Results

Jimmy

Results

Results

In this section, we provided and summarized the results of using the three methods of estimating The moderating effect of self-esteem on the relationship between PED and depression. For model fit indexes, the matched-pair UPI model showed a marginally acceptable fit with $\chi^2(df) = 4068.36(399)$, RMSEA = .06, CFI = .89, SRMR = .04, wherein the χ^2 was significant with $p < .000$. Theoretically a significant χ^2 represented indicated that the matched-pair UPI model did not fit the data well, implying that there were significant discrepancies between the observed and model-implied covariance matrices. However, the sensitivity of χ^2 to sample size has been a well-known issue such that even trivial discrepancies between two matrices could result in significant index, especially with a large dataset (Hu & Bentler, 1999). As for the other indexes, only CFI was slightly below the acceptable value .90, RMSEA and SRMR were below the acceptable values .08 and .05, respectively (Browne & Cudeck, 1993; Jöreskog & Sörbom, 1993; Bentler & Hu, 2009). Overall, matched-pair UPI was a reasonably acceptable method in terms of model fit. The model fit evaluation was not meaningful for RAPI and 2S-PA-Int in this study because their models were just-identified, meaning that fit indices were not informative as there were no discrepancies between observed and model-implied covariance matrices. Thus, we mainly compared the methods on their substantive estimates of path coefficients.

Before the comparison, standardized interaction estimates should be computed in order to appropriately compare the relative strengths of unstandardized coefficients regardless of original units of measurement, and interpret the results. Wen et al. (2010) derived the formula of converting unstandardized coefficients. In the context of this study, the formula of standardization for the latent interaction estimate was

$$\gamma_3'' = \gamma_3 \frac{\hat{\sigma}_{\xi_{PED}} \hat{\sigma}_{\xi_{SelfE}}}{\hat{\sigma}_{PHQ}}, \tag{1}$$

in which γ_3'' was the appropriately standardized coefficient and γ_3 was the original coefficient of the interaction estimate. $\hat{\sigma}_{\xi_{PED}}$, $\hat{\sigma}_{\xi_{SelfE}}$ were the standard deviations of true variances (i.e., variances exclusing measurement error) of first-order latent predictors, while $\hat{\sigma}_{PHQ}$ was the standard deviation of the dependent variable's total variance. The formulas for first-order effects were simpler: $\gamma_1'' = \gamma_1\hat{\sigma}_{\xi_{PED}}/\hat{\sigma}_{PHQ}$ and $\gamma_2'' = \gamma_2\hat{\sigma}_{\xi_{SelfE}}/\hat{\sigma}_{PHQ}$, where γ_1'' and γ_2'' were the standardized coefficients of ξ_{PED} and ξ_{SelfE}. To implement the appropriate standardization procedure in R, an example syntax on the 2S-PA-Int model was demonstrated below:

```
model.2spaint <- "# Measurement model
                    PHQ =~ 1*fs.PHQ
                    PED =~ 1*fs.PED
                    SelfE =~ 1*fs.SelfE
                    PED.SelfE =~ 1*fs.PED.SelfE
                  # Error variance
                    fs.PED ~~ 0.09875111*fs.PED
                    fs.SelfE ~~ 0.3397634*fs.SelfE
                    fs.PED.SelfE ~~ 0.22559*fs.PED.SelfE
                  # Latent variance
                    PED ~~ v1*PED
                    SelfE ~~ v2*SelfE
                    PED.SelfE ~~ v3*PED.SelfE
                  # Latent covariance
                    PED ~~ v12*SelfE
                    PED ~~ v13*PED.SelfE
                    SelfE ~~ v23*PED.SelfE
                  # Residual variance of DV
                    PHQ ~~ v4*PHQ
```

```
# Structural model
  PHQ ~ g1*PED + g2*SelfE + g3*PED.SelfE
# Standardized
  vy := g1^2*v1 + g2^2*v2 + g3^2*v3 + 2*g1*g2*v12 +
        2*g1*g3*v13 + 2*g2*g3*v23 + v4
  gamma1 := g1*sqrt(v1)/sqrt(vy)
  gamma2 := g2*sqrt(v2)/sqrt(vy)
  gamma3 := g3*sqrt(v1)*sqrt(v2)/sqrt(vy)"
```

We added user-defined labels (i.e., g_1, g_2, and g_3) for unstandardized path coefficients and the standardized coefficients, namely γ_1, γ_2, and γ_3, were defined using the formulas mentioned above. Specifically, v_1, v_2 and v_3 were labels of latent variables' sample-estimated variances. Since there was no way to directly label total variance of the dependent variable in `lavaan`, we used v_4 to indicate the residual variance of PHQ, ζ_{PHQ}. Considering ξ_{PED} and ξ_{SelfE} were allowed to correlate in our hypothetical model, we further used labels to indicate the covariances between latent variables. Then the total variance of PHQ, v_y, could be specified using unstandardized coefficients, latent variances, covariances between latent variables, and the residual variance of PEQ.

A summary of standardized estimates of the three methods were listed in Table 1. In general, the structural path coefficients of PED, self-esteem, and their interaction effect on depression were similar for matched-pair UPI, RAPI, and 2S-PA-Int. It was found that PED had significantly positive effect on depression for the three methods, meaning that participants who reported higher PED were scored higher on the PHQ-9 scale and more likely to have depressive symptoms. Self-esteem, however, had significantly negative effect on depression, and it implied that higher levels of self-esteem were associated with lower levels of depression. The interaction effects of self-esteem and PED on depression estimated by the three methods were close to each other (γ_3'' = -.067, SE = .016, $p < .001$ for matched-pair

UPI; γ_3'' = -.072, SE = .016, $p < .001$ for RAPI; γ_3'' = -.05, SE = .014, $p = .001$ for 2S-PA-Int), indicating that higher levels of self-esteem appeared to buffer or reduce the adverse impact of PED on depression. Overall, all the three methods were able to detect significant first-order effects and the interaction effect as hypothesized in the theory.

Discussion

Table 1

Effects of Perceived Everyday Discrimination, Sefl-Esteem, and Their Interaction on Depression.

	PED				SelfE				PED*SelfE			
Method	γ_1	γ_1''	*SE*	*p*	γ_2	γ_2''	*SE*	*p*	γ_3	γ_3''	*SE*	*p*
Matched-pair UPI	.096	.206	.018	<.001	-.515	-.651	.015	<.001	-.041	-.067	.016	<.001
RAPI	.149	.245	.017	<.001	-.701	-.559	.015	<.001	-.085	-.072	.016	<.001
2S-PA-Int	.153	.145	.019	<.001	-.851	-.707	.017	<.001	-.06	-.05	.014	.001

Note. γ = Unstandardized path coefficient; γ'' = Standardized path coefficient; *SE* = Standard error of standardized path coefficient; *p* = p-value of standardized path coefficient.