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Addendum:

Post-hoc Probing of Significant Moderational and Mediational Effects in Studies of Pediatric Populations

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Author Notes

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I hope this helps!
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Computational Example: 3-way Interaction

The strategy for probing a three-way interaction is similar, but more complex (see Aiken & West, 1991, for an example involving three continuous variables). The example that I present involves a significant three-way interaction between group (GROUP), gender (GENDER), and observed maternal behavioral control (MBC) in predicting teacher-reported externalizing symptoms (TEXT). GROUP and GENDER were coded as follows: GROUP (spina bifida) = 0, GROUP (able-bodied) = 1; GENDER (male) = 0, GENDER (female) = 1. MBC was centered in the same way as in computational example #2 (i.e., MBC [centered] = MBC - 4.29). The three-way interaction (GROUP x GENDER x MBC) emerged as significant in the initial regression and needed to be probed. The initial equation included all main effects, all possible two-way interactions, and the three-way interaction. In this case, we needed to generate 4 simple slopes, one for each combination of group by gender (i.e., males with spina bifida, females with spina bifida, able-bodied males, able-bodied females). For this analysis, four conditional moderator variables are needed (i.e., GROUPSB, GROUPAB, GENDERM, and GENDERF). The conditional values were computed as follows:

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Compute GROUPSB = GROUP
Compute GROUPAB = GROUP-1
Compute GENDERM = GENDER
Compute GENDERF = GENDER-1
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Eight two-way and four three-way interaction terms were also computed:

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Compute SB_MBC = GROUPSB x MBC
Compute AB_MBC = GROUPAB x MBC
Compute M_MBC = GENDERM x MBC
Compute F_MBC = GENDERF x MBC
Compute SB_M = GROUPSB x GENDERM
Compute SB_F = GROUPSB x GENDERF
Compute AB_M = GROUPAB x GENDERM
Compute AB_F = GROUPAB x GENDERF
Compute SB_M_MBC = GROUPSB x GENDERM x MBC
Compute SB_F_MBC = GROUPSB x GENDERF x MBC
Compute AB_M_MBC = GROUPAB x GENDERM x MBC
Compute AB_F_MBC = GROUPAB x GENDERF x MBC
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Four regressions were run, one for each group by gender condition; the following equations was generated for these analyses:

For males in the spina bifida sample:

$$TEST_{est} = -3.917\,(GROUPSB) + .575\,(GENDERM) - 11.703\,(MBC) + .555\,(SB\_M) + 9.600\,(SB\_MBC) + 16.538\,(M\_MBC) - 14.925\,(SB\_M\_MBC) + 52.638$$

For females in the spina bifida sample:

$$TEST_{est} = -3.362\,(GROUPSB) + .575\,(GENDERF) + 4.835\,(MBC) + .555\,(SB\_F) - 5.325\,(SB\_MBC) + 16.538\,(F\_MBC) - 14.925\,(SB\_F\_MBC) + 53.213$$

For males in the able-bodied sample:

$$TEST_{est} = -3.917\,(GROUPAB) + 1.130\,(GENDERM) - 2.104\,(MBC) + .555\,(AB\_M) + 9.600\,(AB\_MBC) + 1.614\,(M\_MBC) - 14.925\,(AB\_M\_MBC) + 48.722$$

For females in the able-bodied sample:

$TEST_{est}$ = - 3.362 (GROUPAB) + 1.130 (GENDERF) - .490 (MBC) + .555 (AB_F) - 5.325 (AB_MBC) + 1.614 (F_MBC) - 14.925 (AB_F_MBC) + 49.851

As was the case above with the two-way interactions, when 0 is substituted for the group and gender variables in the equation, all interaction terms and several main effect terms drop out, leaving the following reduced equations:

For males in the spina bifida sample:

$TEST_{est}$ = - 11.703 (MBC) + 52.638 t (114) = - 2.83**

For females in the spina bifida sample:

$TEST_{est}$ = 4.835 (MBC) + 53.213 t (114) = 1.32

For males in the able-bodied sample:

$TEST_{est}$ = - 2.104 (MBC) + 48.722 t (114) = - .65

For females in the able-bodied sample:

