

Project Description Project Fall 2009

The Effect of a Bully Intervention Program on the Incidence of Being Bullied and the Self-Perception of the School Environment

Description

A school district in northwest Florida received a grant from the National Institute of Mental Health to evaluate the effectiveness of an 18-week intervention program to decrease the incidence of bullying behavior. The intervention program differed from previously implemented intervention programs in that parental training sessions were incorporated into the intervention program as suggested by Stevens, De Bourdeaudhuij, and Van Oost (2002) in their published research. A random sample of 300 sixth graders from the school district's population of 971 sixth graders was selected to potentially participate in the study. Both student and parent permissions to participate in the study were obtained.

During the first nine weeks of the school year, information on each potential student was collected. Each of the selected 300 student was asked to keep a weekly log of the number of incidents of bullying that were perpetrated against him/her. The students were given the following definition to help them decide if they had been bullied. A person is being bullied when he or she is exposed, repeatedly and over time, to negative actions on the part of one or more other persons. The log began the first week of the school year and continued through the end of the ninth week.

During the ninth week of the school year the students were asked to respond to the self-report *Bullying Inventory*. On the basis of each student's responses to the inventory, each student was classified as belonging to one of the four following classifications: victim, bully, bully/victim, and noninvolved. The teachers of the 300 students reviewed the resulting classifications. Students who were classified as a victim, a bully, or a bully/victim ($n = 195$) and for whom there was unanimous agreement among the teachers with the classification based on the self-report of the student ($n = 169$) were eligible for the study. All other students from the initial sample of 300 were not retained for the remainder of the study ($n = 131$). Of the 169 students who were eligible to participate in the study, 30 students, one-half of whom were male and one-half of whom were female, from each of the three classifications of victim, bully, and bully/victim were randomly selected to participate in the study. This last stage of sampling was necessary to enable the district's counselors to have sufficient time to offer the bully intervention sessions.

Self-reported measures of the quality of family functioning and self-perception of the school environment were obtained from each of 90 selected for the study during the ninth week of the school year. Students who had been classified as a bully or as a bully/victim attended weekly bully intervention sessions with the district's counselors. The bully intervention program lasted for 18 weeks. Additionally, the parents of the students who were classified as a bully or as a bully/victim attended weekly group parenting sessions with the counselors. After the intervention sessions ended, all of the 90 students were asked to keep a weekly log of the number of incidents of bullying perpetrated against him/her in the same manner as they had done previously. The logs were kept during the last nine weeks of the school year. Each student's self-reported perception of the school environment was obtained during the last week of school. Refer to Tables 1 and 2 for specific information related to the data collected for the study.

Table 1: Pertinent Information about the Data Collected in the Study

Variable Name	Data Set Name	Interpretation
Student ID	Student ID	No interpretation
Gender	Gender	Male or Female
Bully Classification	Classification	Victim, Bully, or Bully/Victim
Quality of Family Functioning	Family	Quality of family functioning reported as either generally positive or generally negative
Being Bullied	Pre Bully or Post Bully	The higher the number, the greater the number of being bullied incidents
Perception of the School Environment	Pre Sch or Post Sch	Range of scores possible 0 to 50 The higher the number the more positive the perception of the school environment.

Table 2: Project Data

Student ID	Gender	Classification	Family	Pre Bully	Post Bully	Pre Sch	Post Sch
1	Male	Victim	Positive	31	21	35	41
2	Male	Victim	Positive	11	21	24	35
3	Male	Victim	Positive	20	16	22	27
4	Male	Victim	Positive	11	16	27	36
5	Male	Victim	Negative	20	25	13	29
6	Male	Victim	Positive	19	17	25	30
7	Male	Victim	Positive	19	10	29	35
8	Male	Victim	Positive	25	15	37	35
9	Male	Victim	Positive	23	25	36	44
10	Male	Victim	Negative	19	12	21	32
11	Male	Victim	Positive	12	13	27	34
12	Male	Victim	Positive	27	34	32	36
13	Male	Victim	Positive	22	13	30	36
14	Male	Victim	Negative	13	23	19	31
15	Male	Victim	Positive	12	1	32	36
16	Male	Bully	Negative	3	1	23	12
17	Male	Bully	Positive	4	2	33	25
18	Male	Bully	Negative	3	0	30	22
19	Male	Bully	Negative	2	2	25	19
20	Male	Bully	Positive	2	3	37	24
21	Male	Bully	Negative	3	1	27	22
22	Male	Bully	Negative	2	4	23	17
23	Male	Bully	Negative	4	0	22	23
24	Male	Bully	Negative	5	1	20	13
25	Male	Bully	Negative	2	2	24	18
26	Male	Bully	Positive	2	3	34	27
27	Male	Bully	Negative	5	1	12	9
28	Male	Bully	Negative	2	3	22	23
29	Male	Bully	Negative	3	2	22	26
30	Male	Bully	Positive	1	3	32	24
31	Male	Bully/Victim	Positive	8	1	31	29
32	Male	Bully/Victim	Positive	11	11	38	30
33	Male	Bully/Victim	Positive	6	6	28	24
34	Male	Bully/Victim	Negative	16	12	26	24
35	Male	Bully/Victim	Negative	12	9	22	23
36	Male	Bully/Victim	Negative	7	5	22	19
37	Male	Bully/Victim	Positive	6	8	27	24
38	Male	Bully/Victim	Negative	13	2	21	21
39	Male	Bully/Victim	Positive	8	6	29	26
40	Male	Bully/Victim	Positive	5	3	25	24
41	Male	Bully/Victim	Negative	7	6	24	25
42	Male	Bully/Victim	Positive	12	5	33	28

