# ANSWERS TO EXERCISES AND REVIEW QUESTIONS

## PART THREE: PRELIMINARY ANALYSES

Before attempting these questions read through Chapters 6, 7, 8, 9 and 10 of the *SPSS Survival Manual*.

### *Descriptive statistics*

The first step in the analysis of any data file is to obtain descriptive statistics on each of your variables. These can be used to check for out-of-range cases, to explore the distribution of the scores, and to describe your sample in the Method section of a report.

**3.1** Use the instructions in Chapter 6 and Chapter 7 of the *SPSS Survival Manual* to answer the following questions concerning the variables included in the survey.sav data file.

(a) What is the mean age of the sample? What is the age range of the sample (minimum and maximum values)?

*p.51 The mean age of the sample is 37.44, with a range from 18 to 82.*

**Statistics**

age

| N | Valid | 439 |
|---|---|---|
| | Missing | 0 |
| Mean | | 37.44 |
| Minimum | | 18 |
| Maximum | | 82 |

(b) What is the percentage of males and females in the sample? Did any of the sample fail to indicate their gender?

*p. 50 The sample consisted of 42.1% males, and 57.9% females. There was no missing data for this variable.*

**sex**

| | | Frequency | Percent | Valid Percent | Cumulative Percent |
|---|---|---|---|---|---|
| Valid | MALES | 185 | 42.1 | 42.1 | 42.1 |
| | FEMALES | 254 | 57.9 | 57.9 | 100.0 |
| | Total | 439 | 100.0 | 100.0 | |

(c) What percentage of the sample were smokers?

*p. 50 Of the people that responded to this question 19.5% reported being a smoker.*

**smoker**

| | | Frequency | Percent | Valid Percent | Cumulative Percent |
|---|---|---|---|---|---|
| Valid | YES | 85 | 19.4 | 19.5 | 19.5 |
| | NO | 351 | 80.0 | 80.5 | 100.0 |
| | Total | 436 | 99.3 | 100.0 | |
| Missing | System | 3 | .7 | | |
| Total | | 439 | 100.0 | | |

(d) Inspect the distribution of scores on the Total Negative Affect scale. How normal is the distribution? Are there any cases that you would consider outliers?

*The distribution of scores on the Total Negative Affect Scale is skewed, with many low scores being recorded. There are no real outliers in the distribution*

**Histogram**



Mean = 19.4
Std. Dev. = 7.072
N = 435
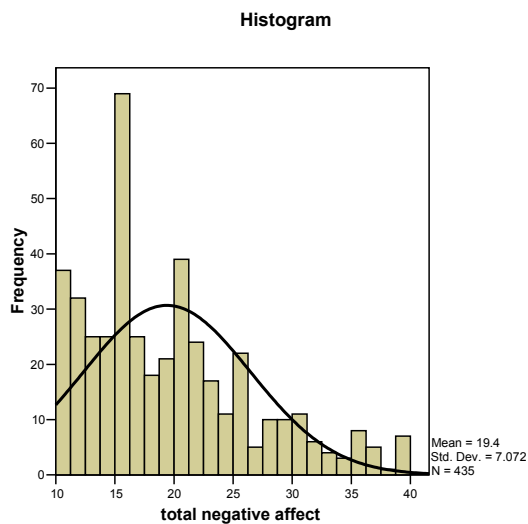
*Using graphs to describe and explore the data*

