Measurement invariance analyses were conducted to explore whether latent constructs of well-being are equal across sex. First, a configural invariance analysis was done to indicate whether indicators are related to the same latent construct across groups. The model fit for this analysis was good, with an insignificant χ2, CFI and TLI above 1.0, large AIC and BIC, and low RMSEA (Table 1). In both males and females, all indicators were related to the latent construct of well-being (Fig. 1). Next, a metric invariance analysis was done to indicate whether factor loadings of the indicators are equal between males and females. The fit for this model was good χ2, CFI and TLI above 1.0, large AIC and BIC, and low RMSEA (table 1). This model indicates that the factor loadings to the indicators are equal across males and females (Fig. 2). Lastly, a scalar invariance analysis was done to indicate whether intercepts of the indicators are equal between males and females. The fit for this model was good χ2, CFI and TLI above 1.0, large AIC and BIC, and low RMSEA (table 1). This model indicates that there is no gender difference in the latent variable of well-being (b = 0.009, SE = 0.12, *p* = .935, z = 0.08).

**Table 1: Model fit parameters for well-being**

|  |  |  |  |
| --- | --- | --- | --- |
|  | Configural Model | Metric Model | Scalar Model |
| npar | 24 | 21 | 18 |
| chisq | 2.748 | 3.712 | 4.856 |
| df | 4 | 7 | 10 |
| pvalue | 0.601 | 0.812 | 0.901 |
| cfi | 1 | 1 | 1 |
| tli | 1.003 | 1.004 | 1.005 |
| aic | 6304.074 | 6299.038 | 6294.183 |
| bic | 6396.665 | 6380.055 | 6363.625 |
| bic2 | 6320.528 | 6313.435 | 6306.523 |
| rmsea | 0 | 0 | 0 |
| rmsea.ci.lower | 0 | 0 | 0 |
| rmsea.ci.upper | 0.096 | 0.058 | 0.035 |
| rmsea.pvalue | 0.766 | 0.929 | 0.976 |

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**Figure 1. Configural invariance model for well-being.**

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**Figure 2. Metric invariance model for well-being.**

Measurement invariance analyses were conducted to explore whether latent constructs of sports are equal across sex. First, a configural invariance analysis was done to indicate whether indicators are related to the same latent construct across groups. The model fit for this analysis was good, with an insignificant χ2, CFI and TLI that were close to 1.0, large AIC and BIC, and low RMSEA (Table 1). In both males and females, all indicators were related to the latent construct of sports (Fig. 3). Next, a metric invariance analysis was done to indicate whether factor loadings of the indicators are equal between males and females. The fit for this model was poor with a significant χ2, CFI and TLI below 1.0, and high RMSEA (table 1). A partial metric model was run that alleviated all of these issues, while still keeping the AIC and BIC high. This model indicates that the factor loadings for the SP\_COMP, SP\_ABL1, and SP\_ABL2 indicators loaded equally onto the latent factor of sports for males and females. The SP\_INTER indicator, however, loaded more strongly for males, than for females (Fig. 4). Lastly, a scalar invariance analysis was done to indicate whether intercepts of the indicators are equal between males and females. The fit for this model was poor with a significant χ2, CFI and TLI below 1.0, and a high RMSEA (table 1). A partial scalar invariance model was run that alleviated these issues, with a non-significant χ2, slightly higher CFI and TLI, high AIC and BIC, and a low RMSEA. This model indicates that there is no gender difference in the latent variable of sports (b = -0.09, SE = 0.11, *p* = .427, z = -0.79).

**Table 2. Model fit parameters for sports**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  | Configural Model | Metric Model | Partial Metric Model | Scalar Model | Partial Scalar Model |
| npar | 24 | 21 | 22 | 18 | 20 |
| chisq | 4.853 | 22.739 | 9.469 | 76.598 | 11.56 |
| df | 4 | 7 | 6 | 10 | 8 |
| pvalue | 0.303 | 0.002 | 0.149 | 0 | 0.172 |
| cfi | 0.999 | 0.982 | 0.996 | 0.923 | 0.996 |
| tli | 0.997 | 0.969 | 0.992 | 0.908 | 0.994 |
| aic | 6095.099 | 6106.985 | 6095.715 | 6154.844 | 6093.806 |
| bic | 6187.69 | 6188.001 | 6180.59 | 6224.287 | 6170.964 |
| bic2 | 6111.553 | 6121.382 | 6110.798 | 6167.184 | 6107.517 |
| rmsea | 0.035 | 0.113 | 0.057 | 0.195 | 0.05 |
| rmsea.ci.lower | 0 | 0.063 | 0 | 0.156 | 0 |
| rmsea.ci.upper | 0.124 | 0.167 | 0.123 | 0.237 | 0.11 |
| rmsea.pvalue | 0.509 | 0.022 | 0.365 | 0 | 0.435 |

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**Figure 3. Configural invariance model for sports.**

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**Figure 4. Partial metric invariance model for sports.**

Finally, a moderation model was run to test for differences between males and females between the latent factors of sports and well-being. The fit for this unconstrained model was poor, with a significant χ2, CFI and TLI below 1.0, and a RMSEA higher than 0.1. The fit for the moderation model with constrained factor loadings was better with a non-significant χ2, CFI and TLI close to 1.0, large AIC and BIC, and a low RMSEA. A χ2 test between these two models reveals that they are significantly different (χ2 = 156.96, *p* , .001). Considering that the constrained model had a better fit, we conclude that gender is not a moderator between sports and well-being.

**Table 3. Fit parameters for moderation model.**

|  |  |  |
| --- | --- | --- |
|  | Unconstrained | Constrained |
| npar | 34 | 39 |
| chisq | 207.794 | 50.848 |
| df | 54 | 49 |
| pvalue | 0 | 0.401 |
| cfi | 0.932 | 0.999 |
| tli | 0.929 | 0.999 |
| aic | 12435.431 | 12288.484 |
| bic | 12566.601 | 12438.944 |
| bic2 | 12458.741 | 12315.222 |
| rmsea | 0.128 | 0.015 |
| rmsea.ci.lower | 0.109 | 0 |
| rmsea.ci.upper | 0.146 | 0.052 |
| rmsea.pvalue | 0 | 0.937 |

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**Figure 5. Moderation of sports and well-being with constrained loadings.**

**Supplementary Table 1. Correlation matrix of indicators, with means and standard deviations.**

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