MM-SR Statistical Analysis

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Introduction To This Document

Below you will find multiple chi-square, two-proportion tests to statistically analyze differences between mixed methods, educational, IES funded studies and non-IES funded published journal articles. This document is divided into two sections: one that analyzes qualitative analyses information and one that analyzes quantitative analyses information from our documents. Both sections involve a significance table at the end of each section to condense findings into one easily readable space. The proportion test we used derived from the **{stats}** package.

- prop.test() is a function that tests the proportions of "successes" of two categorical groups
- at minimum, it requires two things within function: x and n
- x vector is the observed values; c() indicates a list of values
- n vector is sample size of both groups; c() indicates a list of values
- the first values from x = c(x, y) corresponds to the first value of n = c(z, w), so that a count of x is associated with a sample size of z, and a count of y is associated with a sample size of w.
- a two-sided alternative hypothesis was used, as we did not commit to a prior hypothesis.
- conf.level = 0.95 indicates that a 95% confidence level was set for the confidence intervals
- correct = FALSE was used, as the Yates continuinity correction was not implemented
- more info and documentation about prop.test() and its components can be found via "?prop.test" without the quotation marks

Qualitative Data Analysis Method

Journal Articles vs. IES Funded Study Reporting

Was there a significant difference in the frequency that a qualitative data analysis method was reported when comparing these two groups?

```
prop.test(x = c(234, 39), n = c(256, 295), alternative = "two.sided",
          conf.level = 0.95, correct = FALSE)
```

```
##
##  2-sample test for equality of proportions without continuity
```

```
##  correction
##
## data:  c(234, 39) out of c(256, 295)
## X-squared = 335.17, df = 1, p-value < 2.2e-16
## alternative hypothesis: two.sided
## 95 percent confidence interval:
##  0.7301612 0.8335570
## sample estimates:
##    prop 1    prop 2
## 0.9140625 0.1322034
```

Journal Articles Level 1 vs. IES Funded Study Level 1

Was there a significant difference in the frequency that a qualitative data analysis method of complexity level 1 was reported when comparing these two groups?

```
prop.test(x = c(54, 4), n = c(256, 295), alternative = "two.sided",
          conf.level = 0.95, correct = FALSE)
```

```
##
##  2-sample test for equality of proportions without continuity
##  correction
##
## data:  c(54, 4) out of c(256, 295)
## X-squared = 56.694, df = 1, p-value = 5.092e-14
## alternative hypothesis: two.sided
## 95 percent confidence interval:
##  0.1456891 0.2490673
## sample estimates:
##     prop 1     prop 2
## 0.21093750 0.01355932
```

Journal Articles Level 2 vs. IES Funded Study Level 2

Was there a significant difference in the frequency that a qualitative data analysis method of complexity level 2 was reported when comparing these two groups?

```
prop.test(x = c(131, 25), n = c(256, 295), alternative = "two.sided",
          conf.level = 0.95, correct = FALSE)
```

```
##
##  2-sample test for equality of proportions without continuity
##  correction
##
## data:  c(131, 25) out of c(256, 295)
## X-squared = 123.11, df = 1, p-value < 2.2e-16
```

```
## alternative hypothesis: two.sided
## 95 percent confidence interval:
##  0.3579846 0.4959613
## sample estimates:
##     prop 1     prop 2
## 0.51171875 0.08474576
```

Journal Articles Level 3 vs. IES Funded Study Level 3

Was there a significant difference in the frequency that a qualitative data analysis method of complexity level 3 was reported when comparing these two groups?

```
prop.test(x = c(162, 15), n = c(256, 295), alternative = "two.sided",
          conf.level = 0.95, correct = FALSE)
```

```
##
##  2-sample test for equality of proportions without continuity
##  correction
##
## data:  c(162, 15) out of c(256, 295)
## X-squared = 212.89, df = 1, p-value < 2.2e-16
## alternative hypothesis: two.sided
## 95 percent confidence interval:
##  0.5178152 0.6461149
## sample estimates:
##     prop 1     prop 2
## 0.63281250 0.05084746
```

Findings

Figure 1. Significance Table

Chi-Square Two-Proportion Test	Results
Reporting of a Qualitative Analysis Method	Statistically significant difference ($\chi^2 = 335.17$, $p < 0.05$) where journal articles reported the use of a qualitative data analysis method significantly more than IES funded studies.
Utilized Qualitative Analysis Method of Complexity Level 1	Statistically significant difference ($\chi^2 = 56.69$, $p < 0.05$) where journal articles reported using a qualitative data analysis method of complexity level 1 significantly more than IES funded studies.