**3.2** Using the data file survey.sav, follow the instructions in Chapter 7 of the *SPSS Survival Manual* to obtain the following graphs.
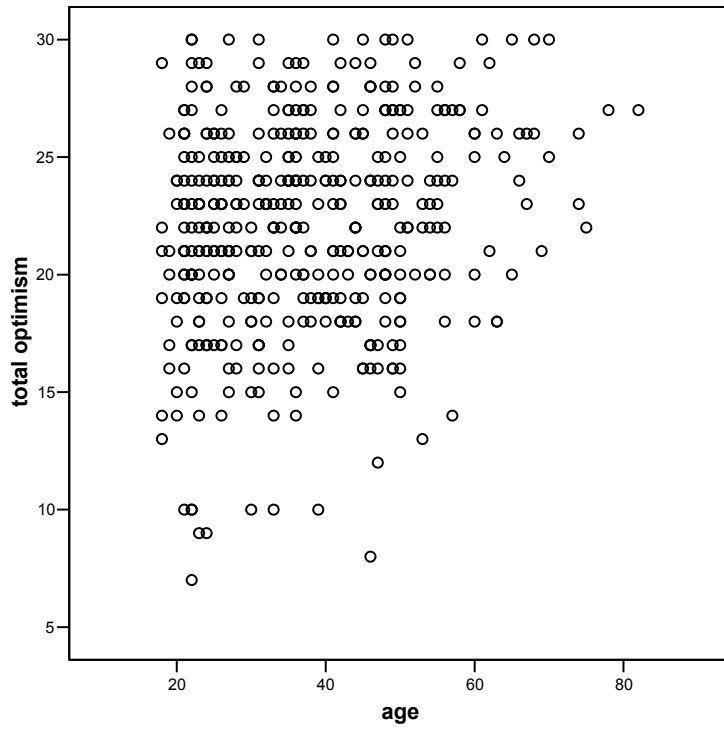
(a) histogram of scores on the Total Self-esteem scale (tslfest)



Mean = 33.53
Std. Dev. = 5.395
N = 436
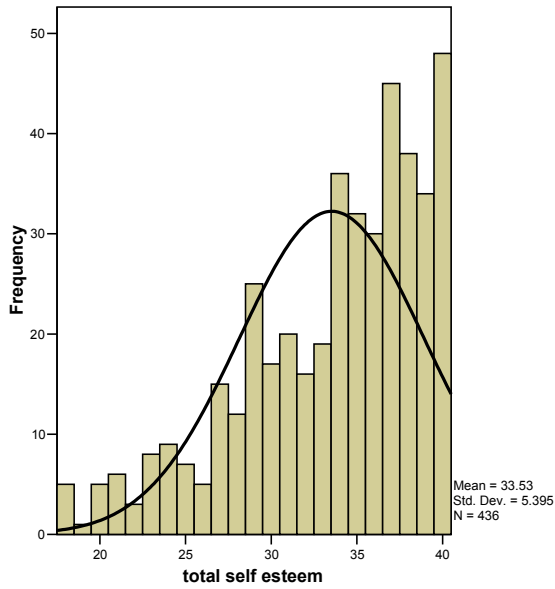
(b) bar graph of scores on the Total Self-esteem scale (tslfest) for males and females (sex), across the three age groups (agegp3)
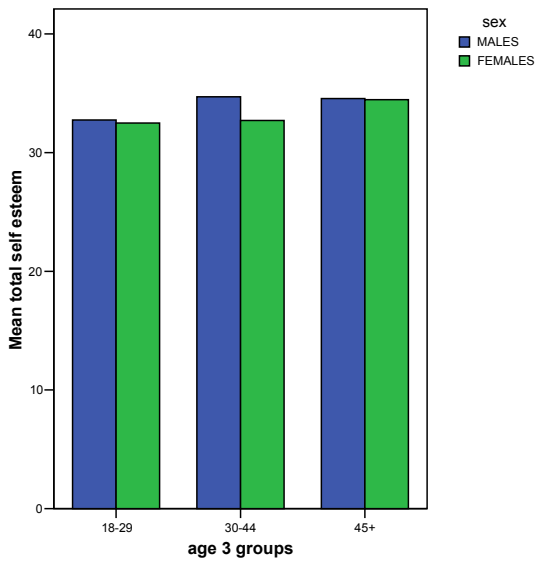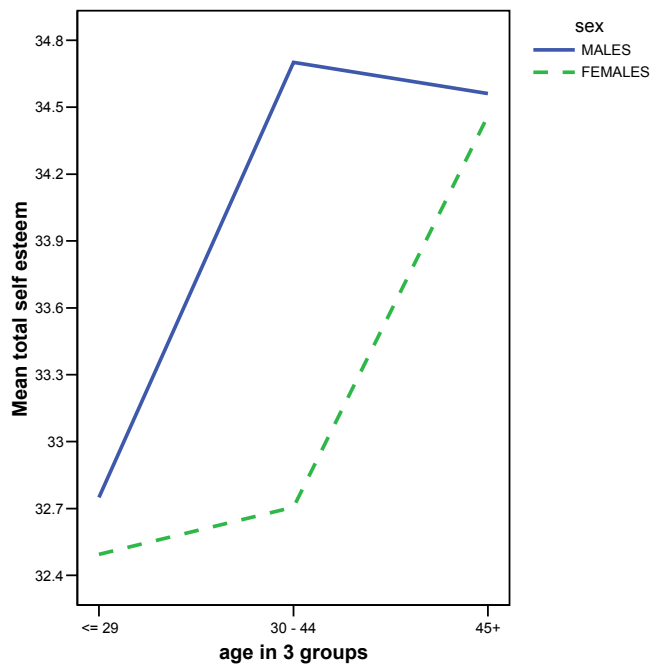
(c) scatterplot of scores on age and total scores on the Optimism scale (toptim)



