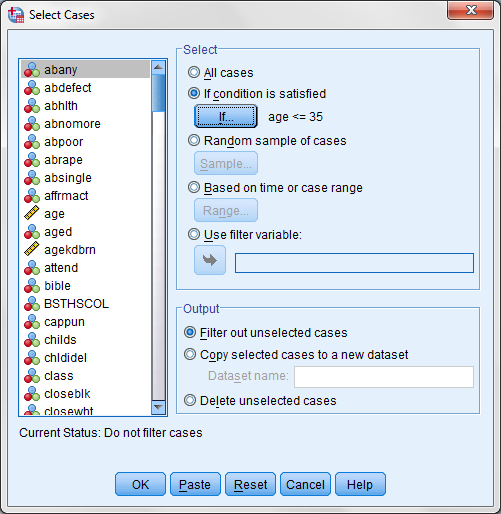
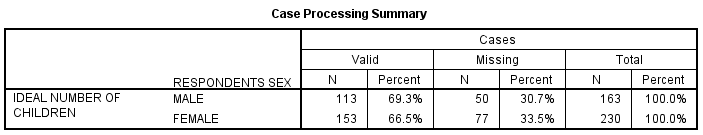
**CHAPTER 7 SPSS PROBLEMS SOLUTIONS**

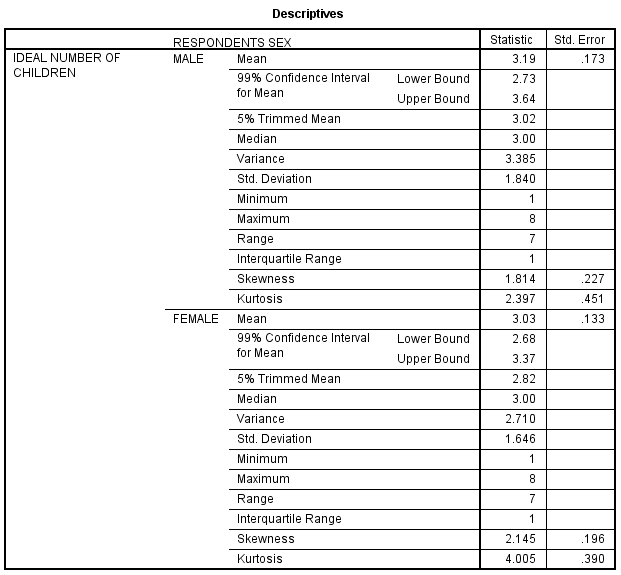
1.

a. Instructors may want to advise students to set 9, -1, and 8 as “MISSING” before running EXPLORE procedure. Results presented here excluded 98 (DK) and 99 (NA), -1 (IAP), or 9 (DK, NA) for analysis. In this problem, students should follow the example of the SPSS demonstration. The SPSS dialog box that selects cases based on respondent age should appear as follows:



b. Students should receive the following output:





As expected, the samples for males and females were much smaller than the entire sample (113 males, 153 females). Both male and female means in the younger sample are smaller than those calculated from the full sample. Specifically, males in the younger sample wanted 3.19 children compared to 3.23 children in the full sample (difference of 0.04). For females in the younger sample, the mean number of ideal children was 3.03 compared to the mean of 3.15 in the full sample (difference of 0.12). The width of the confidence intervals was much larger in the younger sample than the smaller sample. At the 99% confidence interval, the values for the lower and upper bounds for males in the younger sample were 2.73 and 3.64, respectively (width of 0.91). The width of the 99% confidence interval in the full sample was 0.5 for males. For females in the younger sample, the lower bound of the 99% confidence interval was 2.68 and the upper bound was 3.37 (width of 0.69). This exceeded the width of the full sample (0.43). This problem shows that as sample size decreases, the width of the confidence interval increases even at the same confidence level, making our estimates less precise.

