# APIMoM Output 

Actor-Partner Interdependence Moderation Model Results
March 27, 2017

## 1. Text

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## Summary of APIM Moderation Results

The focus of this study is the investigation of the effect of Other Positivity on Satisfaction being moderated by Tension within the Actor-Partner Interdependence Model or APIM. All three variables are mixed variables and so the relationship between any two variables includes actor and partner effects. The variable names in the dataset are as follows: Other Positivity for is OtherPos_W, Other Positivity for is OtherPos_H, Satisfaction for is Satisfaction_W, Satisfaction for is Satisfaction_H, Tension for is Tension_W, and Tension for is Tension_H. The total number of dyads is 148, and there are no missing data. The dyad members are treated as if they were indistinguishable. The test of distinguishability which includes 8 equality constraints on the coefficients, 5 on the means, 5 on the variances, and 12 on the covariances is statistically significant (chi-square (30) = 44.51, $\mathrm{p}=.043$ ), with an RMSEA of 0.057 . The structural equation models are estimated using the program lavaan. Standardized estimates use pooled variances across members and for interaction effects the standardization uses the product of the two standard deviations and not standard deviation of the product. The $X$ and $M$ variables have been centered, i.e., the mean has been subtracted from all the scores before conducting the moderation analysis. However, the X-axis for figures use the uncentered Other Positivity variable. The descriptive statistics are contained in Table 1.

For the estimates below to be valid, it must be assumed that there is no measurement error in Other Positivity and Tension. Additionally, it must be assumed that there are no unmeasured common causes (i.e., confounders) between Other Positivity and Tension, between Other Positivity and Satisfaction, and between Tension and Satisfaction. It must be assumed that Satisfaction does not cause Other Positivity or Tension and that Tension does not cause Other Positivity. Finally, it must be assumed that the relationships between Other Positivity and Satisfaction and between Tension and Satisfaction are linear and that the interaction between Other Positivity and Satisfaction is also linear.

The combined test the four moderation effects involves fitting two models, one with interaction effects and one without those effects. This combined test of interaction is statistically significant (chi-square (4) = 31.29, p < .001), with an RMSEA of 0.215. Because the RMSEA is greater than .10 and the chi square is statistically significant, there is sufficient evidence to believe that there is moderation.

Table 2 presents the effects in the moderation model. The multiple correlation for the Satisfaction equations is . 740. First considered are the "main effects" of Other Positivity on Satisfaction. These are the effects of Other Positivity when the scores of both members on

Tension equal zero. The actor effect equals 0.235 ( $p<.001$ ) with a standardized effect of .326. The partner effect equals 0.166 ( $p<.001$ ) with a standardized effect of . 230. Next considered are the "main" effects of Tension on Satisfaction. These are the effects of Tension when the scores of both members on Other Positivity equal zero. The actor effect equals -0.277 ( $p<.001$ ) with a standardized effect of -.278 . The partner effect equals -0.098 ( $p=.002$ ) with a standardized effect of -.099 . The variables Other Positivity and Tension interact to affect Satisfaction in four different ways. Each interaction involves two components, the first being Other Positivity and the second being Tension. Thus, the term actor-partner refers to the interaction between the actor variable of Other Positivity and the partner variable of Tension. The actor-actor effect equals 0.185 ( $p=.002$ ) with a standardized effect of .127. The actor-partner effect equals 0.133 ( $\mathrm{p}=.031$ ) with a standardized effect of .092. The partner-actor effect equals 0.194 ( $\mathrm{p}=.002$ ) with a standardized effect of .133. The partner-partner effect equals 0.032 ( $\mathrm{p}=.591$ ) with a standardized effect of .022 .

To better understand these interactions, Table 3 and Figures 1 and 2 present the effects of Other Positivity on Satisfaction for different values of Tension. Simple slopes are computed when either the actor or the partner scores on Tension are either one standard deviation below or one standard deviation above the mean. Because one standard deviation of the moderator equals 0.686 , one standard deviation below the mean for Tension is a score of 1.745 and one standard deviation above the mean is a score of 3.117 . To examine the actor-actor interaction effect, which is statistically significant ( $\mathrm{p}=.002$ ), the actor effect of Other Positivity on Satisfaction is measured when the actor variable for Tension is one standard deviation below and above the mean. The effect for one standard deviation below the mean is 0.108 ( $p=.066$ ) and for one standard deviation above the mean is 0.362 ( $p<$ .001). Both of these effects are positive and the Other Positivity actor effect increases as the actor variable for Tension increases. To examine the actor-partner interaction effect, which is statistically significant ( $p=.031$ ), the actor effect of Other Positivity on Satisfaction is measured when the partner variable for Tension is one standard deviation below and above the mean. The effect for one standard deviation below the mean is 0.144 ( $p=.018$ ) and for one standard deviation above the mean is 0.327 ( $p$ < .001). Both of these effects are positive and the Other Positivity actor effect increases as the partner variable for Tension increases. To examine the partner-actor interaction effect, which is statistically significant ( $p=.002$ ), the partner effect of Other Positivity on Satisfaction is measured when the actor variable for Tension is one standard deviation below and above the mean. The effect for one standard deviation below the mean is 0.033 ( $p=.588$ ) and for one standard deviation above the mean is 0.299 ( $p$. .001). Both of these effects are positive and the Other Positivity partner effect increases as the actor variable for Tension increases. To examine the partner-partner interaction effect, which is not statistically significant ( $p=$ .591), the partner effect of Other Positivity on Satisfaction is measured when the partner variable for Tension is one standard deviation below and above the mean. The effect for one standard deviation below the mean is 0.144 ( $p=.014$ ) and for one standard deviation above the mean is 0.188 ( $p=.001$ ). Both of these effects are positive and the Other Positivity partner effect increases as the partner variable for Tension increases.

