Moderation in the Actor-Partner Interdependence Model

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Today’s Talk

* Typology of the types of APIMs with moderation

* Finding patterns and estimating simpler submodels
Types of Moderators
Types of Moderators

* **Within-Dyads Moderator**
  * Example: Gender
  * Two moderation effects

* **Between-Dyads Moderator**
  * Example: Years Married
  * Indistinguishable: Two moderation effects
  * Distinguishable: Four moderation effects
Types of Moderators

* Mixed Moderator
  * Example: Feelings of closeness
  * There are actually two moderator variables
    1. Member 1’s feelings of closeness
    2. Member 2’s feelings of closeness

* Indistinguishable: Four moderation effects
* Distinguishable: Eight moderation effects!!
Patterns of Moderation Effects
Moderation Patterns

- Individual tests of moderation have lower power than the tests for patterns
- Trimming may be problematic since it may be unlikely that any one moderation effect is significant
- Finding patterns among the moderation effects can help to reduce this complexity and aid in the theoretical understanding of the results
### Distinguishable dyads

<table>
<thead>
<tr>
<th>Moderation Effect</th>
<th>Model</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Actor-only</td>
</tr>
<tr>
<td></td>
<td>Partner-only</td>
</tr>
<tr>
<td></td>
<td>Couple</td>
</tr>
<tr>
<td></td>
<td>Contrast</td>
</tr>
<tr>
<td>Member 1</td>
<td></td>
</tr>
<tr>
<td>Actor by Moderator</td>
<td></td>
</tr>
<tr>
<td>Partner by Moderator</td>
<td></td>
</tr>
<tr>
<td>Member 2</td>
<td></td>
</tr>
<tr>
<td>Actor by Moderator</td>
<td></td>
</tr>
<tr>
<td>Partner by Moderator</td>
<td></td>
</tr>
</tbody>
</table>
Example Data


* Middle class, dual-career couples living in the United States (N= 290)

* Distinguishing Variable
  * Gender

* Y = Happy with role responsibility
* X = Actor depressive symptoms
* X’ = Partner depressive symptoms

* Between-Dyads Moderator
  * M = Time living together
### Saturated Model – DV: Happiness

<table>
<thead>
<tr>
<th>Effect</th>
<th>Coefficient</th>
<th>SE</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intercept</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Husband</td>
<td>3.736</td>
<td>0.167</td>
<td>&lt;.001</td>
</tr>
<tr>
<td>Wife</td>
<td>4.082</td>
<td>0.137</td>
<td>&lt;.001</td>
</tr>
<tr>
<td>Wife Main Effects Depression</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Actor</td>
<td>-0.026</td>
<td>0.009</td>
<td>.006</td>
</tr>
<tr>
<td>Partner</td>
<td>-0.036</td>
<td>0.009</td>
<td>&lt;.001</td>
</tr>
<tr>
<td>Husband Main Effects Depression</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Actor</td>
<td>-0.032</td>
<td>0.008</td>
<td>&lt;.001</td>
</tr>
<tr>
<td>Partner</td>
<td>-0.018</td>
<td>0.008</td>
<td>.021</td>
</tr>
</tbody>
</table>

| Decades Together Main Effect                   | Husband     | 7.211 | .717 |
|                                                | Wife        | 8.767 | .988 |
| Wife Depression by Decades                     |             |     |      |
| Actor by Moderator                             | -0.031      | 0.011 | .005 |
| Partner by Moderator                           | -0.014      | 0.012 | .244 |
| Husband Depression by Decades                  |             |     |      |
| Actor by Moderator                             | 0.024       | 0.010 | .019 |
| Partner by Moderator                           | -0.023      | 0.009 | .011 |

- Three of the four interactions are statistically significant.
- The pattern of moderation for wives suggests a couple moderation model while for husbands it suggests a contrast moderation model.
### Between Dyads Moderator – Distinguishable Dyads

<table>
<thead>
<tr>
<th>Patterns</th>
<th>Effect Interacting with Decades Together</th>
<th>Fit</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Wife Actor</td>
<td>Wife Partner</td>
</tr>
<tr>
<td>Saturated Model</td>
<td>-0.031</td>
<td>-0.014</td>
</tr>
<tr>
<td>Both Couple</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Both Contrast</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Wife Couple Husband Contrast</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Wife Contrast Husband Couple</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

* **Wife Couple and Husband Contrast model:**
  * For wives, the longer the couple has lived together the stronger the effect of depression of the couple is on her happiness.
  * For husbands, the longer the two have lived together the greater the effect of his wife’s depression relative to his depression on his unhappiness.
Moderation of the Parameter k
Kenny and Ledermann (2010)

- $k$ is the ratio of the partner effect to the actor effect
- When $k$ is 1 we have couple level model, $k$ equal to $-1$ is contrast model, and $k$ equal to zero is actor-only model

- The parameter $k$, and its confidence interval, is estimated using phantom variables
Moderation of the Parameter $k$

* Define $k_M$ as the ratio of the effect of $X'M$ to the effect of $XM$
  * For the wives in our example, we might expect $k_M$ to be equal to 1, indicating a couple moderation model

* Test for moderation of $k$
  * The common $k$ model: If we assume that $k = k_M$
  * The moderator changes both the actor and partner effects, but the ratio of partner to actor effects does not change as the moderator changes – $k$ is not moderated
Estimating the Common k Model

1. **Wife's Depression by Decades Together**
2. **Wife's Depression**
3. **Decades Together**
4. **Husband's Depression**
5. **Husband's Depression by Decades Together**

Paths:
- **ActModWife**
- **PartModHus**
- **p_H**
- **p_W**
- **a_H**
- **a_W**

End nodes:
- **Wife's Happiness**
- **Husband's Happiness**

Connections:
- **1** from **W** to **E**
- **1** from **H** to **E**
Estimating the Common k Model

Wife’s Depression
by Decades Together

ActModWife

Wife’s Depression

ActModHus

Decades Together

a_W

Husband’s Depression

a_H

Husband’s Depression by Decades Together

ActModWife

ActModHus

Wife’s Happiness

k_W

k_MW

p_1

p_3

p_4

k_H

k_MH

Husband’s Happiness

1

E_W

E_h

* k_W = k_MW
* k_H = k_MH
For wives this was a good fitting model \( (\chi^2(1) = 1.50, p = .221) \), but for Husbands, the fit for the common k model was poor \( (\chi^2(1) = 9.68, p = .002) \)

- The value of the common k for wives was 1.05 [0.31, 3.34]
- For men: \( k = .605 [.120, 1.677], k_M = -1.002 [-5.234, -.209] \)

Thus, we conclude for wives, \( k \) is not moderated by Decades Together, but for husbands it is. The parameter \( k \) decreases for husbands the longer that the couple has been together.
APIM used frequently by dyadic researchers and moderation is included more and more—important to think carefully about these interactions

Finding patterns in the moderation effects can simplify APIM models with a large number of moderation terms

Help dyadic researchers arrive at a summary of their results that is more easily related to theory
Thank You