43	Male	Bully/Victim	Negative	6	7	26	19
44	Male	Bully/Victim	Positive	6	11	29	26
45	Male	Bully/Victim	Negative	11	8	25	20
46	Female	Victim	Negative	34	15	17	28
47	Female	Victim	Positive	21	16	31	36
48	Female	Victim	Positive	19	19	18	26
49	Female	Victim	Positive	17	18	25	29
50	Female	Victim	Positive	13	18	31	35
51	Female	Victim	Positive	21	0	34	36
52	Female	Victim	Positive	19	15	31	37
53	Female	Victim	Positive	16	16	20	28
54	Female	Victim	Positive	23	19	25	33
55	Female	Victim	Negative	23	8	13	21
56	Female	Victim	Positive	23	11	28	33
57	Female	Victim	Positive	34	14	28	35
58	Female	Victim	Positive	25	16	23	32
59	Female	Victim	Positive	19	10	24	28
60	Female	Victim	Positive	21	9	27	28
61	Female	Bully	Negative	5	3	23	13
62	Female	Bully	Positive	1	6	34	19
63	Female	Bully	Negative	7	5	20	10
64	Female	Bully	Positive	4	6	37	26
65	Female	Bully	Negative	3	0	21	8
66	Female	Bully	Negative	1	1	19	14
67	Female	Bully	Positive	3	4	28	18
68	Female	Bully	Negative	4	6	27	17
69	Female	Bully	Positive	5	4	35	22
70	Female	Bully	Negative	1	4	18	8
71	Female	Bully	Negative	3	1	30	18
72	Female	Bully	Positive	5	3	39	25
73	Female	Bully	Negative	1	3	20	16
74	Female	Bully	Negative	8	2	26	18
75	Female	Bully	Positive	4	5	30	20
76	Female	Bully/Victim	Negative	10	7	22	21
77	Female	Bully/Victim	Negative	10	8	21	14
78	Female	Bully/Victim	Negative	6	9	22	21
79	Female	Bully/Victim	Negative	8	6	21	17
80	Female	Bully/Victim	Positive	12	5	27	26
81	Female	Bully/Victim	Positive	6	6	34	27
82	Female	Bully/Victim	Negative	7	7	17	17
83	Female	Bully/Victim	Positive	3	6	31	24
84	Female	Bully/Victim	Negative	11	6	26	23
85	Female	Bully/Victim	Positive	7	9	26	29
86	Female	Bully/Victim	Positive	9	5	38	33
87	Female	Bully/Victim	Positive	11	7	26	25

88	Female	Bully/Victim	Negative	11	7	22	20
89	Female	Bully/Victim	Positive	9	10	29	31
90	Female	Bully/Victim	Negative	5	6	16	10

General Instructions

You are required to perform the analyses shown in Part A of this document using StatCrunch. The point value for each analysis is shown in the parentheses. You need to load the data for the project into StatCrunch's data table using the same procedures that you used to load the "Sample Project Data" file in the Pre Course Assignment. Read Section 1 of this document for the instructions necessary to accomplish this task. Once you have saved this data file you can begin producing the output associated with the required analyses shown in Part A of this document. Sections 2 and 3 of this document describe the required steps for retitling the StatCrunch output and creating a report of your results.

Section 1: Loading the Data into StatCrunch

In the Pre Course Assignment you were required to load and save the "Sample Project Data" in StatCrunch. The procedures to accomplish this task were described in a video titled "Loading Data". This video can be located by clicking on the "StatCrunch" course button followed by clicking on the link to the "Instructional Videos." Use the procedures described in this video to load the project data into StatCrunch except replace any references to the "Sample Project Data" with the words "Project Data."

Section 2: Retitling the StatCrunch Results

When you complete an analysis using StatCrunch, the output is saved in the "Results" folder with a generic title (i.e. bar plot, frequency table, etc.). For the sample project analyses that you have completed, you were required to retittle the output as "Sample Analysis 1", "Sample Analysis 2", and so on. The procedures for retitling an analysis are shown in a video titled "Retitling the Output." This video can be located by clicking on the "StatCrunch" course button followed by clicking on the link to the "Instructional Videos." Use the procedures described in the video to retittle the StatCrunch output for the project analyses, except retittle the output as "Project Analysis 1," "Project Analysis 2," and so on. Please remove from your StatCrunch results folder any incorrect analyses.

Section 3: Creating a Report of Results

Create a report using StatCrunch's "My Report" function as you did for previous StatCrunch assignments. Title the report "Assignment 9". The procedures for creating a report are shown in a video titled "Creating a Report." This video can be located by clicking on the "StatCrunch" course button followed by clicking on the link to the "Instructional Videos."

1. When you attach your results to the report enter them in numerical sequence (Project Analysis 1, Project Analysis 2, etc).
2. For Assignments 9 you will need to attach more than five analyses. The video describes the procedure to attach more than five analyses to your report
3. When you have completed your report, send the report to ryonker@fsu.edu. The report must be received before the due date indicated on the course syllabus.