To further assist in the understanding of these interactions, Table 4 and Figures 3 and 4 present the effects of Other Positivity on Satisfaction for different actor and partner values of Tension. Simple actor and partner slopes are computed when the actor and partner scores on Tension are both one standard deviation below and one standard deviation above the mean.

Model with A Prior Values for the k's

The user has requested to estimate a model in which constraints are placed on interaction effects to create a simpler and more interpretable model. That constant or $k$ for the effect from interaction Other Positivity on Satisfaction has been set to 1.000 and that constant or $k$ from interaction Tension to Satisfaction has been set to 1.000 . The test of the model that imposes these interaction constraints is not statistically significant (chi-square (3) $=5.01, \mathrm{p}=.171$ ), with an RMSEA of 0.067 . Because the RMSEA is less than .10 and the chi square is not statistically significant, there is evidence that these constraints explain the pattern of interaction effects.

Table 5 presents the effects in the moderation model in which there are constraints on the interaction effects. The multiple correlation for the Satisfaction equations is . 736 . First considered are the "main" effects of Other Positivity on Satisfaction. These are the effects of Other Positivity when the scores of both members on Tension equal zero. The actor effect equals 0.241 ( p . .001) with a standardized effect of .334 . The partner effect equals 0.162 ( p . .001) with a standardized effect of .224 . Next considered are the "main" effects of Tension on Satisfaction. These are the effects of Tension when the scores of both members on Other Positivity equal zero. The actor effect equals -0.281 ( $p<.001$ ) with a standardized effect of -.282. The partner effect equals -0.091 ( $p=.003$ ) with a standardized effect of -.092. The variables Other Positivity and Tension interact to affect Satisfaction in four different ways. Each interaction involves two components, the first being Other Positivity and the second being Tension. Thus, the term actor-partner refers to the interaction between the actor variable of Other Positivity and the partner variable of Tension. The actor-actor effect equals 0.136 ( p . 001 ) with a standardized effect of .093 . The actor-partner effect equals 0.136 ( $p$. 001) with a standardized effect of .093. The partner-partner effect equals 0.136 ( $\mathrm{p}<.001$ ) with a standardized effect of .093. The partner-partner effect equals 0.136 ( $p<.001$ ) with a standardized effect of .093.

To better understand these interactions, Table 6 and Figure 5 and 6 present the effects of Other Positivity on Satisfaction for different values of Tension with constraints on the interaction effects. Simple slopes are computed when the actor and partner scores on Tension are one standard deviation below and above the mean. Because one standard deviation of the moderator equals 0.686, one standard deviation below the mean for Tension is a score of 1.745 and one standard deviation above the mean is a score of 3.117. To examine the actor-actor interaction effect, which is statistically significant (p < . 001), the actor effect of Other Positivity on Satisfaction is measured when the actor variable for Tension is one standard deviation below and above the mean. The effect for one standard deviation below the mean is 0.148 ( $\mathrm{p}=.001$ ) and for one standard deviation above the mean is 0.334 ( p < .001). Both of these effects are positive and the Other Positivity actor effect increases as the actor variable for Tension increases. To examine the actor-partner interaction effect, which is statistically significant ( $\mathrm{p}=.031$ ) , the actor effect of Other Positivity on Satisfaction is measured when the partner variable for Tension is one standard deviation below and above the mean. The effect for one standard deviation below the mean is 0.148 ( $p=.001$ ) and for one standard deviation above the mean is 0.334 ( $p$. 001). Both of these effects are positive and the Other Positivity actor effect increases as the partner variable for Tension increases. To examine the partner-actor interaction effect, which is statistically significant (p = .002), the partner effect of Other Positivity on Satisfaction is measured when the actor variable for Tension is one standard deviation below and above the mean. The effect for one standard deviation below the mean is 0.069 ( $p=.131$ ) and for one standard deviation above the mean is 0.255 ( $p<.001$ ). Both of these effects are positive and the Other Positivity partner effect increases as the actor variable for Tension increases. To examine the partner-partner interaction effect, which is not statistically significant ( $p=.591$ ), the partner effect of Other Positivity on Satisfaction is measured when the partner variable for Tension is one standard deviation below and above the mean. The effect for one standard deviation below the mean is 0.069 ( $p=.131$ ) and for one standard deviation above the mean is 0.255 ( $p<.001$ ).

Both of these effects are positive and the Other Positivity partner effect increases as the partner variable for Tension increases.

To further assist in the understanding of these interactions, Table 7 and Figures 7 and 8 present the effects of Other Positivity on Satisfaction for different actor and partner values of Tension. Simple actor and partner slopes are computed when the actor and partner scores on Tension are both one standard deviation above and one standard deviation below the mean.

## 2. Tables

Table 1: Descriptive Statistics

| Variable | Mean | SD | Minimum | Maximum |
| ---: | ---: | ---: | ---: | ---: |
| Other Positivity | -0.000 | 0.498 | 2.600 | 5.000 |
| Satisfaction | 3.605 | 0.496 | 1.167 | 4.000 |
| Tension | -0.000 | 0.686 | 1.167 | 4.000 |

Table 2: Effects in the Moderation Model

| Cause | Type Estimate |  | p value | Lower | 95\% CI | Upper | Standardized |
| ---: | ---: | ---: | ---: | ---: | ---: | ---: | ---: | ---: |
| Other Positivity | Actor | 0.235 | $<.001$ | 0.152 | to | 0.319 | 0.326 |
|  | Partner | 0.166 | $<.001$ | -0.159 | to | 0.249 | 0.230 |
| Tension | Actor | -0.277 | $<.001$ | -0.338 | to | -0.216 | -0.278 |
|  | Partner | -0.098 | .002 | -0.159 | to | -0.037 | -0.099 |
| Interaction | Actor-Actor | 0.185 | .002 | 0.070 | to | 0.300 | 0.127 |
|  | Actor-Partner | 0.133 | .031 | 0.012 | to | 0.254 | 0.092 |
|  | Partner-Actor | 0.194 | .002 | 0.073 | to | 0.314 | 0.133 |
|  | Partner-Partner | 0.032 | .591 | -0.083 | to | 0.147 | 0.022 |

