |  | .25 |  | .00 |  | .01 |  |
| A3 | .13 |  | –.05 |  | .16 |  | .33 | \* | .37 | \* | .38 | \*\* | .28 | \* | .22 |  | –.26 |  | .04 |  | –.03 |  | –.01 |  | .12 |  |
| A4 | –.28 | \* | –.12 |  | –.06 |  | .20 |  | .07 |  | .14 |  | .11 |  | .04 |  | –.25 |  | .21 |  | .18 |  | –.17 |  | –.18 |  |
| A5 | .08 |  | .22 |  | .22 |  | .07 |  | .01 |  | .20 |  | .14 |  | .27 |  | –.18 |  | .32 | \*\* | .26 |  | –.17 |  | –.16 |  |
| A6 | .33 | \* | .04 |  | .37 | \* | .16 |  | .43 | \*\* | .60 | \*\*\* | .47 | \*\* | .35 | \* | .26 |  | .19 |  | .16 |  | .09 |  | .24 | \* |
| C1 | .13 |  | .02 |  | –.18 |  | .23 |  | .25 |  | .34 | \* | –.23 |  | .08 |  | .08 |  | .01 |  | –.01 |  | .13 |  | .19 |  |
| C2 | .27 |  | .04 |  | .22 |  | .44 | \*\* | .51 | \*\*\* | .59 | \*\*\* | .21 |  | .36 | \* | .30 | \* | .18 |  | .39 | \*\* | .39 | \* | .29 | \*\* |
| C3 | .37 | \*\* | .09 |  | –.04 |  | .45 | \*\* | .47 | \*\* | .43 | \*\* | .31 | \* | .43 | \*\* | .06 |  | .41 | \*\* | .29 | \* | .08 |  | .28 | \* |
| C4 | .37 | \*\* | .09 |  | –.03 |  | .26 |  | .37 | \* | .56 | \*\*\* | .02 |  | .04 |  | .13 |  | .06 |  | .34 | \* | .26 |  | .47 | \*\*\* |
| C5 | .25 |  | –.03 |  | .02 |  | .29 |  | .45 | \*\* | .46 | \*\* | .09 |  | .23 |  | .16 |  | .06 |  | .23 |  | .15 |  | .28 | \* |
| C6 | –.08 |  | .05 |  | .04 |  | .23 |  | .39 | \*\* | .32 | \* | .02 |  | .16 |  | .00 |  | .26 | \* | .19 |  | .18 |  | .18 |  |