2. The following results should have been presented to students in SPSS.

a.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| ***Class Identification*** | | | | ***Statistic*** |
| *Number of Children* | LOWER | Mean | | 2.16 |
| 90% Confidence Interval | Lower Bound | 1.87 |
| Upper Bound | 2.45 |
| Median | | 2.00 |
| Std. Deviation | | 1.940 |
| WORKING | Mean | | 2.00 |
| 90% Confidence Interval | Lower Bound | 1.89 |
| Upper Bound | 2.11 |
| Median | | 2.00 |
| Std. Deviation | | 1.728 |
| MIDDLE | Mean | | 1.88 |
| 90% Confidence Interval | Lower Bound | 1.77 |
| Upper Bound | 1.99 |
| Median | | 2.00 |
| Std. Deviation | | 1.706 |
| UPPER | Mean | | 2.23 |
| 90% Confidence Interval | Lower Bound | 1.81 |
| Upper Bound | 2.65 |
| Median | | 2.00 |
| Std. Deviation | | 1.547 |

b.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| ***Class Identification*** | | | | ***Statistic*** |
| *Highest Year of School Completed* | LOWER | Mean | | 11.61 |
| 90% Confidence Interval | Lower Bound | 11.21 |
| Upper Bound | 12.01 |
| Median | | 12.00 |
| Std. Deviation | | 2.672 |
| WORKING | Mean | | 12.80 |
| 90% Confidence Interval | Lower Bound | 12.62 |
| Upper Bound | 12.98 |
| Median | | 12.00 |
| Std. Deviation | | 2.849 |
| MIDDLE | Mean | | 14.45 |
| 90% Confidence Interval | Lower Bound | 14.25 |
| Upper Bound | 14.65 |
| Median | | 15.00 |
| Std. Deviation | | 3.079 |
| UPPER | Mean | | 15.45 |
| 90% Confidence Interval | Lower Bound | 14.63 |
| Upper Bound | 16.26 |
| Median | | 16.00 |
| Std. Deviation | | 2.984 |

c.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| ***Class Identification*** | | | | ***Statistic*** |
| *Highest School Year Completed, Father* | LOWER | Mean | | 10.24 |
| 90% Confidence Interval | Lower Bound | 9.39 |
| Upper Bound | 11.09 |
| Median | | 12.00 |
| Std. Deviation | | 4.288 |
| WORKING | Mean | | 10.85 |
| 90% Confidence Interval | Lower Bound | 10.58 |
| Upper Bound | 11.13 |
| Median | | 12.00 |
| Std. Deviation | | 3.931 |
| MIDDLE | Mean | | 12.11 |
| 90% Confidence Interval | Lower Bound | 11.80 |
| Upper Bound | 12.42 |
| Median | | 12.00 |
| Std. Deviation | | 4.184 |
| UPPER | Mean | | 13.42 |
| 90% Confidence Interval | Lower Bound | 12.30 |
| Upper Bound | 14.55 |
| Median | | 12.00 |
| Std. Deviation | | 3.816 |

d.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| ***Class Identification*** | | | | ***Statistic*** |
| *Occupational Prestige Score (1980)* | LOWER | Mean | | 37.82 |
| 90% Confidence Interval | Lower Bound | 35.98 |
| Upper Bound | 39.66 |
| Median | | 35.00 |
| Std. Deviation | | 11.373 |
| WORKING | Mean | | 40.79 |
| 90% Confidence Interval | Lower Bound | 40.01 |
| Upper Bound | 41.58 |
| Median | | 39.00 |
| Std. Deviation | | 12.447 |
| MIDDLE | Mean | | 48.87 |
| 90% Confidence Interval | Lower Bound | 47.92 |
| Upper Bound | 49.81 |
| Median | | 49.00 |
| Std. Deviation | | 13.955 |
| UPPER | Mean | | 48.92 |
| 90% Confidence Interval | Lower Bound | 44.14 |
| Upper Bound | 53.70 |
| Median | | 51.00 |
| Std. Deviation | | 16.975 |

e.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| ***Class Identification*** | | | | ***Statistic*** |
| *Highest Year of School Completed, Mother* | LOWER | Mean | | 10.63 |
| 90% Confidence Interval | Lower Bound | 10.11 |
| Upper Bound | 11.15 |
| Median | | 12.00 |
| Std. Deviation | | 3.100 |
| WORKING | Mean | | 11.27 |
| 90% Confidence Interval | Lower Bound | 11.03 |
| Upper Bound | 11.52 |
| Median | | 12.00 |
| Std. Deviation | | 3.633 |
| MIDDLE | Mean | | 12.02 |
| 90% Confidence Interval | Lower Bound | 11.79 |
| Upper Bound | 12.25 |
| Median | | 12.00 |
| Std. Deviation | | 3.336 |
| UPPER | Mean | | 11.43 |
| 90% Confidence Interval | Lower Bound | 10.45 |
| Upper Bound | 12.40 |
| Median | | 12.00 |
| Std. Deviation | | 3.407 |

Across all classes, upper class respondents had the highest mean for all variables except mother’s highest year of school completed. This suggests that because of their level of education, their parents’ levels of education, and their occupational prestige score, they may be able to afford the costs of raising more children. Conversely, with the exception of number of children, lower class respondents had the lowest means for each of the education variables as well as the occupational prestige variable.