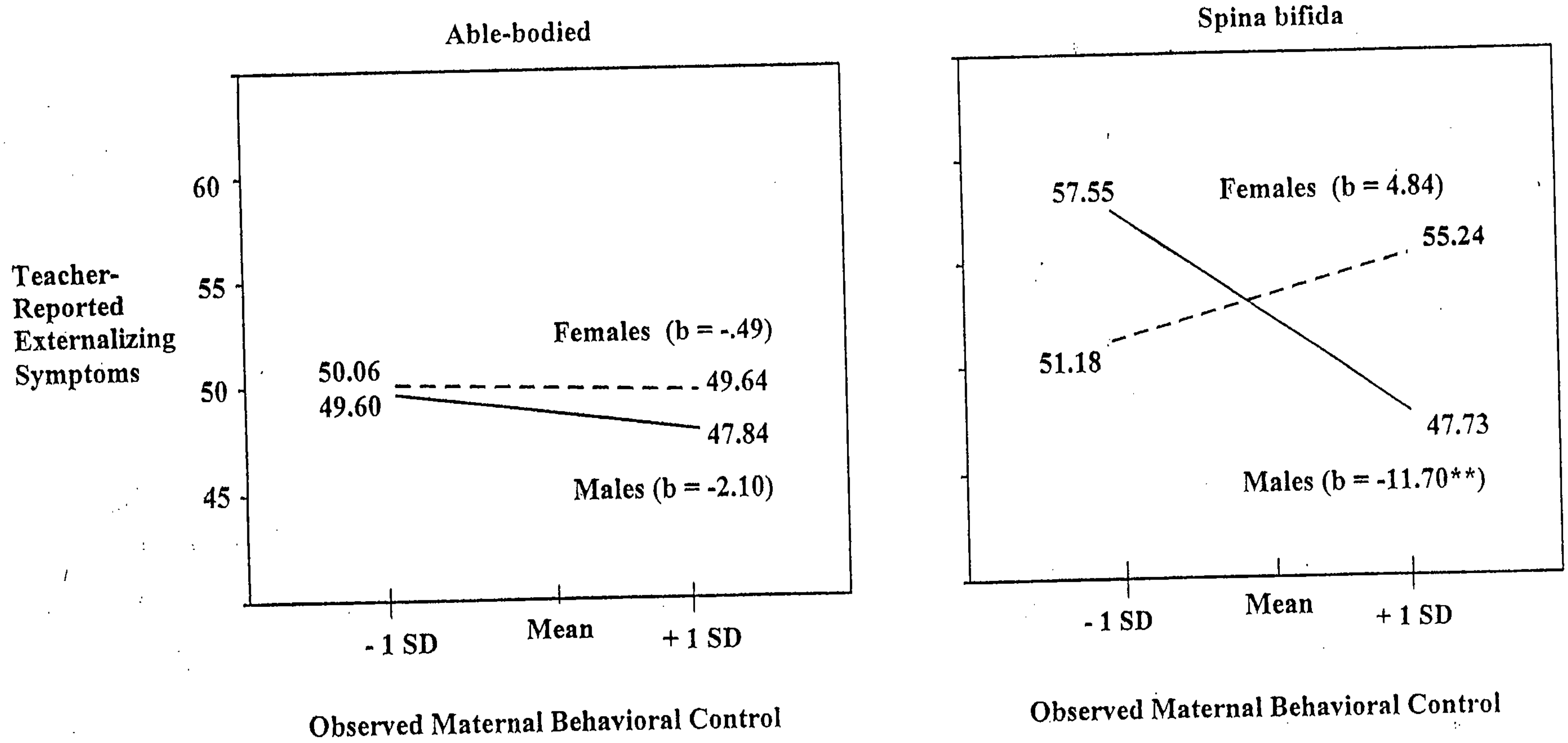
$TEST_{est}$ = - .490 (MBC) + 49.851 t (114) = - .17

The coefficient for MBC is the simple slope for a particular gender in a particular group. The regression lines can be plotted by substituting high (1 SD above the mean; .42) and low (1 SD below the mean; -.42) values of MBC into all 4 equations. These lines were plotted and appear in Figure 1. These regression lines indicate that for males in the spina bifida sample, higher levels of observed maternal behavioral control were associated with lower levels of teacher-reported externalizing symptoms.

Aiken, L. S., & West, S. G. (1991). Multiple regression: Testing and interpreting interactions. Newbury Park, CA: Sage.

Figure Caption

Figure 1: Regression lines for relations between observed maternal behavioral control and teacher-reported externalizing symptoms as moderated by gender and group status (a 3-way interaction). b = unstandardized regression coefficient (i.e., simple slope); SD = standard deviation.



Able-bodied
Teacher-Reported Externalizing Symptoms
60
55
50
45
Females (b = -.49)
50.06
49.64
49.60
47.84
Males (b = -2.10)
- 1 SD
Mean
+ 1 SD
Observed Maternal Behavioral Control
Spina bifida
57.55
Females (b = 4.84)
55.24
51.18
47.73
Males (b = -11.70**)
- 1 SD
Mean
+ 1 SD
Observed Maternal Behavioral Control

** = $p<0.01$