Table 3: Effects of Other Positivity with Either the Actor or the Partner Effects of Tension +1 (and -1
Type of Effect M for Actor M for Partner Estimate p value Lower 95\% CI Upper

| Actor | -1sd | mean | 0.108 | .066 | -0.007 | to | 0.224 |
| :---: | ---: | ---: | ---: | ---: | ---: | ---: | ---: |
|  | +1sd | mean | 0.362 | $<.001$ | 0.249 | to | 0.476 |
|  | mean | -1sd | 0.144 | .018 | 0.024 | to | 0.264 |
| Partner | mean | +1sd | 0.327 | $<.001$ | 0.212 | to | 0.441 |
|  | -1sd | mean | 0.033 | .588 | -0.087 | to | 0.153 |
|  | +1sd | mean | 0.299 | $<.001$ | 0.184 | to | 0.414 |
|  | mean | -1sd | 0.144 | .014 | 0.029 | to | 0.260 |
|  | mean | +1sd | 0.188 | .001 | 0.074 | to | 0.301 |

Table 4: Effects of Other Positivity with Both Actor and Partner the Effects of Tension +1 (and -1) Sta Type of Effect M for Actor M for Partner Estimate p value Lower 95\% CI Upper

| Actor | -1sd | -1sd | 0.017 | .793 | -0.112 | to | 0.147 |
| ---: | ---: | ---: | ---: | ---: | ---: | ---: | ---: |
|  | -1sd | +1sd | 0.200 | .002 | 0.075 | to | 0.324 |
|  | +1sd | -1sd | 0.271 | $<.001$ | 0.144 | to | 0.398 |
|  | Partner | +1sd | +1sd | 0.454 | $<.001$ | 0.332 | to |
|  | -1sd | -1sd | 0.012 | .861 | -0.118 | to | 0.141 |
|  | -1sd | +1sd | 0.277 | $<.001$ | 0.149 | to | 0.406 |
|  | +1sd | -1sd | 0.055 | .402 | -0.073 | to | 0.183 |
|  | +1sd | +1sd | 0.321 | $<.001$ | 0.199 | to | 0.443 |

Table 4: Effects of Other Positivity with Both Actor and Partner the Effects of Tension +1 (and -1) Sta)

| Cause | Type |  |  |  |  |  |  |  | Estimate | p | value | Lower | $95 \%$ | CI | Upper | Standardized |
| ---: | ---: | ---: | ---: | ---: | ---: | ---: | ---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| Other Positivity | Actor | 0.241 | $<.001$ | 0.158 | to | 0.324 | .334 |  |  |  |  |  |  |  |  |  |
|  | Partner | 0.162 | $<.001$ | -0.152 | to | 0.245 | .224 |  |  |  |  |  |  |  |  |  |
| Tension | Actor | -0.281 | $<.001$ | -0.342 | to | -0.220 | -.282 |  |  |  |  |  |  |  |  |  |
|  | Partner | -0.091 | .003 | -0.152 | to | -0.030 | -.092 |  |  |  |  |  |  |  |  |  |
| Interaction | Actor-Actor | 0.136 | $<.001$ | 0.086 | to | 0.185 | .093 |  |  |  |  |  |  |  |  |  |
|  | Actor-Partner | 0.136 | $<.001$ | 0.086 | to | 0.185 | .093 |  |  |  |  |  |  |  |  |  |
|  | Partner-Actor | 0.136 | $<.001$ | 0.086 | to | 0.185 | .093 |  |  |  |  |  |  |  |  |  |
|  | Partner-Partner | 0.136 | $<.001$ | 0.086 | to | 0.185 | .093 |  |  |  |  |  |  |  |  |  |

Table 6: Effects of Other Positivity with Either the Actor or the Partner Effects of Tension +1 (and Type of Effect M for Actor M for Partner Estimate p value Lower 95\% CI Upper

| Actor | -1sd | mean | 0.148 | .001 | 0.059 | to | 0.237 |
| ---: | ---: | ---: | ---: | ---: | ---: | ---: | ---: |
|  | +1sd | mean | 0.334 | $<.001$ | 0.243 | to | 0.425 |
|  | mean | -1sd | 0.148 | .001 | 0.059 | to | 0.237 |
| Partner | mean | +1sd | 0.334 | $<.001$ | 0.243 | to | 0.425 |
|  | -1sd | mean | 0.069 | .131 | -0.021 | to | 0.158 |
|  | +1sd | mean | 0.255 | $<.001$ | 0.164 | to | 0.345 |
|  | mean | -1sd | 0.069 | .131 | -0.021 | to | 0.158 |
|  | mean | +1sd | 0.255 | $<.001$ | 0.164 | to | 0.345 |

Table 7: Effects of Other Positivity with Both the Actor and the Partner Effects of Tension +1 (and -1 )
Type of Effect M for Actor M for Partner Estimate p value Lower 95\% CI Upper

| Actor | -1sd | -1sd | 0.055 | .310 | -0.051 | to | 0.161 |
| ---: | ---: | ---: | ---: | ---: | ---: | ---: | ---: |
|  | -1sd | +1sd | 0.241 | $<.001$ | 0.134 | to | 0.348 |
|  | +1sd | -1sd | 0.241 | $<.001$ | 0.134 | to | 0.348 |
|  | Partner | +1sd | +1sd | 0.427 | $<.001$ | 0.318 | to |
|  | -1sd | -1sd | -0.024 | .713 | -0.155 | to | 0.106 |
|  | -1sd | +1sd | 0.162 | .003 | 0.054 | to | 0.269 |
|  | +1sd | -1sd | 0.162 | .003 | 0.054 | to | 0.269 |
|  | +1sd | +1sd | 0.348 | $<.001$ | 0.239 | to | 0.456 |