(d) boxplot of scores on the Total Negative Affect scale (tnegaff) for males and females
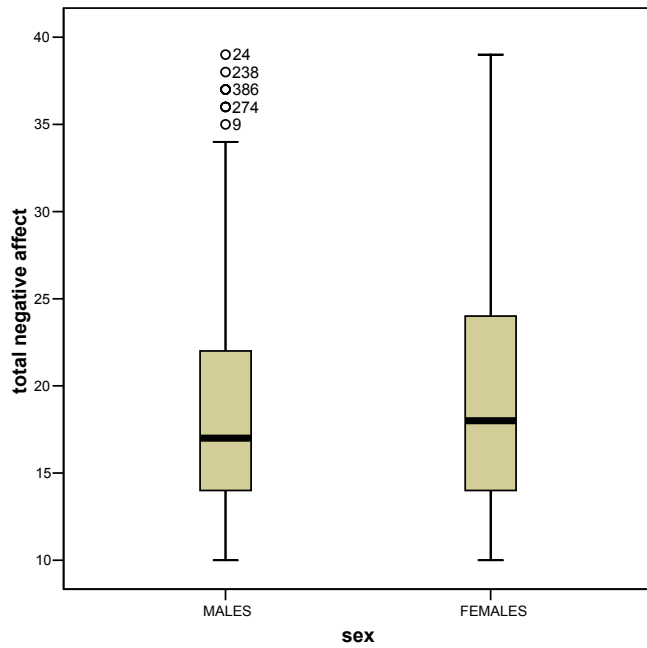


(e) line graph of the Total Self-esteem scale (tslfest) for males and females (sex), across the three age groups (agegp3)

Note: For display purposes I have modified the graph by changing the female line to a dashed line.


## *Manipulating the data*

This section includes a number of activities to help you review, and to apply, the material covered in Chapter 8 of the *SPSS Survival Manual*. You should read through this chapter before attempting these questions.

**3.3** One of the things that many students initially find difficult is being able to identify when items in a scale need to be 'reversed' before being added to give a total score. It is essential that this is done correctly, otherwise the values obtained for the total scale do not mean anything.

To give you some practice at this we will use the Perceived Control of Internal States scale (Pallant, 2000). The scale is shown below.

*Using the scale provided, decide how much you either agree or disagree with each statement. Next to each statement, write the number that best indicates how you feel.*

| **strongly disagree** | **1** | **2** | **3** | **4** | **5** | **strongly agree** |
|---|---|---|---|---|---|---|

1. _____      I don't have much control over my emotional reactions to stressful situations.