I have encouraged personal interactions among the course participants for Assignments 1-8. However, for Assignment 9 the required analyses and the questions related to the required analyses are to be completed by you without other human assistance of any kind. You may use your textbook, notes, previous assignments, any of the materials posted on our course, and any other printed or electronic resources. I expect you to adhere to the University's academic honesty policy.

Part A: Complete Analyses 1-12

To help you set up the required project analyses in StatCrunch you may want to refer to the instructional videos that you used to analyze the "Sample Project Data" in previous StatCrunch assignments. Make sure you use the variables from the Project and not the variables from the Sample Project. **Only produce the information specifically requested in each of the following analyses.**

Project Analysis 1: (5 points)

Produce an ungrouped frequency distribution for the pre perception of the school environment scores with the highest scores at the top of the distribution (descending order).

Project Analysis 2: (5 points)

Produce a grouped frequency for the pre perception of the school environment scores with the highest scores at the top of the distribution (descending order). The lowest bin should begin with a score of 12 and use an interval width of 3.

Project Analysis 3: (5 points)

Produce a histogram for the pre perception of the school environment scores. Begin the distribution with a score of 12 and use an interval width of 3. Additionally, overlay on the histogram a normal distribution density function.

Project Analysis 4: (5 points)

Produce a stem and leaf graph for the pre perception of the school environment scores.

Project Analysis 5: (5 points)

Produce a bar plot for the quality of family functioning variable such that the frequency of males and females are shown on the same bar plot.

Project Analyses 6: (5 points)

Produce all of the available descriptive statistics (mean, median, standard deviation, etc.) and the 10th and 90th percentiles for each of the three bully classifications for the pre perception of the school environment scores.

Project Analysis 7: (5 points)

Produce box plots for the pre perception of the school environment scores for each of the three bully classifications such that the three box plots are on the same graph.

Project Analysis 8: (5 points)

Produce for each of the sixth graders the z-score associated with his/her pre perception of the school environment score. Save the message that the z-scores have been added to the data table in your results folder, retitle the message as Project Analysis 8, and attach this message saved as Project Analysis 8 to your report. It is not necessary to attach the 90 z-scores to your report.

A special note to Mac users: The entire function is not visible in the "Functions" box; however, if you place your cursor on a listed function, after a few seconds you will be able to view the entire function. Keep placing your cursor on a new function until you see the function that will produce the desired z-scores.

Project Analysis 9: (5 points)

Use a one-sample z-test to determine if there is a difference between the mean of the pre perception of the school environment scores for the sixth grade students in this study (sample) and the mean perception of the school environment of the sixth grade norm group (population) reported in the instrument's testing manual as 27.65. The testing manual also reported the norm group's standard deviation as 5.87.

Project Analysis 10: (5 points)

Use a one-sample t-test to determine if there is a difference between the mean number of incidents of being bullied reported prior to the implementation of the bully intervention program by the 90 sixth grade students in this study (sample) and the population mean of 7.33 obtained from test's psychometric manual for the sixth grade norm group.

Project Analyses 11A-11C: (5 points each)

- A. Obtain Hartley's F-max test to check on the assumption of homogeneity of variance for the analysis requested in Project Analysis 11B. Make sure to set up the analysis such that the gender with the largest variance is in the numerator of the ratio, which will then produce a ratio greater than or equal to 1.
- B. Use a two-samples t-test to determine if there is a difference between the males' and the females' means with respect to the pre perception of the school environment scores. Consider the results of Project Analysis 11A to help you decide if a pooled or separate variance estimate should be used to obtain the requested analysis.
- C. Obtain the point estimate and 95% confidence interval for $\mu_{\text{Male}} - \mu_{\text{Female}}$ using the pre perception of the school environment scores. Consider the results of Project Analysis 11A to help you decide if a pooled or separate variance estimate should be used to obtain the requested analysis.

Project Analysis 12: (5 points)

Use a paired-samples t-test to determine if there is a difference between the means of the pre and post perception of the school environment scores for each of the three bully classifications separately.

Part B: Questions for the Project Analyses 1 - 9D

Instructions:

1. Print a copy of the my StatCrunch analyses by clicking the link to Dr. Yonker's StatCrunch Analyses for Assignment 9. Use my StatCrunch analyses to answer Questions 1 through 91.
2. Once you have printed the questions and the analyses, log off the course.
3. When you have answered all of the questions, log on to the course, click on the "Project" course button, and click on the link "Answer Sheet for Assignment 9."
4. Transfer your answers from your printed copy of the questions to the electronic answer sheet by clicking on the circle adjacent to your answer for each of the questions.
5. When you have finished entering your answers, click the "Submit" button at the end of the answer sheet.
6. Once you access the online answer sheet, you must enter your answers to all of the questions during one session. **DO NOT ATTEMPT TO ACCESS THE ANSWER SHEET UNTIL YOU ARE PREPARED TO SUBMIT YOUR ANSWERS.**
7. You need to answer the questions and submit your answers electronically before midnight of Monday, October 26th.
8. This document consists of 91 true/false, multiple-choice, and completion questions.
9. Each question is worth 1 point.
10. I have permitted and have encouraged personal interactions among the course participants for Assignments 1-8; however, this assignment is to be completed by you without other human assistance of any kind. You may use your textbook, notes, previous assignments, any of the materials posted on our course, and any other printed or electronic resources. I expect you to adhere to the University's academic honesty policy. *Can e-mail Dr. Yonker questions, but he may not answer some.*

Note 1: When I refer to numerical values from the StatCrunch output, the values will have been rounded to the nearest hundredth.