## 3. lavaan Computer Output

Moderation Run with Indistinguishable Dyads
lavaan (0.5-22) converged normally after 84 iterations
Number of observations 148
Number of missing patterns 1

| Estimator | ML |
| :--- | ---: |
| Minimum Function Test Statistic | 44.505 |
| Degrees of freedom | 30 |
| P-value (Chi-square) | 0.043 |

lhs op rhs label est se z pvalue ci.lower ci.upper

| 1 | yv1 | $\sim$ | mv1 | ab | -0.277 | 0.031 | -8.891 | 0.000 | -0.338 | -0.216 |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| 2 | yv2 | ~ | mv2 | ab | -0.277 | 0.031 | -8.891 | 0.000 | -0.338 | -0.216 |
| 3 | yv1 | $\sim$ | mv2 | pb | -0.098 | 0.031 | -3.156 | 0.002 | -0.159 | -0.037 |
| 4 | yv2 | ~ | mv1 | pb | -0.098 | 0.031 | -3.156 | 0.002 | -0.159 | -0.037 |
| 5 | yv1 | ~ | $\mathrm{xv1}$ | aa | 0.235 | 0.042 | 5.556 | 0.000 | 0.152 | 0.319 |
| 6 | yv2 | ~ | xv 2 | a | 0.235 | 0.042 | 5.556 | 0.000 | 0.152 | 0.319 |
| 7 | yv1 | $\sim$ | xv 2 | pa | 0.166 | 0.042 | 3.919 | 0.000 | 0.083 | 0.249 |
| 8 | yv2 | ~ | $\mathrm{xv1}$ | pa | 0.166 | 0.042 | 3.919 | 0.000 | 0.083 | 0.249 |
| 9 | yv1 | $\sim$ | xm11 | iAA | 0.185 | 0.059 | 3.154 | 0.002 | 0.070 | 0.300 |
| 10 | yv2 | $\sim$ | xm11 | iPP | 0.032 | 0.059 | 0.537 | 0.591 | -0.083 | 0.147 |
| 11 | yv1 |  | xm12 | iAP | 0.133 | 0.062 | 2.158 | 0.031 | 0.012 | 0.254 |
| 12 | yv2 |  | xm12 | iPA | 0.194 | 0.062 | 3.144 | 0.002 | 0.073 | 0.314 |
| 13 | yv1 |  | xm21 | iPA | 0.194 | 0.062 | 3.144 | 0.002 | 0.073 | 0.314 |
| 14 | yv2 |  | xm21 | iAP | 0.133 | 0.062 | 2.158 | 0.031 | 0.012 | 0.254 |
| 15 | yv1 |  | xm22 | iPP | 0.032 | 0.059 | 0.537 | 0.591 | -0.083 | 0.147 |
| 16 | yv2 | ~ | xm22 | iAA | 0.185 | 0.059 | 3.154 | 0.002 | 0.070 | 0.300 |
| 17 | xv1 |  | xv2 |  | 0.057 | 0.021 | 2.744 | 0.006 | 0.016 | 0.098 |
| 18 | yv1 | ~ | yv2 |  | 0.033 | 0.010 | 3.470 | 0.001 | 0.014 | 0.052 |
| 19 | mv1 |  | mv2 |  | 0.149 | 0.041 | 3.670 | 0.000 | 0.069 | 0.228 |
| 20 | xm11 |  | xm22 |  | 0.018 | 0.010 | 1.703 | 0.089 | -0.003 | 0.038 |
| 21 | xm12 | ~ | xm21 |  | 0.025 | 0.009 | 2.672 | 0.008 | 0.007 | 0.043 |
| 22 | xv1 | $\sim 1$ |  | m1 | 0.000 | 0.032 | 0.000 | 1.000 | -0.063 | 0.063 |
| 23 | xv2 | $\sim 1$ |  | m1 | 0.000 | 0.032 | 0.000 | 1.000 | -0.063 | 0.063 |
| 24 | yv1 | $\sim 1$ |  | m2 | 3.662 | 0.025 | 147.757 | 0.000 | 3.614 | 3.711 |
| 25 | yv2 | $\sim 1$ |  | m2 | 3.662 | 0.025 | 147.757 | 0.000 | 3.614 | 3.711 |
| 26 | mv1 | $\sim 1$ |  | m3 | 0.000 | 0.046 | 0.000 | 1.000 | -0.090 | 0.090 |
| 27 | mv2 | $\sim 1$ |  | m3 | 0.000 | 0.046 | 0.000 | 1.000 | -0.090 | 0.090 |
| 28 | xm11 | $\sim 1$ |  | m4 | -0.126 | 0.022 | -5.716 | 0.000 | -0.169 | -0.083 |
| 29 | xm22 | $\sim 1$ |  | m4 | -0.126 | 0.022 | -5.716 | 0.000 | -0.169 | -0.083 |
| 30 | xm12 | $\sim 1$ |  | m5 | -0.093 | 0.021 | -4.322 | 0.000 | -0.135 | -0.051 |
| 31 | xm21 | $\sim 1$ |  | m5 | -0.093 | 0.021 | -4.322 | 0.000 | -0.135 | -0.051 |
| 32 | xv1 | ~ | $\mathrm{xv1}$ | v1 | 0.248 | 0.021 | 11.852 | 0.000 | 0.207 | 0.289 |
| 33 | xv2 |  | xv2 | v1 | 0.248 | 0.021 | 11.852 | 0.000 | 0.207 | 0.289 |
| 34 | yv1 |  | yv1 | v2 | 0.111 | 0.010 | 11.660 | 0.000 | 0.092 | 0.130 |
| 35 | yv2 |  | yv2 | v2 | 0.111 | 0.010 | 11.660 | 0.000 | 0.092 | 0.130 |
| 36 | mv1 |  | mv1 | v3 | 0.471 | 0.041 | 11.599 | 0.000 | 0.391 | 0.550 |
| 37 | mv2 |  | mv2 | v3 | 0.471 | 0.041 | 11.599 | 0.000 | 0.391 | 0.550 |
| 38 | xm11 |  | xm11 | v4 | 0.125 | 0.010 | 12.046 | 0.000 | 0.105 | 0.146 |
| 39 | xm22 |  | xm22 | v4 | 0.125 | 0.010 | 12.046 | 0.000 | 0.105 | 0.146 |
| 40 | xm12 | ~ | xm12 | v5 | 0.111 | 0.009 | 11.869 | 0.000 | 0.093 | 0.129 |
| 41 | xm21 | ~ | xm21 | v5 | 0.111 | 0.009 | 11.869 | 0.000 | 0.093 | 0.129 |
| 42 | xv1 | ~ | xm11 | c1 | 0.017 | 0.010 | 1.662 | 0.097 | -0.003 | 0.038 |
| 43 | xv2 | ~ | xm22 | c1 | 0.017 | 0.010 | 1.662 | 0.097 | -0.003 | 0.038 |
| 44 | xv2 | ~ | xm11 | c2 | -0.004 | 0.010 | -0.388 | 0.698 | -0.025 | 0.016 |
| 45 | xv1 | ~ | xm22 | c2 | -0.004 | 0.010 | -0.388 | 0.698 | -0.025 | 0.016 |
| 46 | xv 1 | ~ | xm12 | c3 | 0.012 | 0.010 | 1.262 | 0.207 | -0.007 | 0.032 |
| 47 | xv 2 | ~ | xm21 | c3 | 0.012 | 0.010 | 1.262 | 0.207 | -0.007 | 0.032 |
| 48 | xv 2 | ~ | xm12 | c4 | -0.004 | 0.010 | -0.409 | 0.682 | -0.023 | 0.015 |
| 49 | xv 1 | ~ | xm21 | c4 | -0.004 | 0.010 | -0.409 | 0.682 | -0.023 | 0.015 |
| 50 | mv1 | ~ | xm11 | c5 | -0.042 | 0.015 | -2.844 | 0.004 | -0.070 | -0.013 |
| 51 | mv2 | ~ | xm22 | c5 | -0.042 | 0.015 | -2.844 | 0.004 | -0.070 | -0.013 |
| 52 | mv2 | ~ | xm11 | c6 | -0.016 | 0.015 | -1.086 | 0.277 | -0.045 | 0.013 |
| 53 | mv1 | ~ | xm22 | c6 | -0.016 | 0.015 | -1.086 | 0.277 | -0.045 | 0.013 |
| 54 | mv1 | ~ | xm12 | c7 | -0.016 | 0.014 | -1.154 | 0.248 | -0.043 | 0.011 |


