## Chapter 11

1. A music teacher had noticed that some students went to pieces during exams. He wanted to test whether this performance anxiety was different for people playing different instruments. He took groups of guitarists, drummers and pianists (variable = **Instru**) and measured their anxiety (variable = **Anxiety**) during the exam. He also noted the grade of exam they were taking (in the UK, musical instrument exams are known as 'grades' and range from 1 to 8). He wanted to see whether the type of instrument played affected performance anxiety when controlling for the grade of the exam. What analysis should he use?

    a. Analysis of covariance*.

    b. Independent analysis of variance.

    c. Repeated measures analysis of variance.

    d. Mixed analysis of variance.

2. The next part of the **R** output for the example in the previous question is given below. Which of the following statements best reflects what the effect of **INSTRU** in the table tells us?

```
Response: ANXIETY
             Sum Sq     Df    F value     Pr(>F)
(Intercept)  32903.788  1     197.594       .000 ***
GRADE        907.833    1     5.452         .023 *
INSTRU       6351.708   2     19.072        .000 ***
Residuals    9325.228   56
```

    a. The type of instrument played in the exam had a significant effect on the level of anxiety experienced.

    b. The type of instrument played in the exam did not have a significant effect on the level of anxiety experienced.

    c. The type of instrument played in the exam had a significant effect on the level of anxiety experienced even after the effect of the grade of the exam had been accounted for.*

    d. The type of instrument played in the exam did not have a significant effect on the level of anxiety experienced even after the effect of the grade of the exam had been accounted for.

3. Use the table of means and the **R** output below for the example used in the previous two questions to decide which of the following statements best reflects what these tables tell us.

| INSTRU | Mean (SE) |
|---|---|

| | |
|---|---|
| Guitar | 72.633 (3.066) |
| Piano | 85.852 (2.887) |
| Drums | 98.225 (2.761) |

```
       Simultaneous Confidence Intervals

Multiple Comparisons of Means: Tukey Contrasts

95% family-wise confidence level

Linear Hypotheses:
                       Estimate lwr     upr
Drums - Guitar == 0    1.7857   15.355  35.830
Drums - Piano  == 0    2.2249   2.527   22.219
Piano - Guitar == 0    0.4392   2.804   23.634
```

a. Guitarists were significantly less anxious than drummers, but were about as anxious as pianists, and drummers were about as anxious as pianists.

b. Guitarists were significantly less anxious than pianists and drummers, and drummers were significantly less anxious than pianists.

c. Guitarists, drummers and pianists were all about equally anxious.

d. Guitarists were significantly less anxious than pianists and drummers, and drummers were significantly more anxious than pianists.*

A psychologist was interested in the effects of different fear information in children's beliefs about an animal. Three groups of children were shown a picture of an animal that they had never seen before (a quoll). Then one group was told a negative story (in which the quoll is described as a vicious, disease-ridden, bundle of nastiness that eats children's brains), one group a positive story (in which the quoll is described as a harmless, docile creature that likes nothing more than to be stroked), and a final group weren't told a story at all. After the story children rated how scared they would be if they met a quoll, on a scale ranging from 1 (not at all scared) to 5 (very scared indeed). To control for the natural anxiousness of each child, a questionnaire measure of trait anxiety was given to the children and used in the analysis. The (edited) **R** output is below. The next two questions relate to this output.

```
Response: Fear of Animal
                        Sum Sq  Df   F value    Pr(>F)
(Intercept)             96.249   1   109.141    .000 ***
Natural Fear Level      4.924    1   5.579      .022 *
Type of Information     13.567   2   7.685      .001 **
Residuals               49.426   56

: Type of Information
: Positive
       mean   SE.mean
       2.594  .219
------------------------
: Negative
       mean   SE.mean
       3.658      .211
------------------------
: None
       mean   SE.mean
       2.697      .215
-------------------------
```

```
Simultaneous Confidence Intervals

Multiple Comparisons of Means: Tukey Contrasts

Fit: aov(formula = libido ~ partnerLibido + dose, data = viagraData)

Quantile = 2.4856
95% family-wise confidence level

Linear Hypotheses:
                           Estimate   lwr     upr
Positive - None     == 0  -0.103   -0.880    .675
Negative - None     == 0   0.961    0.225   1.697
Negative - Positive == 0   1.064    0.306   1.823
```

4. What analysis has been used?
    a. Analysis of covariance.*
    b. Independent analysis of variance.
    c. Repeated measures analysis of variance.
    d. Mixed analysis of variance.
    e. Factor analysis.

5. Which of the following statements best reflects what the effect of 'Natural Fear Level' in the table tells us?
    a. The child's natural level of fear had a significant relationship with their fear beliefs about the animals.*
    b. The child's natural level of fear did not have a significant relationship with their fear beliefs about the animals.
    c. The type of information given to the children had a significant relationship with the child's natural level of fear.
    d. The type of information given to the children did not have a significant relationship with the child's natural level of fear.
    e. Natural fear levels were significantly different in the groups of children.