Main effects and Interactions in factorial designs

Single factor - PHYSICAL STATE

2nd factor - did well
Took quiz again
What kind of design? Between groups or repeated measures?

Additive effect
Another way of looking at it

Additive effect = one factor has the same effect at all levels of the other factor

MAIN EFFECT - effect of each variable on the outcome, collapsed across the other condition (factor).

The overall effect of each independent variable.

Main effect of factor A: Physical state affected mood
Main effect of factor B: Doing well on the quiz affected mood in a positive way

Main effects and Interactions in factorial designs

INTERACTION - effect of one factor differs, depending on the level of the other factor.

Important when doing ANOVA
Example

OUTCOME (dependent variable) = mean number of problems attempted

TEACHER’S RESPONSE

<table>
<thead>
<tr>
<th>AGE GROUP</th>
<th>No praise</th>
<th>Praise</th>
</tr>
</thead>
<tbody>
<tr>
<td>Elementary (n=30)</td>
<td>6.2</td>
<td>10.8</td>
</tr>
<tr>
<td>Junior high (n=34)</td>
<td>11.7</td>
<td>8.3</td>
</tr>
<tr>
<td>High school (n=32)</td>
<td>12.4</td>
<td>12.1</td>
</tr>
</tbody>
</table>

What do you think the effect of praise will be?

Additive? Describe an interaction effect.

Look at the plotted lines
parallel = no interaction

Main effects and Interactions in factorial designs

INTERACTION = effect of one independent variable differs, depending on the level of the other independent variable

MAIN EFFECT = effect of each variable on the outcome

Not meaningful when an interaction is present.

Always analyze a significant interaction before looking at main effects.
Pardon My Gaffe

INDEPENDENT VARIABLES

A SEVERITY of consequences
   a1 Serious (camera)
   a2 Mild (paper)

B STATUS of offender
   b1 High (interviewer)
   b2 Low (interviewee)

C GENDER of offender
   c1 Male
   c2 Female

DEPENDENT VARIABLE
Number of account elements

Design?
2 x 2 x 2
Severity x Status x Gender
(2 levels of each)
"between subjects factorial design"

A x B Interaction
F(1,72) = 58.54, p = .001
Severity x Status interaction

A SEVERITY - Serious
   b1 High M = 5.63
   b2 Low M = 4.88
   n.s.

A SEVERITY - Mild
   b1 High M = 4.22
   b2 Low M = 6.08

F(1,72) = 6.99, p = .01

Factor C, GENDER, did NOT interact with either of the other 2 factors.

Main effect of GENDER
(effect of gender across severity and status)

GENDER   Mean # account elements
Male      4.22
Female    6.08

F(1,72) = 58.54, p = .001