Chi-Square Two-Proportion Test	Results
Utilized Qualitative Analysis Method of Complexity Level 2	Statistically significant difference ($\chi^2 = 123.11$, $p < 0.05$) where journal articles reported using a qualitative data analysis method of complexity level 2 significantly more than IES funded studies.
Utilized Qualitative Analysis Method of Complexity Level 3	Statistically significant difference ($\chi^2 = 212.89$, $p < 0.05$) where journal articles reported using a qualitative data analysis method of complexity level 3 significantly more than IES funded studies.

Quantitative Data Analysis Method

Journal Articles vs. IES Funded Study Reporting

Was there a significant difference in the frequency that a quantitative data analysis method was reported when comparing these two groups?

```
prop.test(x = c(256, 295), n = c(256, 295), alternative = "two.sided",
          conf.level = 0.95, correct = FALSE)
```

```
## Warning in prop.test(x = c(256, 295), n = c(256, 295), alternative =
## "two.sided", : Chi-squared approximation may be incorrect
```

```
##
##  2-sample test for equality of proportions without continuity
##  correction
##
## data:  c(256, 295) out of c(256, 295)
## X-squared = NaN, df = 1, p-value = NA
## alternative hypothesis: two.sided
## 95 percent confidence interval:
##  0 0
## sample estimates:
## prop 1 prop 2
##      1      1
```

Journal Articles Level 1 vs. IES Funded Study Level 1

Was there a significant difference in the frequency that a quantitative data analysis method of complexity level 1 was reported when comparing these two groups?

```
prop.test(x = c(154, 59), n = c(256, 295), alternative = "two.sided",
          conf.level = 0.95, correct = FALSE)
```

```
##
##  2-sample test for equality of proportions without continuity
##  correction
##
## data:  c(154, 59) out of c(256, 295)
## X-squared = 93.202, df = 1, p-value < 2.2e-16
## alternative hypothesis: two.sided
## 95 percent confidence interval:
##  0.3261958 0.4769292
## sample estimates:
##    prop 1    prop 2
## 0.6015625 0.2000000
```

Journal Articles Level 2 vs. IES Funded Study Level 2

Was there a significant difference in the frequency that a quantitative data analysis method of complexity level 2 was reported when comparing these two groups?

```
prop.test(x = c(172, 56), n = c(256, 295), alternative = "two.sided",
          conf.level = 0.95, correct = FALSE)
```

```
##
##  2-sample test for equality of proportions without continuity
##  correction
##
## data:  c(172, 56) out of c(256, 295)
## X-squared = 131.3, df = 1, p-value < 2.2e-16
## alternative hypothesis: two.sided
## 95 percent confidence interval:
##  0.409169 0.554920
## sample estimates:
##    prop 1    prop 2
## 0.6718750 0.1898305
```

Journal Articles Level 3 vs. IES Funded Study Level 3

Was there a significant difference in the frequency that a quantitative data analysis method of complexity level 3 was reported when comparing these two groups?

```
prop.test(x = c(56, 93), n = c(256, 295), alternative = "two.sided",
          conf.level = 0.95, correct = FALSE)
```

```
##
##  2-sample test for equality of proportions without continuity
##  correction
##
## data:  c(56, 93) out of c(256, 295)
## X-squared = 6.4698, df = 1, p-value = 0.01097
## alternative hypothesis: two.sided
## 95 percent confidence interval:
##  -0.16982186 -0.02318661
## sample estimates:
##    prop 1    prop 2
## 0.2187500 0.3152542
```

Journal Articles Level 4 vs. IES Funded Study Level 4

Was there a significant difference in the frequency that a quantitative data analysis method of complexity level 4 was reported when comparing these two groups?

```
prop.test(x = c(4, 6), n = c(256, 295), alternative = "two.sided",
          conf.level = 0.95, correct = FALSE)
```

```
## Warning in prop.test(x = c(4, 6), n = c(256, 295), alternative = "two.sided", :
## Chi-squared approximation may be incorrect
```

```
##
##  2-sample test for equality of proportions without continuity
##  correction
##
## data:  c(4, 6) out of c(256, 295)
## X-squared = 0.17092, df = 1, p-value = 0.6793
## alternative hypothesis: two.sided
## 95 percent confidence interval:
##  -0.02685593  0.01742796
## sample estimates:
##     prop 1     prop 2
## 0.01562500 0.02033898
```

Journal Articles Level 5 vs. IES Funded Study Level 5

Was there a significant difference in the frequency that a quantitative data analysis method of complexity level 5 was reported when comparing these two groups?

```
prop.test(x = c(61, 48), n = c(256, 295), alternative = "two.sided",
          conf.level = 0.95, correct = FALSE)
```

```
##
##  2-sample test for equality of proportions without continuity
##  correction
##
## data:  c(61, 48) out of c(256, 295)
## X-squared = 4.9324, df = 1, p-value = 0.02636
## alternative hypothesis: two.sided
## 95 percent confidence interval:
##  0.00850491 0.14263386
## sample estimates:
##    prop 1    prop 2
## 0.2382812 0.1627119
```