**CHAPTER 7 EXERCISE SOLUTIONS**

1.

a. The estimate at the 90% confidence level is 16.035% to 16.365%. This means that there are 90 chances out of 100 that the confidence interval will contain the true population percentage of victims in the American population.

Confidence interval = 16.2 ± 1.65(0.10)

= 16.2 ± 0.165

= 16.035 to 16.365

b.

Confidence interval = 16.2 ± 2.58(0.10)

= 16.2 ± 0.258

= 15.942 to 16.458

c. If the sample size was cut in half and the percentage remained at 16.2, the confidence intervals will increase by a factor of , or about 41%.

d. Sample sizes on the order of 1,000 to 1,500 are a trade-off between precision and cost. Samples of that size yield confidence intervals for proportions with errors around ±3% at the 95% confidence level, which is sufficient for most purposes in applied social research. Doubling the sample size to 3,000 does reduce the errors but increases the cost by more. As you can see with this example, such a large sample size minimizes the standard error and thereby shortens the width of the confidence interval. Therefore, our estimates of victimization are fairly accurate no matter which confidence interval we select.

2.

Recall that the mean years of education for lower class respondents (*N* = 123) was 11.61 with a standard deviation of 2.67 years; and the mean years of education for middle class respondents (*N* = 626) was 14.45 with a standard deviation of 3.08 years.

a. For lower-class respondents:



Confidence interval = 11.61 ± 1.96(0.24)

= 11.61 ± 0.47

= 11.14 to 12.08

For middle-class respondents:



Confidence interval = 14.45 ± 1.96(0.12)

= 14.45 ± 0.24

= 14.21 to 14.69

b.

For lower-class respondents:



Confidence interval = 11.61 ± 2.58(0.24)

= 11.61 ± 0.62

= 10.99 to 12.23

For middle-class respondents:



Confidence interval = 14.45 ± 2.58(0.12)

= 14.45 ± 0.31

= 14.14 to 14.76

c. As our confidence level increases, the confidence interval gets wider, not narrower. This is because a wider interval is needed to increase the probability that our calculated interval includes the true population value. Thus increasing confidence leads to less precise intervals.

3.

a.



Confidence interval = 0.39 ± 1.96(0.013)

= 0.39 ± 0.025

= 0.365 to 0.415

b.

Confidence interval = 0.39 ± 2.58(0.013)

= 0.39 ± 0.034

= 0.356 to 0.424

c. There is very little difference between the 95% or 99% confidence intervals here because the sample size is reasonably large. The former interval is only one-half of a percentage point wide, the latter nearly two-thirds of a percentage point. Most large survey organizations use the 95% confidence interval routinely and that seems like the best choice here. Our conclusions about Americans’ opinions about global warming will be the same in either case. The intent of this problem is to get students to recognize that they always have a choice as to what confidence interval they choose for a particular problem.

4.

a. For respondents with a high school diploma:



Confidence interval = 40.59 ± 1.65(0.43)

= 40.59 ± 0.71

= 39.88 to 41.30

b. For respondents with a bachelor’s degree:



Confidence interval = 50.95 ± 1.65(0.79)

= 50.95 ± 1.30

= 49.65 to 52.25

At the 90% confidence level, we can be certain that with a sample of 270 people holding bachelor’s degrees, 90 times out of 100 our sample mean will fall between 49.65 and 52.25.

c. Persons with bachelor’s degrees have, on average, higher occupational prestige scores than those with only a high school diploma. We can be 90 percent confident that the actual mean occupational prestige score for those with a high school degree is not lower than 39.88 and not higher than 41.30. Likewise, we can be 90 percent confident that the actual mean occupational prestige score for those with a bachelor’s degree is not lower than 49.65 and 52.25.

5.