Note 2: When you are required to perform calculations, round all the values obtained from the StatCrunch output to the nearest hundredth prior to entering the values into the appropriate formula. Round all final answers to the nearest hundredth.

Note 3: For all completion questions, the answer should be expressed as a numerical value, not as a word.

Note 4: Use an alpha level of 0.05 for all of the questions.

Note 5: Assume that all statistical tests are two-tailed unless stated otherwise.

Analysis 1: Interpretation of a Frequency Distribution Table

1. The number of students who were bullied exactly 19 times is equal to 6.
2. The number of students who were bullied 9 or fewer times is equal to 48.
3. The percentage of students who were bullied exactly 5 times to the nearest hundredth is equal to 7.78 %.
4. The percentage of students who were bullied 23 or more times to the nearest hundredth is equal to 11.11 %.
5. The percentile rank for an individual who was bullied 17 times rounded to the nearest whole percentile rank is equal to 76.
6. The distribution of scores is
 - a. unimodal
 - b. bimodal
 - c. trimodal
 - d. multimodal

Handwritten notes for Q6: 74.44% + 11.11% = 85.55% → rounds to 86. Percentile ranks: 24.44% ← 22 above, 1.11% ← 1 at, 74.44% ← 67 below. 90 total. Percentile ranks is % of individuals w/ scores at or below.
7. If a student's percentile rank is 75, then the student was bullied equal to or greater than 75 % of the students in the distribution. *Handwritten note: 75% at or below (less) - this was at or greater than this 75%*
8. The type of frequency distribution produced in this analysis is referred to as a(n) _____ frequency distribution.
 - a. grouped
 - b. ungrouped
 - c. specialty
 - d. chi-square

Handwritten note: (b) ungrouped

Analysis 2: Interpretation of a Graph

9. The number of scores of 19 in the distribution is equal to 6.
10. In the distribution there are 6 scores greater than 23.
11. This graph is an example of a
 a. bar plot (graph).
 b. histogram.
 c. box plot.
 d. stem and leaf.

(25, 25, 27, 31, 34, 34)

d stem and leaf

Analysis 3: Interpretation of a Graph

12. The interval from 6 to 9 has a frequency of 15.
 a. true
 b. false
13. The shape of the distribution of scores shown in the histogram is
 a. symmetrical.
 b. skewed positive.
 c. skewed negative.

← ← ← 6 → 9
a true

b skewed positive



14. The lowest score in the modal interval for this distribution is 3 and the highest score is 5.
 The interval is 3-5, but measure if 3 or 6 is included!
15. In this distribution, it can be concluded that the median number of incidents of being bullied is greater than the mean number of incidents of being bullied.

a. true
 b. false b false (figure 3/4 p. 97)

3	8	5	4
4	5	7	5
5	3	6	6
20		18	
∴ mean is 3.5			

unrounded from Act 1
 For Pre-Bully incidents:
 3-8
 4-5 6-6
 5-7

16. This graph is an example of a
 a. bar plot (graph).
 b. histogram.
 c. box plot.
 d. stem and leaf.
17. The type of graph shown in this analysis is used to depict a variable with a _____ scale of measurement.
 a. nominal
 b. ordinal
 c. interval/ratio

b histogram

c interval/ratio

median: Victim ~~mean~~ Pre Bully = 20

Analyses 4A and 4B: Interpretation of Descriptive Statistics

18. Fifty percent of the victims reported being bullied prior to the bully intervention program 20 or fewer times.
 → Victim mean Pre-Bully = 20.4
19. The mean number of times the victims reported being bullied prior to the beginning of the bully intervention program is 20.40 to the nearest hundredth.
 → Bully being bullied = 93 - 91 = 4 - 2 = 2
20. The value of the interquartile range for the number of times the bullies reported being bullied prior to the beginning of the bully intervention program is 2.

21. Using the formula sheet that can be located by clicking on the "Stat Documents" course button in Blackboard, the number corresponding to the formula for the standard deviations reported in Analyses 4A and 4B is 7.

7?
 since these are one samples!

22. In the distribution of post bully scores for the victims, the variability of the scores as indicated by the standard deviation is 6.79 to the nearest hundredth.
 Bully/Victim Post-Bully
23. In the distribution of the number of times that the bully/victims reported being bullied after the bully intervention program, each of the scores in the distribution is on the average 2.50 bullying incidents (to the nearest hundredth) away from the mean of 6.80.
 (standard deviation)

Bully, Post-Bully, range min max - range 11

24. The number of times that the bullies reported being bullied after the bully intervention program ranges from a low of 1 to a high of 8
 a. true
 b. false **(b) False - 8 is only Q3/75th percentile**

25. In the bully/victim classification, a post bully value of 8 has a percentile rank of 70.

Post-Bully, Bully/Victim - 8 is 70th percentile as seen in right two columns

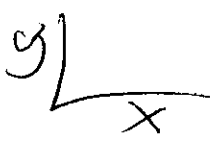
Analysis 5: Interpretation of a Graph

26. This graph is an example of a
 a. bar plot (graph).
 b. histogram
 c. box plot
 d. stem and leaf **(c) box plot**

27. The values at the extreme ends of the vertical lines represent the lowest and highest scores in the distributions excluding any outliers if any are shown.
 a. true
 b. false **(a) true**