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| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| NEO–PI–3 | Portugal |  | Puerto Rico |  | Russia |  | Serbia |  | Slovak Republic |  | South Korea |  | Thailand |  | Turkey |  | Uganda |  | USA |  |
| N | .05 |  | .09 |  | .50 | \*\* | .12 |  | .27 | \* | .14 |  | .19 |  | .19 |  | -.05 |  | .24 | \*\* |
| E | .29 | \* | -.10 |  | -.01 |  | -.16 |  | .23 |  | .00 |  | -.26 |  | .27 |  | -.20 |  | .19 | \* |
| O | .26 |  | .10 |  | .32 | \* | .42 | \*\* | .57 | \*\*\* | .19 |  | .07 |  | .25 |  | -.32 | \* | .29 | \*\*\* |
| A | .17 |  | -.04 |  | .16 |  | .06 |  | .28 | \* | .12 |  | .13 |  | .04 |  | .13 |  | .08 |  |
| C | .26 |  | .07 |  | .17 |  | .41 | \*\* | .44 | \*\* | .32 |  | .23 |  | .23 |  | .23 |  | .29 | \*\*\* |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| N1 | .22 |  | –.06 |  | .67 | \*\*\* | .37 | \* | .40 | \*\* | .24 |  | .47 | \*\* | .26 |  | .11 |  | .45 | \*\*\* |
| N2 | –.01 |  | .39 | \* | .11 |  | .06 |  | .21 |  | –.01 |  | –.06 |  | –.02 |  | –.03 |  | .11 |  |
| N3 | .02 |  | –.02 |  | .44 | \*\* | .25 |  | .38 | \*\* | .22 |  | .24 |  | .30 |  | –.05 |  | .18 | \* |
| N4 | .06 |  | .03 |  | .40 | \*\* | –.05 |  | –.04 |  | .19 |  | .33 | \* | .21 |  | –.02 |  | .22 | \*\* |
| N5 | –.13 |  | .09 |  | .15 |  | –.22 |  | –.07 |  | –.06 |  | –.12 |  | –.04 |  | –.11 |  | –.14 |  |
| N6 | .02 |  | –.07 |  | .40 | \*\* | .03 |  | .27 | \* | .04 |  | .04 |  | .17 |  | –.11 |  | .27 | \*\* |
| E1 | .24 |  | –.09 |  | –.05 |  | –.06 |  | .38 | \*\* | .11 |  | –.05 |  | .24 |  | –.14 |  | .18 | \* |
| E2 | .43 | \*\* | –.09 |  | .02 |  | –.05 |  | .34 | \* | .05 |  | .00 |  | .43 | \*\* | –.12 |  | .37 | \*\*\* |
| E3 | .19 |  | –.33 |  | –.01 |  | –.05 |  | .15 |  | –.01 |  | –.18 |  | .05 |  | .01 |  | .12 |  |
| E4 | .09 |  | .05 |  | .00 |  | –.15 |  | .16 |  | .08 |  | –.39 | \* | .36 | \* | .05 |  | .10 |  |
| E5 | –.06 |  | .07 |  | –.27 |  | –.31 | \* | –.32 | \* | –.26 |  | –.48 | \*\* | .11 |  | –.52 | \*\*\* | –.29 | \*\*\* |
| E6 | .31 | \* | –.02 |  | .30 | \* | .02 |  | .24 |  | .06 |  | .03 |  | .03 |  | –.02 |  | .33 | \*\*\* |
| O1 | .20 |  | .11 |  | .04 |  | .00 |  | –.01 |  | –.02 |  | .29 |  | –.07 |  | –.38 | \* | –.07 |  |
| O2 | .37 | \* | .06 |  | .70 | \*\*\* | .59 | \*\*\* | .72 | \*\*\* | .38 | \* | .21 |  | .42 | \*\* | .11 |  | .58 | \*\*\* |
| O3 | .21 |  | .13 |  | .11 |  | .39 | \*\* | .90 | \*\*\* | .38 | \* | –.32 | \* | .40 | \*\* | .08 |  | .44 | \*\*\* |
| O4 | .07 |  | .00 |  | .25 |  | .24 |  | .13 |  | .28 |  | –.12 |  | .14 |  | –.36 | \* | .17 | \* |
| O5 | .06 |  | .03 |  | .05 |  | .16 |  | .15 |  | –.13 |  | .08 |  | .05 |  | –.37 | \* | –.13 |  |
| O6 | .03 |  | –.03 |  | –.16 |  | .09 |  | –.03 |  | –.14 |  | –.08 |  | –.02 |  | –.13 |  | .13 |  |
| A1 | .26 |  | –.20 |  | .01 |  | –.02 |  | .24 |  | –.06 |  | –.16 |  | .08 |  | –.03 |  | .06 |  |
| A2 | .18 |  | .00 |  | .15 |  | .09 |  | .14 |  | .19 |  | .16 |  | –.16 |  | .22 |  | –.01 |  |
| A3 | .09 |  | –.08 |  | .25 |  | –.12 |  | .38 | \*\* | –.02 |  | .17 |  | .01 |  | –.02 |  | –.04 |  |
| A4 | .04 |  | –.12 |  | .02 |  | .31 | \* | .04 |  | .03 |  | .12 |  | –.03 |  | .22 |  | –.03 |  |
| A5 | –.15 |  | .30 |  | –.06 |  | –.07 |  | .10 |  | .22 |  | .01 |  | .00 |  | .14 |  | .16 |  |
| A6 | .38 | \* | –.01 |  | .43 | \*\* | .06 |  | .43 | \*\*\* | .15 |  | .22 |  | .29 |  | –.01 |  | .27 | \*\* |
| C1 | –.02 |  | .10 |  | .10 |  | .18 |  | .27 | \* | .23 |  | .02 |  | .16 |  | .04 |  | .09 |  |
| C2 | .51 | \*\*\* | –.01 |  | .14 |  | .55 | \*\*\* | .41 | \*\* | .23 |  | .33 | \* | .10 |  | .49 | \*\* | .32 | \*\*\* |
| C3 | .23 |  | .01 |  | .32 | \* | .37 | \* | .57 | \*\*\* | .31 |  | .19 |  | .14 |  | .16 |  | .24 | \*\* |
| C4 | .21 |  | .22 |  | –.03 |  | .28 |  | .34 | \* | .26 |  | .20 |  | .25 |  | .05 |  | .19 | \* |
| C5 | .22 |  | .02 |  | .08 |  | .34 | \* | .43 | \*\*\* | .30 |  | .14 |  | .26 |  | .21 |  | .33 | \*\*\* |
| C6 | .02 |  | .03 |  | .22 |  | .33 | \* | .24 |  | .32 |  | .21 |  | .24 |  | .24 |  | .28 | \*\* |

*Note*. N = Neuroticism; E = Extraversion; O = Openness to Experience; A = Agreeableness; C = Conscientiousness; N1 – N6 = facets of N; E1 – E6 = facets of E; O1 – O6 = facets of O; A1 – A6 = facets of A; C1 – C6 = facets of C.

\* *p* < .05. \*\* *p* < .01. \*\*\* *p* < .001.

**Proportion reduction in variance (PRV)**

In multilevel analyses, the proportional reduction in variance statistic is generally used as an effect size estimate to quantify the effect of explanatory variables on the response variable (Raudenbush & Bryk, 2002; Singer & Willett, 2003). This multilevel effect size is analogous to the *R*2 statistic in ordinary multiple regression analysis.

Applied to the current study, the variance reduction statistic can be computed based on the following general equation:

PRV = (*Var*NoPredictor−*Var*Predictor)/ *VarNoPredictor*

where PRV is the proportion reduction in variance, and ‘*Var*’ represent the level-1 variance. The “NoPredictor” subscript represents the variance estimate from the model prior to adding sex as a predictor, and the “Predictor” subscript represents the corresponding variance from a model that contains sex as a predictor variable. In the current study, the PRV reflects how much Level-1 variance in the respective personality trait is explained by sex.

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