Example 3: Factorial ANOVA Results with Nonsignificant Interaction

A 2 X 3 ANOVA was conducted on grade point average improvement with respect to differences in note-taking methods and gender. An alpha level of .05 was utilized for this study. Males and females were normally distributed. Note-taking method was also normally distributed for method 1, method 2, and the control group. Variances were homogeneous, *FLevene* (5, 54) = .575, *p* = .719.

There was not a statistically significant interaction between gender and note-taking method, *F*(2, 54) = 2.921, *p* = .062. Statistically significant differences were found in grade point average improvement between males and females, *F*(1, 54) = 15.86, *p* < .001. Males had significantly improved their gpa compared to females (see Table 1). A large effect size was noted *d* = .80 (95% CI [.28, 1.34]) indicating a strong degree of practical significance. Replication of this analysis could yield effects that range from small to large, suggesting some instability in this finding. Statistically significant differences were found in grade point average improvement among note-taking methods, *F*(2, 54) = 17.809, *p* < .001. A large effect size was noted *f* = .77 (95% CI [.47, 1.08]) indicating a strong degree of practical significance. Replication of this analysis could yield effects that range from large to very large, suggesting this finding is relatively stable. A Tukey post hoc analysis was conducted on note-taking method. Method 2 was statistically significantly higher than both the control group (*p* < .001) and Method 1 (*p* = .001) (see table 2). Large effect sizes were noted between method 2 and method 1, *d* = .94, method 2 and the control group, *d* = 1.65, and method 1 and control, *d* = .63. Given the sample size of *n* = 60, statistical significance would be detected for large effect sizes, *f* > .41.

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| Table 1 |  | |  |  |  |  |
| *Change in GPA Across Gender and Note-Taking Method* | | | | | | |
| Gender | | Mean | SD | *n* |  |  |
| Men | | 0.38 | 0.27 | 30 |  |  |
| Women | | 0.19 | 0.19 | 30 |  |  |
| Method 1 | | 0.25 | 0.22 | 20 |  |  |
| Method 2 | | 0.47 | 0.25 | 20 |  |  |
| Control | | 0.14 | 0.15 | 20 |  |  |

Table 2.

| **Post Hoc Comparisons - method** | | | | | | | | | | | | | | | | | |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | | | | | | **95% CI for Mean Difference** | | | |  | | | | | | | |
|  | |  | | **Mean Difference** | | **Lower** | | **Upper** | | **SE** | | **t** | | **Cohen's d** | | **p tukey** | |
| Method, 1 |  | Method, 2 |  | -0.220 |  | -0.358 |  | -0.082 |  | 0.057 |  | -3.832 |  | -0.939 |  | < .001 |  |
|  |  | Control |  | 0.118 |  | -0.021 |  | 0.256 |  | 0.057 |  | 2.047 |  | 0.631 |  | 0.111 |  |
| Method, 2 |  | Control |  | 0.337 |  | 0.199 |  | 0.476 |  | 0.057 |  | 5.878 |  | 1.651 |  | < .001 |  |
|  | | | | | | | | | | | | | | | | | |
| *Note.*  Cohen's d does not correct for multiple comparisons. | | | | | | | | | | | | | | | | | |
| *Note.*  P-value and confidence intervals adjusted for comparing a family of 3 estimates (confidence intervals corrected using the tukey method). | | | | | | | | | | | | | | | | | |
| *Note.*  Results are averaged over the levels of: gender | | | | | | | | | | | | | | | | | |