28. The y-axis indicates the number of reported incidents of being bullied.
 a. true
 b. false **(a) true**

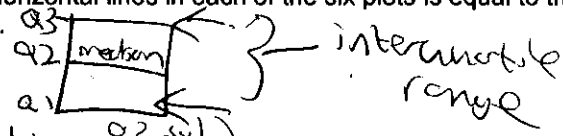


29. The horizontal line in each of the middle of the six rectangles is positioned at the mean of the number of incidents of being bullied.
 a. true
 b. false **(b) False - it's the median not that there's that much difference here**

30. The horizontal line on the top side of the rectangular box is positioned at the 75th percentile for each of the six plots. **(Q3)**

31. The horizontal line on the bottom side of the rectangular box is positioned at the 25th percentile for each of the six plots. **(Q1)**

32. The distance between the bottom horizontal line and the top horizontal lines in each of the six plots is equal to the _____ of the number of incidents of being bullied.
 a. range
 b. interquartile range
 c. semi-interquartile range
 d. standard deviation **(b) interquartile range (semi - would be $\frac{Q3-Q1}{2}$)**



33. The percentage of the total number of scores in each of the six distributions that fall within the rectangular boxes is 50%. **(interquartile range is Q3-Q1, or 75th to 25th)**

34. For the victims, the median number of incidents of being bullied prior to the bully intervention program was greater than the 75th percentile of the number of incidents of being bullied after the bully intervention program.
 a. true
 b. false **(a) true**

Victim's median pre-bully **(7)**
~~7~~
 Victim's 75th percentile post-bully **(Q3)**
 - also see 4A/4B - median pre is 20
 Q3 post is 19

Can confirm with 4A + 4B

	Pre	Post
Bully	$4 - 2 = 2$	$4 - 1 = 3$
Bully/Victim	$11 - 6 = 5$	$8 - 6 = 2$
Victim	$23 - 17 = 6$	$19 - 12 = 7$

35. The variability of the number of incidents of being bullied as shown by the interquartile range on the graph is the greatest for which one of the following categories?

- a. Pre Bully
- b. Post Bully
- c. Pre Bully/Victim
- d. Post Bully/Victim
- e. Pre Victim
- f. Post Victim

(f)

Which is largest interquartile range?
 Post-Victim

36. The black dots on the graph represent extreme scores in the distributions and are called outliers. A score in the distribution is considered an outlier if the distance that a score is from either the 25th or 75th percentile is 1.5 to 3.0 times the value of the standard deviation.

- a. true
- b. false

same question

Sent 1: true
 Sent 2: hmm... not true, because the standard deviation never enters into it, it's the interquartile range!
 pre-bully

Analysis 6: Interpretation of z-Scores

37. The z-score associated with Student 82 is 0.46 standard deviations below the mean of the ~~2007 language arts~~ scores.

$z(82) = -0.46$

Use the probability calculator to answer questions 38 through 40. The probability calculator can be located by clicking on the course button labeled "Calculators" then on the "Normal Distribution" link. Use the first of the two calculators shown. Assume the distribution of the ~~2007 language arts~~ scores is normally distributed.

38. The percentage of scores in the distribution above the z-score listed for Student 21 rounded to the nearest whole percent is equal to 83 %.

$z(21) = -0.94$, above = 0.82639

39. The percentage of scores in the distribution below the z-score listed for Student 59 rounded to the nearest whole percent is equal to 84 %.

$z(59) = 1.00$, below = 0.841345

40. The percentage of scores in the distribution between the z-score listed for Student 87 and Student 62 rounded to the nearest whole percent is equal to 39 %.

$z(87) = 0.03$, between = 0.394943
 $z(62) = -1.19$

Analyses 7A and 7B: Question – Is there a difference between the mean perception of the school environment for each of the three bully classification categories and the population mean perception of the school environment of 27.65 with an unknown population standard deviation?

41. The null hypothesis for each of the six analyses shown in 7A and 7B is that the population mean is equal to 27.65.

42. The alternate hypothesis for each of the six analyses shown in 7A and 7B is that the population mean is not equal to 27.65.

43. Using the formula sheet that can be located by clicking on the "Stat Documents" course button in Blackboard, the number corresponding to the formula that produced the test statistics shown in Analyses 7A and 7B is 10.

44. The estimated standard error of the mean for each of the six analyses shown in 7A and 7B was calculated by dividing the variance of the perception of the school environment scores by the sample size of 30 and then taking the square root of this result.

- a. true
- b. false

$S_m = \sqrt{\frac{s^2}{n}}$ or $\frac{s}{\sqrt{n}}$

45. The estimated standard error of the mean provides an estimate of the standard distance between the sample mean and the population mean.

46. The t-statistic for each of the six analyses shown in 7A and 7B was calculated by dividing the difference between the sample mean and the population mean by the estimated standard error of the mean.

- a. true
- b. false

(a) true (as seen in formula #10)

$p = 0.3233$

47. If the null hypothesis were to be rejected for the pre perception of the school environment for the bullies, the probability of having committed a Type I error is 0.32 to the nearest hundredth.

