

NATURAL SCIENCES TRIPOS Part IB
NATURAL SCIENCES TRIPOS Part II (General)
NATURAL SCIENCES TRIPOS Preliminary Examination for Part II
Psychology

Saturday 26 May 2007 1.30 to 3

EXPERIMENTAL PSYCHOLOGY – WRITTEN PRACTICAL

Answer all three parts of Question 1 in Section A and one question from Section B.

Each question carries equal marks.

Answers from each Section must be tied up in a separate bundle, with the letter of the Section written on each cover sheet.

Write your number not your name on the cover sheet for each Section.

STATIONERY REQUIREMENTS

Loose script paper

Cover sheets

Graph paper x 1 sheet

SPECIAL REQUIREMENTS

Tables and Formulae

Calculator

<p>You may not start to read the questions printed on the subsequent pages of this question paper until instructed that you may do so by the Invigilator.</p>

SECTION A

1. Experimenters reported on the effect of a 24-week course of cognitive-behavioural therapy (CBT) as a treatment for anorexia. There were 17 girls in this study, and they were weighed before and after treatment. The weights of the girls, in pounds, are given below:

Subject	1	2	3	4	5	6	7	8	9	10
Before	83.8	83.3	86.0	82.5	86.7	79.6	76.9	94.2	73.4	80.5
After	95.2	94.3	91.5	91.9	100.3	76.7	76.8	101.6	94.9	75.2

Subject	11	12	13	14	15	16	17
Before	81.6	82.1	77.6	83.5	89.9	86.0	87.3
After	77.8	95.5	90.7	92.5	93.8	91.7	98.0

(a) Specify the null and experimental (alternative) hypotheses, and run the appropriate t test, justifying your choice and stating your conclusions.

(b) The data above suggest that girls receiving CBT gained weight over the course of the therapy. However, it is possible that they gained weight simply because they got older. In order to control for this effect, the amount of weight gained (or lost) by the CBT group ($n = 17$) was contrasted with the amount of weight gained (or lost) in a Control group ($n = 26$), who received no therapy over the same time period. The data on *weight gain* for the two groups is shown below:

Control		CBT	
-0.5	3.3	11.4	9.0
-9.3	11.3	11.0	3.9
-5.4	0.0	5.5	5.7
12.3	-1.0	9.4	10.7
-2.0	-10.6	13.6	
-10.2	-4.6	-2.9	
-12.2	-6.7	-0.1	
11.6	2.8	7.4	
-7.1	0.3	21.5	
6.2	1.8	-5.3	
-0.2	3.7	-3.8	
-9.2	15.9	13.4	
8.3	-10.2	13.1	

As before, run the appropriate t test to compare the group means and state your conclusions.

(c) Calculate the 95% confidence interval on $\mu_1 - \mu_2$ for the data from the CBT and control groups, and interpret your results accordingly.

SECTION B

2. How would you determine if two cognitive processes were performed in a serial manner in the human mind. Please give an example.
3. It is known that aspirin doses can lead to tinnitus ('ringing' sounds heard when no such external sound is present) in people. Design an experiment to assess whether rats experience tinnitus when given a large dose of aspirin.
4. Design an experiment to assess why, after experience of correlated presentations of a stimulus (e.g., a red triangle) and reward (e.g., an increase in bonus score shown on a screen), subjects are able to give accurate ratings reflecting the degree of correlation between the two events.

END OF PAPER