**Latent Variable Model Write-up (multi-group measurement invariance analysis)**

**Analysis Plan**

A multi-group structural equation model was conducted to test the following study hypotheses:

H1: One’s perceived health is associated with one’s mood.

H2: That the relationship is consistent across sexes.

All variables were scored on a continuous scale and were normally distributed, apart from biological sex which was coded (0 = males, 1 = females). A path model is presented in Figure 1. Analyses were conducted using Mplus 7.4 (Muthén & Muthén, 1998–2012). Perceived health was modeled as a single indicator latent variable, and Mood was modeled as a latent variable composed of three indicators, i.e., angry, anxious, and sad.

Hypothesis 1 was tested by adding a structural covariance path between the perceived health and mood latent variables. An a priori reliability estimate of .87 was used to specify the measurement error in the perceived health observed variable.

Hypothesis 2 was tested through a series of invariance tests following recommendations by Kline (2011). This procedure involves adding increasingly more constraints at each level. Specifically, we tested whether the model was invariant between males and females on the configural, metric, and scalar levels.

To evaluate overall model fit, we used model fit criteria suggested by Hu and Bentler (1999) including the comparative fit index (CFI) > .95, Tucker–Lewis Index (TLI) > .95, root mean square error of approximation (RMSEA) < .06, and standardized root mean square residual (SRMR) < .08. In addition, we evaluated the Chi-Square test of model fit, where a non-significant test indicates perfect fit of the model to the data. The best fitting model was selected using the model fit indices described above and we only report on the best fitting model (additional models are available at the request of the first author).

**Results**

*Overall Model Fit.* The measurement model specifying the two latent variables and the covariance between them resulted in excellent model fit. The Chi-Square test of model fit was not significant (χ2(2) = 1.54, p = .46). Overall fit indices were all in the excellent range (RMSEA = .00 [.00, .05], p = .94; CFI = 1.00; SRMR < .01). The factor loadings for mood ranged from 1 (fixed) to 1.35 and were all statistically significant.

*Measurement invariance testing* indicated configural and metric invariance was present across sexes, but not scalar invariance (Configural: χ2(24) = 7.75, p = .10; Metric: χ2(22) = 8.69, p = .19; Scalar: χ2(20) = 25.45, p = .001; Metric against Configural: χ2(2) = .94, p = .62; Scalar against Configural: χ2(4) = 17.70, p < .01; Scalar against Metric: χ2(2) = 16.75, p < .01). This indicates that the factor structure and loadings are invariant by sex, but the intercepts vary.

*Perceived health and mood.* The final metric-invariant SEM indicated that perceived health and mood are negatively associated in both males and females (Males: Covhealth,mood = -.11, p < .01; Females: Covhealth,mood = -.16, p < .01), with the relationship being slightly stronger among females.

**Discussion**

The present study showed that perceived health and mood can be represented with latent variables. Moreover, our results support a negative association between one’s perceived health and mood. The indicators of the mood variable are more akin to indices of negative mood. As such, the negative association indicates that the greater one’s perceived health the less negative mood he or she experiences. This relationship did not differ for males vs. females. Together, the present study would suggest that treatments that improve perceived health may also improve mood or that treatments that improve mood may also improve perceived health. Further, there may be a slightly larger effect for females than for males.