48. From the results shown in Analysis 7A, it would be correct to accept the null hypothesis that there is no difference between the population mean of 27.65 and the mean of the pre perception of the school environment scores for each of the three bully classifications.
a. true
b. false

do not reject
At $\alpha = 0.05$, (a) true ~~(b) false~~ *wrong answer is (b) false*

49. From the results shown in Analysis 7B, it would be correct to conclude that the mean of the post perception of the school environment scores for the bullies is statistically significantly higher than and the population mean of 27.65 obtained from the standardized test's psychometric manual.
a. true
b. false

$p < 0.0001$
mean for bullies is 18.53, t - stat negative, so ~~higher~~ lower

50. From the results shown in Analysis 7B, it would be correct to conclude that the mean of the post perception of the school environment scores for the bully/victims is statistically significantly higher than the population mean of 27.65 obtained from standardized test's psychometric manual.
a. true
b. false

$p < 0.0001$
mean for bully/victims is 23.33, t - stat is negative, so ~~higher~~ lower

51. From the results shown in Analysis 7B, it would be correct to conclude that the mean of the post perception of the school environment scores for the victims is statistically significantly higher than the population mean of 27.65 obtained from standardized test's psychometric manual.
a. true
b. false

$p < 0.0001$
mean for victims is 32.733, t - stat is positive, so higher

Analyses 8A - 8D: Question - Is there a difference in the mean number of incidents of being bullied prior to the bully intervention program between those students who indicated that the quality of their family functioning was generally positive and those students who indicated that the quality of their family functioning was generally negative?

52. Given the results shown in Analysis 8B, which one of the following two conclusions regarding the homogeneity of variance assumption is correct.

- a. There is evidence that the two variances are not equal; therefore, the homogeneity of variance assumption is being violated.
- b. There is no evidence that the two variances are not equal; therefore there is no evidence that the homogeneity of variance assumption is being violated. $p = 0.1677$

(b)

53. Given the results shown in Analysis 8B, it is appropriate to use the pooled variance estimate for the analysis shown in Analysis 8C.
a. true
b. false

(a) true

54. The null hypothesis associated with Analysis 8C is that in the population there is a difference in the mean number of incidents of being bullied prior to the bully intervention program between those students who indicated that the quality of their family functioning was generally positive and those students who indicated that the quality of their family functioning was generally negative.

- a. true
- b. false

(b) False

55. Using the formula sheet that can be located by clicking on the "Stat Documents" course button in Blackboard, the number corresponding to the formula that produced the test statistic shown in Analysis 8C is 11.

56. Given the results shown in Analysis 8C, the null hypothesis should be rejected.
a. true
b. false

(a) true ($p = 0.0026$)

pos - neg = pos value
 so neg's smaller/less than pos

57. From the results shown in Analysis 8C, it would be correct to conclude that mean number of incidents of being bullied prior to the bully intervention program for those students who indicated that the quality of their family functioning was generally positive, is less than for those students who indicated that the quality of their family functioning was generally negative.

- a. true
- b. false

b) false - actually back words!
 (also see 8A)

58. Using the G*3 program, the estimated Cohen's d effect size for Analysis 8C is 0.66 to the nearest hundredth.

59. Assuming the effect size in the previous question is 0.50, then an effect size of 0.50 indicates that the mean number of incidents of being bullied prior to the bully intervention program for those students who indicated that the quality of their family functioning was generally positive, is one-half of a standard deviation higher than the mean for those students who indicated that the quality of their family functioning was generally negative.

- a. true
- b. false

Positive is higher by $\frac{1}{2}$ std dev a) true

60. Using the G*3 program, the power of the statistical test for Analysis 8C is 0.87 to the nearest hundredth.

61. The power of a statistical test is the probability that the test will reject a false null hypothesis.

- a. true
- b. false

a) true

correctly reject - not falsely reject.
 but correct rejection requires that it is false!

62. Using the G*3 program, the probability of a Type II error for Analysis 8C is 0.13 to the nearest hundredth.

$\beta = 0.13$

63. A Type II error occurs when a false null hypothesis is rejected.

- a. true
- b. false

b) false

Type II - failing to reject when there actually is effect
 i.e., fail to reject a false null

64. If the null hypothesis associated with Analysis 8C were to be rejected, the probability of having committed a Type I error is 0.03 to the nearest thousandth.

$\alpha = 0.0026$

65. Using the percentage of variance accounted for (r^2) method of determining an effect size, the effect size for the results shown in Analysis 8C to the nearest whole percent is 10%.

66. From the results shown in Analysis 8D, the single number that is the best estimate of the difference in the mean number of reported incidents of being bullied prior to a bully intervention program between a population of students who indicate that the quality of their family functioning is generally positive and a population of students who indicate that the quality of their family functioning is generally negative is 5.16 to the nearest hundredth.

67. From the results shown in Analysis 8D, you can be 95% confident that the best estimate of the difference in the mean number of reported incidents of being bullied prior to a bully intervention program between a population of students who indicate that the quality of their family functioning is generally positive and a population of students who indicate that the quality of their family functioning is generally negative is between 1.85 and 8.47 incidents higher for a population of students who indicate that the quality of their family functioning is generally positive than for a population of students who indicated that the quality of their family functioning is generally negative.