| 55 | mv2 ~~ | xm21 | c7 | -0.016 | 0.014 | -1.154 | 0.248 | -0.043 | 0.011 |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| 56 | mv2 ~~ | xm12 | c8 | -0.015 | 0.014 | -1.074 | 0.283 | -0.042 | 0.012 |
| 57 | mv1 ~ | xm21 | c8 | -0.015 | 0.014 | -1.074 | 0.283 | -0.042 | 0.012 |
| 58 | xm11 ~~ | xm12 | c9 | 0.039 | 0.007 | 5.273 | 0.000 | 0.025 | 0.054 |
| 59 | xm21 ~~ | xm22 | c9 | 0.039 | 0.007 | 5.273 | 0.000 | 0.025 | 0.054 |
| 60 | xm11 ~~ | xm21 | c10 | 0.019 | 0.007 | 2.581 | 0.010 | 0.005 | 0.034 |
| 61 | xm12 ~~ | xm22 | c10 | 0.019 | 0.007 | 2.581 | 0.010 | 0.005 | 0.034 |
| 62 | mv1 ~~ | $\mathrm{xv1}$ | c11 | -0.126 | 0.022 | -5.593 | 0.000 | -0.170 | -0.082 |
| 63 | mv2 ~~ | xv 2 | c11 | -0.126 | 0.022 | -5.593 | 0.000 | -0.170 | -0.082 |
| 64 | mv2 ~~ | $\mathrm{xv1}$ | c12 | -0.093 | 0.022 | -4.119 | 0.000 | -0.137 | -0.049 |
| 65 | mv1 ~~ | xv2 | c12 | -0.093 | 0.022 | -4.119 | 0.000 | -0.137 | -0.049 |
| 66 | kx := | pa/aa | kx | 0.705 | 0.199 | 3.536 | 0.000 | 0.314 | 1.096 |
| 67 | km := | pb/ab | km | 0.355 | 0.115 | 3.099 | 0.002 | 0.130 | 0.579 |
|  | std.lv | std.all |  |  |  |  |  |  |  |
| 1 | -0.277 | -0.383 |  |  |  |  |  |  |  |
| 2 | -0.277 | -0.383 |  |  |  |  |  |  |  |
| 3 | -0.098 | -0.136 |  |  |  |  |  |  |  |
| 4 | -0.098 | -0.136 |  |  |  |  |  |  |  |
| 5 | 0.235 | 0.236 |  |  |  |  |  |  |  |
| 6 | 0.235 | 0.236 |  |  |  |  |  |  |  |
| 7 | 0.166 | 0.167 |  |  |  |  |  |  |  |
| 8 | 0.166 | 0.167 |  |  |  |  |  |  |  |
| 9 | 0.185 | 0.132 |  |  |  |  |  |  |  |
| 10 | 0.032 | 0.023 |  |  |  |  |  |  |  |
| 11 | 0.133 | 0.089 |  |  |  |  |  |  |  |
| 12 | 0.194 | 0.130 |  |  |  |  |  |  |  |
| 13 | 0.194 | 0.130 |  |  |  |  |  |  |  |
| 14 | 0.133 | 0.089 |  |  |  |  |  |  |  |
| 15 | 0.032 | 0.023 |  |  |  |  |  |  |  |
| 16 | 0.185 | 0.132 |  |  |  |  |  |  |  |
| 17 | 0.057 | 0.232 |  |  |  |  |  |  |  |
| 18 | 0.033 | 0.298 |  |  |  |  |  |  |  |
| 19 | 0.149 | 0.316 |  |  |  |  |  |  |  |
| 20 | 0.018 | 0.141 |  |  |  |  |  |  |  |
| 21 | 0.025 | 0.225 |  |  |  |  |  |  |  |
| 22 | 0.000 | 0.000 |  |  |  |  |  |  |  |
| 23 | 0.000 | 0.000 |  |  |  |  |  |  |  |
| 24 | 3.662 | 7.390 |  |  |  |  |  |  |  |
| 25 | 3.662 | 7.390 |  |  |  |  |  |  |  |
| 26 | 0.000 | 0.000 |  |  |  |  |  |  |  |
| 27 | 0.000 | 0.000 |  |  |  |  |  |  |  |
| 28 | -0.126 | -0.355 |  |  |  |  |  |  |  |
| 29 | -0.126 | -0.355 |  |  |  |  |  |  |  |
| 30 | -0.093 | -0.278 |  |  |  |  |  |  |  |
| 31 | -0.093 | -0.278 |  |  |  |  |  |  |  |
| 32 | 0.248 | 1.000 |  |  |  |  |  |  |  |
| 33 | 0.248 | 1.000 |  |  |  |  |  |  |  |
| 34 | 0.111 | 0.452 |  |  |  |  |  |  |  |
| 35 | 0.111 | 0.452 |  |  |  |  |  |  |  |
| 36 | 0.471 | 1.000 |  |  |  |  |  |  |  |
| 37 | 0.471 | 1.000 |  |  |  |  |  |  |  |
| 38 | 0.125 | 1.000 |  |  |  |  |  |  |  |
| 39 | 0.125 | 1.000 |  |  |  |  |  |  |  |
| 40 | 0.111 | 1.000 |  |  |  |  |  |  |  |