2. _____      When I'm in a bad mood I find it hard to snap myself out of it.

3. _____      My feelings are usually fairly stable.

4. _____      I can usually talk myself out of feeling bad.

5. _____      No matter what happens to me in my life I am confident of my ability to cope emotionally.

6. _____      I have a number of good techniques that will help me cope with any stressful situation.

7. _____      I find it hard to stop myself from thinking about my problems.

8. _____      If I start to worry about something I can usually distract myself and think about something nicer.

9. _____      If I realize I am thinking silly thoughts I can usually stop myself.

10. _____      I am usually able to keep my thoughts under control.

11. _____      I imagine there will be many situations in the future where silly thoughts will get the better of me.

12. _____      I have a number of techniques which I am confident will help me think clearly and rationally in any situation I might find myself.

13. _____      Even when under pressure I can usually keep calm and relaxed.

14. _____      I have a number of techniques or tricks that I use to stay relaxed in stressful situations.

15. _____      When I'm anxious or uptight there does not seem to be much that I can do to help myself relax.

16. _____      There is not much I can do to relax when I get uptight.

17. _____      I have a number of ways of relaxing that I am confident will help me cope.

18. _____      If my stress levels get too high I know there are things I can do to help myself.

Pallant, J. (2000). Development and evaluation of a scale to measure perceived control of internal states. *Journal of Personality Assessment*, 75 (2), 308-337.

The aim of this exercise is to identify which items to reverse (not to actually carry out the reversals on the items in the survey.sav data file as these have already been correctly reversed).

(a) Identify which items in the scale would need to be reversed so that high total scores would indicate high levels of perceived control.

*Items 1, 2, 7, 11, 15, 16 need to be reversed.*

As discussed in Chapter 8 of the *SPSS Survival Manual* the next step is to calculate total scores by adding together the items that make up each scale. The following two exercises give you some practice with this process.

**3.4** Use the procedures covered in Chapter 8 to create (using Compute) the following new total scale scores. Create new total subscale scores for the Perceived Control of Internal States scale (this scale is shown above).

(a) To calculate the Emotion subscale, add items pc1 to pc6. Call this new variable pcemot.
(b) To calculate the Thoughts subscale, add items pc7 to pc12. Call this new variable pcthou.
(c) To calculate the Physical subscale, add items pc13 to pc18. Call this new variable pcphys.

Check the descriptive statistics (mean, standard deviation, minimum, maximum) for your new subscales.

**3.5** In this exercise a variable with eight different responses will be recoded into another variable which has only two possible values. The variable you will be using is marital status. The question in the questionnaire used to collect this information is shown below.

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What is your marital status? *(please tick whichever applies)*

☐ 1. single      ☐ 2. in a steady relationship      ☐ 3. living with partner      ☐ 4. married for first time
☐ 5. remarried      ☐ 6. separated
☐ 7. divorced      ☐ 8. widowed

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Open the survey.sav data file.

(a) Run **Frequencies** on the variable marital status (marital) to find out how many people fall into each of the categories.

**marital status**

| | | Frequency | Percent | Valid Percent | Cumulative Percent |
|---|---|---|---|---|---|
| Valid | SINGLE | 105 | 23.9 | 23.9 | 23.9 |
| | STEADY RELATIONSHIP | 37 | 8.4 | 8.4 | 32.3 |
| | LIVING WITH PARTNER | 37 | 8.4 | 8.4 | 40.8 |
| | MARRIED FIRST TIME | 189 | 43.1 | 43.1 | 83.8 |
| | REMARRIED | 30 | 6.8 | 6.8 | 90.7 |
| | SEPARATED | 10 | 2.3 | 2.3 | 92.9 |
| | DIVORCED | 24 | 5.5 | 5.5 | 98.4 |
| | WIDOWED | 7 | 1.6 | 1.6 | 100.0 |
| | Total | 439 | 100.0 | 100.0 | |

(b) Follow the instructions in Chapter 8 to create a new variable (relship) from the variable in the data file (marital). The new variable will only have two values, indicating whether a person is or is not in a relationship.

