

Practice with 2x2 Mixed Factorial Designs

1. The purpose of the study was also to examine effect of participation in sports upon school performance and to consider whether that effect would differ across age groups. In this study a group of 1st graders who were participating in organized sports and another group of 1st graders who were not participating in organized sports were identified and followed through 5th grade. The outcome measure was a composite score from their classroom grades with a score range from 0-20. Any student in the study that shifted into or out of sports participation was dropped from the study.
 - a. Draw and label the boxes depicting this 2x2 mixed group design.
 - b. What are the "effects" in the study?

--

--

--
 - c. Which effects are causally interpretable?

Here are the output...

Descriptive Statistics

	SPORTS	Mean	Std. Deviation	N
G1SCORE	no	10.8182	4.49584	66
	yes	14.1000	4.91176	60
	Total	12.3810	4.96041	126
G5SCORE	no	11.5606	4.42068	66
	yes	19.5167	5.58597	60
	Total	15.3492	6.38789	126

- b. Transpose the cell and marginal means into the table you drew above.

Tests of Within-Subjects Effects

Measure: MEASURE_1

Source		Type III Sum of Squares	df	Mean Square	F	Sig.
GRADE	Sphericity Assumed	596.112	1	596.112	26.290	.000
GRADE * SPORTS	Sphericity Assumed	343.334	1	343.334	15.142	.000
Error(GRADE)	Sphericity Assumed	2811.602	124	22.674		

Tests of Between-Subjects Effects

Measure: MEASURE_1

Transformed Variable: Average

Source	Type III Sum of Squares	df	Mean Square	F	Sig.
Intercept	49272.000	1	49272.000	2011.859	.000
SPORTS	1984.556	1	1984.556	81.033	.000
Error	3036.857	124	24.491		

- c. For the interaction... Do we need to compute the LSDmmd? Why or why not?
- d. To compute the LSDmmd we'll need df_{error} _____ MSe _____ n _____ $LSDmmd$ _____
- e. Put $<$, $>$ & $=$ in the table above to portray the simple effects of Sports Participation for each Grade.
- f. Describe the interaction using these simple effects
- g. Put $<$, $>$ & $=$ in the table above to portray the simple effects of Grade for each condition of Sports Participation.
- h. Describe the interaction using these simple effects.
- i. For the main effect of Sports... Do we need to use the LSDmmd? Why or why not?
- j. Put $<$, $>$ & $=$ in the table above to portray the Main effect of Sports Participation
- k. Is the main effect of Sport Presentation descriptive or potentially misleading?
- l. For the main effect of Grade... Do we need to compute the LSDmmd? Why or why not?
- m. Put $<$, $>$ & $=$ in the table above to portray the Main effect of Grade
- n. Is the main effect of Grade descriptive or potentially misleading?

- o. One RH: was that grades would improve for all students, but that those who participated in sports would show a larger improvement.
- Is this a main effect RH: or a RH: about an interaction?
 - Which set of simple effects would be used for the most direct test of the RH:?
 - Is this RH: support, partially supported or not supported by the results? Explain your answer.
- p. A second RH: was that those who participated in sports would have higher grades.
- Is this a main effect RH: or a RH: about an interaction?
 - Is this RH: support, partially supported or not supported by the results? Explain your answer.
- q. A third RH: was that 5th graders would have higher grades than 1st graders
- Is this a main effect RH: or a RH: about an interaction?
 - Is this RH: support, partially supported or not supported by the results? Explain your answer.