| 41 | 0.111 | 1.000 |
| ---: | ---: | ---: |
| 42 | 0.017 | 0.099 |
| 43 | 0.017 | 0.099 |
| 44 | -0.004 | -0.023 |
| 45 | -0.004 | -0.023 |
| 46 | 0.012 | 0.075 |
| 47 | 0.012 | 0.075 |
| 48 | -0.004 | -0.024 |
| 49 | -0.004 | -0.024 |
| 50 | -0.042 | -0.172 |
| 51 | -0.042 | -0.172 |
| 52 | -0.016 | -0.066 |
| 53 | -0.016 | -0.066 |
| 54 | -0.016 | -0.070 |
| 55 | -0.016 | -0.070 |
| 56 | -0.015 | -0.065 |
| 57 | -0.015 | -0.065 |
| 58 | 0.039 | 0.331 |
| 59 | 0.039 | 0.331 |
| 60 | 0.019 | 0.162 |
| 61 | 0.019 | 0.162 |
| 62 | -0.126 | -0.368 |
| 63 | -0.126 | -0.368 |
| 64 | -0.093 | -0.271 |
| 65 | -0.093 | -0.271 |
| 66 | 0.705 | 0.705 |
| 67 | 0.355 | 0.355 |

Moderation with Constraints on Interaction Effects lavaan (0.5-22) converged normally after 72 iterations
Number of observations 148

Number of missing patterns 1

| Estimator |  |  |  |  |  | ML |  |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  | Minimu | $m$ Functi | ion Test | t Stat | istic | 49.520 |  |  |  |  |
|  | Degree | s of fre | eedom |  |  | 33 |  |  |  |  |
|  | P-valu | e (Chi-s | square) |  |  | 0.032 |  |  |  |  |
|  | lhs | op rhs | label | est | se | z | pvalue | ci.lower | ci.upper | std.lv |
| 1 | yv1 | mv1 | ab | -0.281 | 0.031 | -9.005 | 0.000 | -0.342 | -0.220 | -0.281 |
| 2 | yv2 | mv2 | ab | -0.281 | 0.031 | -9.005 | 0.000 | -0.342 | -0.220 | -0.281 |
| 3 | yv1 | mv2 | pb | -0.091 | 0.031 | -2.928 | 0.003 | -0.152 | -0.030 | -0.091 |
| 4 | yv2 | mv1 | pb | -0.091 | 0.031 | -2.928 | 0.003 | -0.152 | -0.030 | -0.091 |
| 5 | yv1 | xv1 | aa | 0.241 | 0.042 | 5.682 | 0.000 | 0.158 | 0.324 | 0.241 |
| 6 | yv2 | xv2 | aa | 0.241 | 0.042 | 5.682 | 0.000 | 0.158 | 0.324 | 0.241 |
| 7 | yv1 | xv2 | pa | 0.162 | 0.042 | 3.808 | 0.000 | 0.078 | 0.245 | 0.162 |
| 8 | yv2 | xv1 | pa | 0.162 | 0.042 | 3.808 | 0.000 | 0.078 | 0.245 | 0.162 |
| 9 | yv1 | ~ xm11 | iAA | 0.136 | 0.025 | 5.362 | 0.000 | 0.086 | 0.185 | 0.136 |
| 10 | yv2 | ~ xm11 | iPP | 0.136 | 0.025 | 5.362 | 0.000 | 0.086 | 0.185 | 0.136 |
| 1 | yv1 | ~ xm12 | iAP | 0.136 | 0.025 | 5.362 | 0.000 | 0.086 | 0.185 | 0.136 |
|  | yv2 | ~ xm12 | iPA | 0.136 | 0.025 | 5.362 | 0.000 | 0.086 | 0.185 | 0.136 |
| 13 | yv1 | ~ xm21 | iPA | 0.136 | 0.025 | 5.362 | 0.000 | 0.086 | 0.185 | 0.136 |
| 14 | yv2 | ~ xm21 | iAP | 0.136 | 0.025 | 5.362 | 0.000 | 0.086 | 0.185 | 0.136 |