- In the first group include people who are not in a relationship (single, separated, divorced, widowed). These will be coded 1.
- In the second group include people who are in a relationship (steady relationship, living with partner, married for the first time, remarried). These will be coded 2.

(c) Run **Frequencies** on the new variable (relship) and compare this with the results of the **Frequencies** on the original variable (marital). Are there the correct number of cases in each of the new groups?

**relship**

|       |       | Frequency | Percent | Valid Percent | Cumulative Percent |
|-------|-------|-----------|---------|---------------|--------------------|
| Valid | 1     | 146       | 33.3    | 33.3          | 33.3               |
|       | 2     | 293       | 66.7    | 66.7          | 100.0              |
|       | Total | 439       | 100.0   | 100.0         |                    |

## *Checking the reliability of a scale*

If you use scales or standardized measures in your research (this is common in psychological research) it is important to assess the reliability (internal consistency) of the scores on the scale in your sample. The following exercise gives you some practice in this process.

**3.6** Follow the procedure in Chapter 9 of the *SPSS Survival Manual* to assess the reliability of the following scales.

(a) Optimism scale (op1 to op6)

**Reliability Statistics**

| Cronbach's Alpha | N of Items |
|------------------|------------|
| .797             | 6          |

*In this sample the Optimism Scale shows adequate internal consistency with a Cronbach alpha value of .80 (rounded to 2 decimal places).*

(b) Perceived Control of Internal States Scale (pc1 to pc18)

**Reliability Statistics**

| Cronbach's Alpha | N of Items |
|------------------|------------|
| .901             | 18         |

*In this sample the Perceived Control of Internal States Scale shows good internal consistency with a Cronbach alpha value of .90.*

(c) Self-esteem scale (sest1 to sest10)

**Reliability Statistics**

| Cronbach's Alpha | N of Items |
|---|---|
| .854 | 10 |

*In this sample the Self esteem Scale shows good internal consistency with a Cronbach alpha value of .85.*

## Choosing the right statistic

Many students find it difficult to identify which statistical technique to use to address their research questions. Chapter 10 of the *SPSS Survival Manual* will help you with this process.

**3.7** For each of the following research situations identify which statistical technique could be used.

(a) Ann is interested in exploring the possibility of gender differences in levels of perceived stress.
*Independent samples t-test*

(b) Ann would also like to explore the relationship between optimism and perceived stress. She suspects that higher levels of optimism would be associated with lower levels of perceived stress.
*Correlation*

(c) Bill is interested in exploring the effect of both sex and age group on self-esteem scores. He is interested in the effect of each variable individually, and any interaction that may exist.
*Two way ANOVA*

(d) Celia would like to know which is a better predictor of negative affect: optimism or self-esteem.
*Multiple Regression*

(e) If Celia were also concerned that age may be a confounding variable, how would she go about controlling for this variable in the analyses?
*Hierarchical multiple regression*

(f) David is interested in the question: Are younger people (18-29yrs) more likely to be smokers than older people (30-44yrs or 45+yrs)?
*Chi-square test of independence*

(g) Ellie conducts a study to find out if there is a significant change in depression levels across three time periods (prior to an intervention, after the intervention and at a three-month follow-up).
*One way repeated measures ANOVA*

**3.8** Review each of the situations listed in Exercise 3.7 and consider what non-parametric technique you would use if it was not appropriate to use a parametric test. (Hint: Not all will have a non-parametric alternative.)

*Parametric alternatives:*
    *(a) Mann Whitney test*
    *(b) Spearman Rank Order Correlation*
    *(c) No non-parametric alternative*
    *(d) No non-parametric alternative*
    *(e) No non-parametric alternative*
    *(f) Chi-square test for independence*
    *(g) Friedman test*