- a. true
- b. false

a) true

higher positive than negative
 pos - neg = pos
 so neg's smaller

68. If the sample sizes remain the same in Analysis 8D, the effect of increasing the confidence that an interval contains the population parameter will also have the effect of producing a wider confidence interval.

- a. true
- b. false

a) true

increase 95 to 99

69. An action that can be taken to increase the confidence that the confidence interval in Analysis 8D contains the population parameter without sacrificing precision is to decrease the sample sizes.

- a. true
- b. false

b) false

decrease sample sizes would result in less precision or confidence - so question is backwards!

70. Using the formula sheet that can be located by clicking on the "Stat Documents" course button in Blackboard, the number corresponding to the formula that produced the confidence interval shown in Analysis 8D is 14.

Analyses 9A-9D: Question – Is there a difference between the number of incidents of being bullied before and after the bully intervention treatment for each of the three bully classifications?

71. Using the formula sheet that can be located by clicking on the "Stat Documents" course button in Blackboard, the number corresponding to the formula that produced the test statistics in Analysis 9C is 12.

2-sample dependent

72. The sample mean difference of 4.87 shown in Analysis 9C for the victims was obtained by subtracting the victim's post mean shown in Analysis 9B from the victim's pre mean shown in Analysis 9A.

a. true a true 15.53 20.4
 b. false
 $20.4 - 15.53 = 4.87$ ✓

73. The value of the standard error of the mean difference shown in Analysis 9C for the victims indicates that on the average, in the theoretical distribution of sample mean differences when the null hypothesis is true, each sample mean difference is 1.56 incidents of being bullied away from the population mean difference.

a. true a true
 b. false

74. Analysis 9C indicates that there is a/are statistically significant mean difference(s) between the number of incidents of being bullied before and after the bully intervention treatment for which one of the following sets of bully classification options?

a. bullies only
 b. victims only
 c. bully/victims and victims only c
 d. bullies and victims only
 e. bullies, bully/victims, and victims

Bully/victim and victim (not Bully b/c) p=0.0078 p=0.0040 (p=0.2245)

75. If the null hypothesis related to the mean difference between the number of incidents of being bullied before and after the bully intervention shown in Analysis 9C for the bullies is rejected, to the nearest whole percent, there is a 22 % chance that an erroneous decision was made.

$p = 0.2245$ ← Type I error prob.

76. From the results shown in Analyses 9A-9C, it would be correct to conclude that for the bullies there is no evidence of a difference in the mean number of incidents of being bullied from the pre to the post intervention; however, for the victims, the mean number of incidents of being bullied decreased from the pre to the post intervention, and for the bully/victims the mean number of incidents of being bullied increased from the pre to the post intervention.

a. true b false Bullies - no diff - correct
 b. false
*Bully victims: decreased - correct (20.4 → 15.53)
 wrong (8 → 6.8, a decrease)*

77. Given the value of the t-statistics and the p-values reported in Analysis 9C, effect sizes should be calculated to determine the magnitude of the mean difference between the pre to the post intervention with respect to the number of incidents of being bullied for each of the three bully classifications.

a. true
 b. false b false *no only for Bully/victim and victim*

78. Using the G*Power program, the Cohen's *d* effect size for the mean difference between the number of incidents of being bullied before and after the bully intervention for the bully/victims (Analysis 9C) is 0.52 to the nearest hundredth.

0.52

79. Using the G*Power program, the power of the statistical test utilized to examine the mean difference between the number of incidents of being bullied before and after the bully intervention for the bully/victims (Analysis 9C) is 0.79 to the nearest hundredth.

0.79

80. If the sample size in the calculation of the power in the previous question were to be decreased and all other values remained constant, then the power will _____.

a. increase
 b. decrease b decrease *(as sample size increases, power decreases)*
 c. remain the same