| 15 | yv1 | xm22 | iPP | 0.136 | 0.025 | 5.362 | 0.000 | 0.086 | 0.185 | 0.136 |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| 16 | yv2 | xm22 | iAA | 0.136 | 0.025 | 5.362 | 0.000 | 0.086 | 0.185 | 0.136 |
| 17 | xv 1 | ~ xv 2 |  | 0.057 | 0.021 | 2.744 | 0.006 | 0.016 | 0.098 | 0.057 |
| 18 | yv1 | ~ yv2 |  | 0.032 | 0.010 | 3.336 | 0.001 | 0.013 | 0.051 | 0.032 |
| 19 | mv1 | mv2 |  | 0.149 | 0.041 | 3.670 | 0.000 | 0.069 | 0.228 | 0.149 |
| 20 | xm11 | ~ xm22 |  | 0.018 | 0.010 | 1.703 | 0.089 | -0.003 | 0.038 | 0.018 |
| 21 | xm12 | xm21 |  | 0.025 | 0.009 | 2.672 | 0.008 | 0.007 | 0.043 | 0.025 |
| 22 | xv1 | $\sim 1$ | m1 | 0.000 | 0.032 | 0.000 | 1.000 | -0.063 | 0.063 | 0.000 |
| 23 | xv 2 | $\sim 1$ | m1 | 0.000 | 0.032 | 0.000 | 1.000 | -0.063 | 0.063 | 0.000 |
| 24 | yv1 | $\sim 1$ | m2 | 3.664 | 0.025 | 148.290 | 0.000 | 3.615 | 3.712 | 3.664 |
| 25 | yv2 | $\sim 1$ | m2 | 3.664 | 0.025 | 148.290 | 0.000 | 3.615 | 3.712 | 3.664 |
| 26 | mv1 | $\sim 1$ | m3 | 0.000 | 0.046 | 0.000 | 1.000 | -0.090 | 0.090 | 0.000 |
| 27 | mv2 | $\sim 1$ | m3 | 0.000 | 0.046 | 0.000 | 1.000 | -0.090 | 0.090 | 0.000 |
| 28 | xm11 | $\sim 1$ | m4 | -0.126 | 0.022 | -5.716 | 0.000 | -0.169 | -0.083 | -0.126 |
| 29 | xm22 | $\sim 1$ | m4 | -0.126 | 0.022 | -5.716 | 0.000 | -0.169 | -0.083 | -0.126 |
| 30 | xm12 | $\sim 1$ | m5 | -0.093 | 0.021 | -4.322 | 0.000 | -0.135 | -0.051 | -0.093 |
| 31 | xm21 | $\sim 1$ | m5 | -0.093 | 0.021 | -4.322 | 0.000 | -0.135 | -0.051 | -0.093 |
| 32 | xv1 | $\mathrm{xv1}$ | v1 | 0.248 | 0.021 | 11.852 | 0.000 | 0.207 | 0.289 | 0.248 |
| 33 | xv 2 | xv 2 | v1 | 0.248 | 0.021 | 11.852 | 0.000 | 0.207 | 0.289 | 0.248 |
| 34 | yv1 | yv1 | v2 | 0.113 | 0.010 | 11.699 | 0.000 | 0.094 | 0.131 | 0.113 |
| 35 | yv2 | yv2 | v2 | 0.113 | 0.010 | 11.699 | 0.000 | 0.094 | 0.131 | 0.113 |
| 36 | mv1 | mv1 | v3 | 0.471 | 0.041 | 11.599 | 0.000 | 0.391 | 0.550 | 0.471 |
| 37 | mv2 | mv2 | v3 | 0.471 | 0.041 | 11.599 | 0.000 | 0.391 | 0.550 | 0.471 |
| 38 | xm11 | xm11 | v4 | 0.125 | 0.010 | 12.046 | 0.000 | 0.105 | 0.146 | 0.125 |
| 39 | xm22 | xm22 | v4 | 0.125 | 0.010 | 12.046 | 0.000 | 0.105 | 0.146 | 0.125 |
| 40 | xm12 | xm12 | v5 | 0.111 | 0.009 | 11.869 | 0.000 | 0.093 | 0.129 | 0.111 |
| 41 | xm21 | xm21 | v5 | 0.111 | 0.009 | 11.869 | 0.000 | 0.093 | 0.129 | 0.111 |
| 42 | xv1 | xm11 | c1 | 0.017 | 0.010 | 1.662 | 0.097 | -0.003 | 0.038 | 0.017 |
| 43 | xv2 | xm22 | c1 | 0.017 | 0.010 | 1.662 | 0.097 | -0.003 | 0.038 | 0.017 |
| 44 | xv2 | xm11 | c2 | -0.004 | 0.010 | -0.388 | 0.698 | -0.025 | 0.016 | -0.004 |
| 45 | xv1 | xm22 | c2 | -0.004 | 0.010 | -0.388 | 0.698 | -0.025 | 0.016 | -0.004 |
| 46 | xv1 | xm12 | c3 | 0.012 | 0.010 | 1.262 | 0.207 | -0.007 | 0.032 | 0.012 |
| 47 | xv2 | xm21 | c3 | 0.012 | 0.010 | 1.262 | 0.207 | -0.007 | 0.032 | 0.012 |
| 48 | xv2 | xm12 | c4 | -0.004 | 0.010 | -0.409 | 0.682 | -0.023 | 0.015 | -0.004 |
| 49 | xv1 | xm21 | c4 | -0.004 | 0.010 | -0.409 | 0.682 | -0.023 | 0.015 | -0.004 |
| 50 | mv1 | xm11 | c5 | -0.042 | 0.015 | -2.844 | 0.004 | -0.070 | -0.013 | -0.042 |
| 51 | mv2 | xm22 | c5 | -0.042 | 0.015 | -2.844 | 0.004 | -0.070 | -0.013 | -0.042 |
| 52 | mv2 | xm11 | c6 | -0.016 | 0.015 | -1.086 | 0.277 | -0.045 | 0.013 | -0.016 |
| 53 | mv1 | xm22 | c6 | -0.016 | 0.015 | -1.086 | 0.277 | -0.045 | 0.013 | -0.016 |
| 54 | mv1 | xm12 | c7 | -0.016 | 0.014 | -1.154 | 0.248 | -0.043 | 0.011 | -0.016 |
| 55 | mv2 | xm21 | c7 | -0.016 | 0.014 | -1.154 | 0.248 | -0.043 | 0.011 | -0.016 |
| 56 | mv2 | xm12 | c8 | -0.015 | 0.014 | -1.074 | 0.283 | -0.042 | 0.012 | -0.015 |
| 57 | mv1 | xm21 | c8 | -0.015 | 0.014 | -1.074 | 0.283 | -0.042 | 0.012 | -0.015 |
| 58 | xm11 | xm12 | c9 | 0.039 | 0.007 | 5.273 | 0.000 | 0.025 | 0.054 | 0.039 |
| 59 | xm21 | xm22 | c9 | 0.039 | 0.007 | 5.273 | 0.000 | 0.025 | 0.054 | 0.039 |
| 60 | xm11 | xm21 | c10 | 0.019 | 0.007 | 2.581 | 0.010 | 0.005 | 0.034 | 0.019 |
| 61 | xm12 | xm22 | c10 | 0.019 | 0.007 | 2.581 | 0.010 | 0.005 | 0.034 | 0.019 |
| 62 | mv1 | $\mathrm{xv1}$ | c11 | -0.126 | 0.022 | -5.593 | 0.000 | -0.170 | -0.082 | -0.126 |
| 63 | mv2 | xv 2 | c11 | -0.126 | 0.022 | -5.593 | 0.000 | -0.170 | -0.082 | -0.126 |
| 64 | mv2 | $\mathrm{xv1}$ | c12 | -0.093 | 0.022 | -4.119 | 0.000 | -0.137 | -0.049 | -0.093 |
| 65 | $\begin{gathered} \text { mv1 } \\ \text { std.a } \end{gathered}$ | $\begin{array}{ll} \sim & \text { xv2 } \\ \text { all } & \end{array}$ | c12 | -0.093 | 0.022 | -4.119 | 0.000 | -0.137 | -0.049 | -0.093 |
| 1 | -0.3 |  |  |  |  |  |  |  |  |  |
| 2 | -0.3 |  |  |  |  |  |  |  |  |  |