Confidence interval = 51 ± 1.96(0.67)

= 49.69% to 52.31%

We set the interval at the 95% confidence level. However, no matter whether the 90%, 95%, or 99% confidence level is chosen, the calculated interval includes values below 50% for the vote for a Republican candidate. Therefore, you should tell your supervisors that it would not be possible to declare a Republican candidate the likely winner of the votes coming from men if there was an election today because it seems quite possible that less than a majority of male voters would support her/him.

6.

a.



Confidence interval = 1.27 ± 1.96(0.03)

= 1.27 ± 0.06

= 1.21 to 1.33

b. The calculation of a confidence interval is still appropriate. For large enough samples, which 914 certainly is, the distribution of the sample means will be normal, no matter what the shape of the actual distribution of severe binge drinking. That being the case, we can confidently calculate confidence intervals based on normal distributions to get, in this instance, the 95% confidence interval.

7.

a.



Confidence interval = 0.727 ± 1.96(0.012)

= 0.727 ± 0.024

= 0.703 to 0.751 or 70.3% to 75.1%

b. Based on our answer in 7a, we know that a 90% confidence interval will be more precise than a 95% confidence interval that has a lower bound of 70.3% and an upper bound of 75.1%. Accordingly, a 90% confidence interval will have a lower bound that is greater than 70.3% and an upper bound that is less than 75.1%. Additionally, we know that a 99% confidence interval will be less precise than what we calculated in 7a. Thus, the lower bound for a 99% confidence interval will be less than 70.3% and the upper bound will be greater than 75.1%.

8.

a. No estimate of the mean is needed. The error in a sample is related to the standard deviation and sample size, not to the mean.

b. Reducing sampling error to ±$500 means reducing this quantity to ±$500:

1.96(Standard Error) or



So, we solve this equation:



So,

, 

c. Here we solve this equation



So,

, 

9.



Confidence interval = 1.97 ± 1.65(0.045)

= 1.97 ± 0.074

= 1.896 to 2.044

10.



Confidence interval = 49.3 ± 1.96(1.44)

= 49.3 ± 2.82

= 46.48 to 52.12

Confidence interval = 49.3 ± 2.58(1.44)

= 49.3 ± 3.72

= 45.58 to 53.02

11.



Confidence interval = 21 ± 1.96(0.86)

= 21 ± 1.69

= 19.31% to 22.69%

12.

a.



Confidence interval = 61 ± 1.96(2.12)

= 61 ± 4.16

= 56.84 to 65.16

b.



Confidence interval = 61 ± 2.58(2.12)

= 61 ± 5.47

= 55.53 to 66.47

c. The 95% and 99% confidence intervals only include values above 50% (i.e., the majority). Since we are estimating whether the majority of Millenials (>50%) believe that their generation has a unique and distinctive identity, intervals are compatible with the idea that more than 50% of Millenials hold this view.

13.

a. For those who thought that homosexual relations were always wrong:



Confidence interval = 50.2 ± 1.96(1.64)

= 50.2 ± 3.21

= 46.99% to 53.41%

For those who thought that homosexual relations were not wrong at all:



Confidence interval = 37.2 ± 1.96(1.58)

= 37.2 ± 3.10

= 34.10% to 40.30%

b.



Confidence interval = 13 ± 1.96(1.10)

= 13 ± 2.16

= 10.84% to 15.16%

c. Because the 95% confidence interval for those who think that homosexual relations are always wrong does include a value less than 50%, we cannot have a definite conclusion that the majority of the American public thinks that homosexual relations are always wrong.

14. a. The 99% confidence interval for the time people who think life is exciting watch tv daily is 2.01 to 2.68. The 99% confidence interval for the time people who think life is dull watch tv daily is 3.24 to 9.03. Given that there is no overlap between the two intervals, we can safely conclude that people who think life is exciting watch less tv daily.

b. The sample standard deviation for the “dull” respondents is much higher: 5.642 compared to the 1.996 for those who found it exciting. Another possibility is that the sample size for “dull” respondents was smaller, resulting again in a wider confidence interval.

15. a. The 95% confidence interval is 2.47 to 2.60. It does not contain 2.3, so we can safely say the population parameter is not exactly 2.3 children at this confidence level.

b. First, we must find the estimated standard error.

= = .032

2.54 ± (2.58).032 = 2.54 ± .083 = 2.457 to 2.623

This interval still does not contain 2.3 children. Once again, we can safely say that the true population parameter for the ideal number of children Americans want is not 2.3.