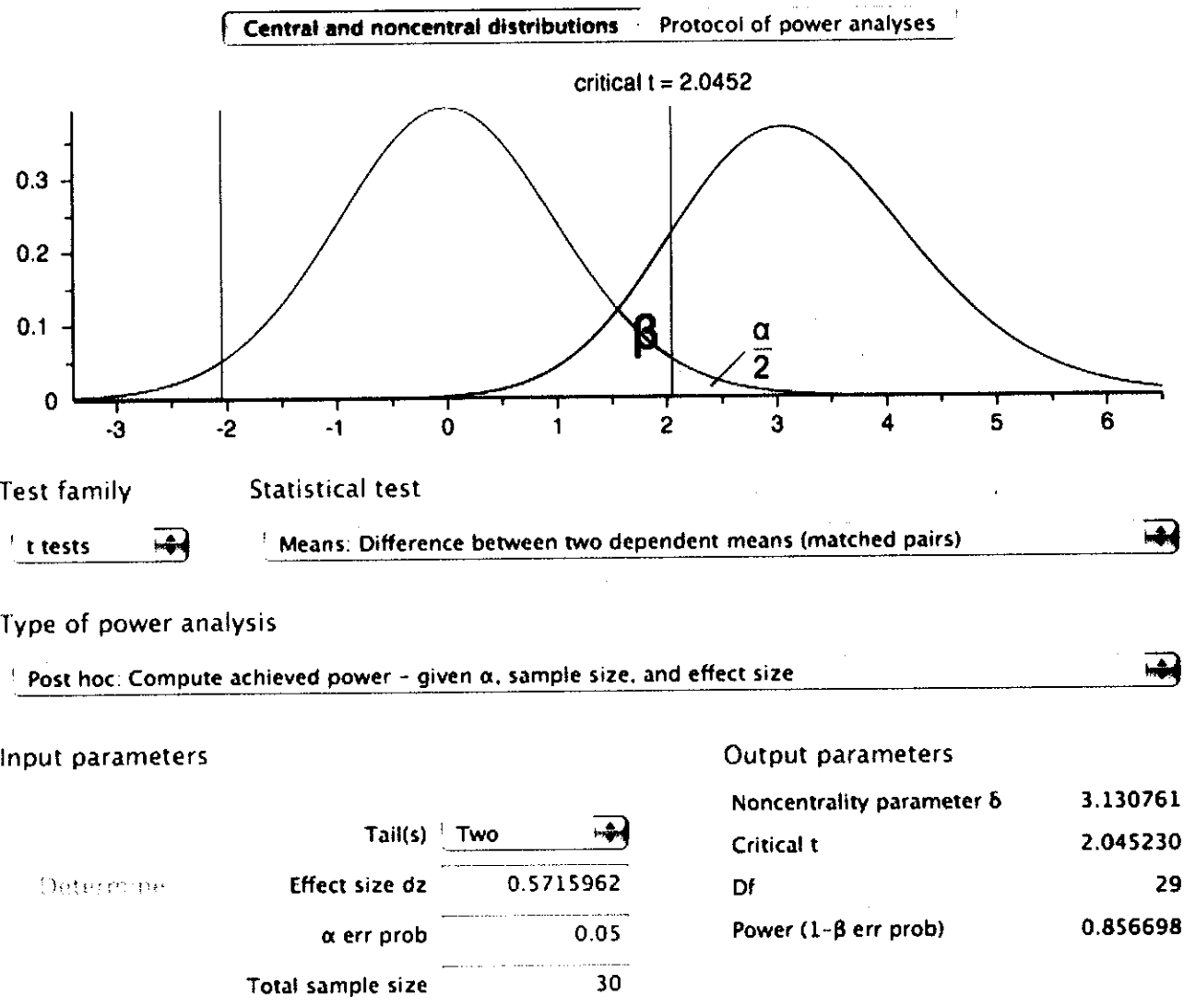
81. Using the G*Power program, the probability of committing a Type II or Beta error if the null hypothesis associated with the mean difference between the number of incidents of being bullied before and after the bully intervention for the bully/victims (Analysis 9C) is not rejected, is ~~0.21~~ to the nearest hundredth.

82.) Using the percentage of variance accounted for (r^2) method of determining an effect size, the effect size for the mean difference between the number of incidents of being bullied before and after the bully intervention for the bully/victims (Analysis 9C) to the nearest whole percent is ~~8%~~ 22% - $df = 29$, $N = 89$

83. The resulting r^2 in the previous question indicates the percent of variance in the post number of incidents of being bullied that can be accounted for by the bully intervention treatment.
 a. true (a) true
 b. false
 $r^2 = 10\%$ of variance accounted for by the treatment

Below is a screen capture of the results of a post hoc power analysis (using the G*Power program) of the mean difference between the number of incidents of being bullied before and after the bully intervention. Use the information shown in the screen capture below (Figure 1) to answer Questions 84 - 87

Figure 1



84. The area under the curve on the right-hand side of Figure 1 to the right of the critical value of $t = 2.0452$ represents the

- a. power of the statistical test.
- b. probability of a Type I error.
- c. probability of a Type II error.
- d. effect size.

(a) power

85. The shaded area under the curve on the right-hand side of Figure 1 to the left of the critical value of $t = 2.0452$ represents the

- a. power of the statistical test.
- b. probability of a Type I error.
- c. probability of a Type II error.
- d. effect size.

(c) Type II error (β)

86. The power of the statistical test utilized to examine the mean difference between the number of incidents of being bullied before and after the bully intervention for the victims (Analysis 9C) was found to be 0.86. This value of 0.86 indicates the probability that the statistical test will reject a false null hypothesis.

- a. true
- b. false

(a) true (see #61)

87. If the variability of the difference scores used in the calculation of the power in the previous question were to be increased and all other values remained constant, then the power would _____.

- a. increase
- b. decrease
- c. remain the same

Increased variability will decrease power
(b) decrease

88. From the results shown in Analyses 9A, 9B, and 9D, the single number that is the best estimate of the mean decrease in the number of incidents of being bullied from before to after the bully intervention for a population of victims is 4.87 to the nearest hundredth.

89. From the results shown in Analyses 9A, 9B, and 9D, you can be 95% confident that the mean decrease in the number of incidents of being bullied from before to after the bully intervention for a population of victims is between 1.68 and 8.05 to the nearest hundredth.

90. From the results shown in Analyses 9A, 9B, and 9D, you can be 95% confident that the mean increase in the number of incidents of being bullied from before and to after the bully intervention for a population of bully/victims is between 0.52 and 3.15 to the nearest hundredth.

- a. true
- b. false

(b) false

Bully/victims 8.63 → 6.8 decrease, not increase!

91. Using the formula sheet that can be located by clicking on the "Stat Documents" course button in Blackboard, the number corresponding to the formula that produced the confidence intervals shown in Analysis 9D is 15.

(15/16)