| 3 | -0.126 |
| :--- | ---: |
| 4 | -0.126 |
| 5 | 0.242 |
| 6 | 0.242 |
| 7 | 0.162 |
| 8 | 0.162 |
| 9 | 0.097 |
| 10 | 0.097 |
| 11 | 0.091 |
| 12 | 0.091 |
| 13 | 0.091 |
| 14 | 0.091 |
| 15 | 0.097 |
| 16 | 0.097 |
| 17 | 0.232 |
| 18 | 0.285 |
| 19 | 0.316 |
| 20 | 0.141 |
| 21 | 0.225 |
| 22 | 0.000 |
| 23 | 0.000 |
| 24 | 7.393 |
| 25 | 7.393 |
| 26 | 0.000 |
| 27 | 0.000 |
| 28 | -0.355 |
| 29 | -0.355 |
| 30 | -0.278 |
| 31 | -0.278 |
| 32 | 1.000 |
| 33 | 1.000 |
| 34 | 0.458 |
| 35 | 0.458 |
| 36 | 1.000 |
| 37 | 1.000 |
| 38 | 1.000 |
| 39 | 1.000 |
| 40 | 1.000 |
| 41 | 1.000 |
| 42 | 0.099 |
| 43 | 0.099 |
| 44 | -0.023 |
| 45 | -0.023 |
| 46 | 0.075 |
| 47 | 0.075 |
| 48 | -0.024 |
| 49 | -0.024 |
| 50 | -0.172 |
| 51 | -0.172 |
| 56 | -0.066 |
| 5 | -0.066 |
|  | -0.070 |


| 57 | -0.065 |
| ---: | ---: |
| 58 | 0.331 |
| 59 | 0.331 |
| 60 | 0.162 |
| 61 | 0.162 |
| 62 | -0.368 |
| 63 | -0.368 |
| 64 | -0.271 |
| 65 | -0.271 |

## 4. Figures

Figure 1: The Effect for the Actor's Other Positivity at Different Actor or Partner Moderator Values


Figure 2: The Effect for the Partner's Other Positivity at Different Actor or Partner Moderator Values


Figure 3: The Effect for the Actor's Other Positivity at Different Actor and Partner Moderator Values


Figure 4: The Effect for the Partner's Other Positivity at Different Actor and Partner Moderator Values


Figure 5: The Effect for the Actor's Other Positivity with Constraints at Different Actor or Partner Moderator Value:


Figure 6: The Effect for the Partner's Other Positivity with Constraints at Different Actor or Partner Moderator Value


Figure 7: The Effect for the Actor's Other Positivity with Constraints at Different Actor and Partner Moderator Value


Figure 8: The Effect for the Partner's Other Positivity with Constraints at Different Actor and Partner Moderator Valu