Journal Articles Level 6 vs. IES Funded Study Level 6

Was there a significant difference in the frequency that a quantitative data analysis method of complexity level 6 was reported when comparing these two groups?

```
prop.test(x = c(17, 66), n = c(256, 295), alternative = "two.sided",
          conf.level = 0.95, correct = FALSE)
```

```
##
##  2-sample test for equality of proportions without continuity
##  correction
##
## data:  c(17, 66) out of c(256, 295)
## X-squared = 26.514, df = 1, p-value = 2.617e-07
## alternative hypothesis: two.sided
## 95 percent confidence interval:
##  -0.2138192 -0.1008259
## sample estimates:
##     prop 1     prop 2
## 0.06640625 0.22372881
```

Journal Articles Level 7 vs. IES Funded Study Level 7

Was there a significant difference in the frequency that a quantitative data analysis method of complexity level 7 was reported when comparing these two groups?

```
prop.test(x = c(11, 199), n = c(256, 295), alternative = "two.sided",
          conf.level = 0.95, correct = FALSE)
```

```
##
##  2-sample test for equality of proportions without continuity
##  correction
##
```

```
## data:  c(11, 199) out of c(256, 295)
## X-squared = 231.81, df = 1, p-value < 2.2e-16
## alternative hypothesis: two.sided
## 95 percent confidence interval:
##  -0.6905624 -0.5726526
## sample estimates:
##     prop 1     prop 2
## 0.04296875 0.67457627
```

Journal Articles Level 8 vs. IES Funded Study Level 8

Was there a significant difference in the frequency that a quantitative data analysis method of complexity level 8 was reported when comparing these two groups?

```
prop.test(x = c(0, 30), n = c(256, 295), alternative = "two.sided",
          conf.level = 0.95, correct = FALSE)
```

```
##
##  2-sample test for equality of proportions without continuity
##  correction
##
## data:  c(0, 30) out of c(256, 295)
## X-squared = 27.533, df = 1, p-value = 1.544e-07
## alternative hypothesis: two.sided
## 95 percent confidence interval:
##  -0.13618535 -0.06720448
## sample estimates:
##    prop 1    prop 2
## 0.0000000 0.1016949
```

Findings

Figure 2. Significance Table

Chi-Square Two-Proportion Test	Results
Reporting of a Quantitative Analysis Method	No significant difference ($\chi^2 = 0$) where the proportion of IES funded studies reported using a quantitative data analysis method is equal to the proportion of journal articles that reported a quantitative data analysis.
Utilized Quantitative Analysis Method of Complexity Level 1	Statistically significant difference ($\chi^2 = 93.20$, $p < 0.05$) where the number of journal articles reported using a quantitative data analysis method of complexity level 1 was significantly more than IES funded studies.

Chi-Square Two-Proportion Test	Results
Utilized Quantitative Analysis Method of Complexity Level 2	Statistically significant difference ($\chi^2 = 131.30$, $p < 0.05$) where the number of journal articles reported using a quantitative data analysis method of complexity level 2 was significantly more than IES funded studies.
Utilized Quantitative Analysis Method of Complexity Level 3	Statistically significant difference ($\chi^2 = 6.47$, $p < 0.05$) where the number of IES funded studies reported using a quantitative data analysis method of complexity level 3 was significantly more than journal articles.
Utilized Quantitative Analysis Method of Complexity Level 4	Non-significant statistical difference ($\chi^2 = 0.17$, $p > 0.05$) where the number of IES funded studies that used a quantitative data analysis method of complexity level 4 did not significantly differ from journal articles.
Utilized Quantitative Analysis Method of Complexity Level 5	Statistically significant difference ($\chi^2 = 4.93$, $p < 0.05$) where the number of journal articles reported using a quantitative data analysis method of complexity level 5 was significantly more than journal articles.
Utilized Quantitative Analysis Method of Complexity Level 6	Statistically significant difference ($\chi^2 = 26.51$, $p < 0.05$) where the number of IES funded studies reported using a quantitative data analysis method of complexity level 6 was significantly more than journal articles.
Utilized Quantitative Analysis Method of Complexity Level 7	Statistically significant difference ($\chi^2 = 231.81$, $p < 0.05$) where the number of IES funded studies reported using a quantitative data analysis method of complexity level 7 was significantly more than journal articles.
Utilized Quantitative Analysis Method of Complexity Level 8	Statistically significant difference ($\chi^2 = 27.53$, $p < 0.05$) where the number of IES funded studies reported using a quantitative data analysis method of complexity level 8 was significantly more than journal articles.