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

Saturday 27 May 2006 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

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.

SECTION A

1

(a) A food manufacturer employed a research group to assess whether supplementing children's diet with DHA (an Omega-3 fatty-acid) would affect their ablity to sustain attention at school. To measure sustained attention, a task was devised in which children had to press a key whenever a small triangle was presented on a computer screen, but not to respond when other shapes were presented. The stimuli were presented one at a time at random locations on the screen. Target stimuli remained on the screen until a response was made. Average reaction time for responses to triangles over a twenty-minute period was recorded for each child.

Prior to performing the task, forty children were randomly assigned to one of two groups. Every day for four weeks, children from one group each received a tablet containing DHA and those from the other group received a placebo. You may assume that the children could not distinguish the DHA tablet from the placebo tablet, that the two groups did not differ in terms of the number of errors they made, and that reaction times for each group were normally distributed.

GROUP	Reaction Time (milliseconds)
DHA	595
DHA	532
DHA	672
DHA	574
DHA	476
DHA	651
DHA	504
DHA	546
DHA	511
DHA	658
DHA	637
DHA	546
DHA	553
DHA	581
DHA	532
DHA	574
DHA	693
DHA	609
DHA	532
DHA	588

GROUP	Reaction Time (milliseconds)
PLACEBO	588
PLACEBO	637
PLACEBO	574
PLACEBO	553
PLACEBO	448
PLACEBO	525
PLACEBO	511
PLACEBO	644
PLACEBO	609
PLACEBO	693
PLACEBO	581
PLACEBO	441
PLACEBO	504
PLACEBO	525
PLACEBO	609
PLACEBO	518
PLACEBO	483
PLACEBO	476
PLACEBO	539
PLACEBO	518

Did the DHA supplements have a significant effect on performance of the sustained attention task?

TURN OVER

(b) In a second study, the same research group studied whether prolonged use of DHA supplements in identified 'at risk' pre-school children affected the probability of a child later being diagnosed with Attention Deficit Disorder (ADD). One hundred children were randomly assigned to one of two groups; each child in the first group of fifty received a DHA tablet and each from the other group received a placebo. Again, you may assume that the tablets were indistinguishable from each other. In the control group 28 of the 50 children were later diagnosed with ADD, whereas in the DHA group, 18 of the children received diagnoses.

Did the DHA tablets affect significantly the likelihood of a ADD diagnosis?

c) Finally, the research group wished to examine performance on the sustained attention task prior to receiving DHA tablets versus after receiving DHA tablets. A group of twenty children are tested on the task described in Question 1a. They then receive DHA tablets each day for three weeks and are then re-tested on the same task. What statistical test should be used to examine whether or not performance improved following administration of DHA tablets?

SECTION B

2 Design an experiment to assess whether patients process emotional aspects of stimuli while under general anaesthesia.

3 Design an experiment to test whether or not one year old human infants distinguish short-term properties (e.g., direction of motion, emotion) from more permanent long-term properties (e.g., identity, gender) of other people.

4 Testosterone levels can be measured in samples of amniotic fluid during pregnancy. A scientist claims that foetuses who have high levels of testosterone in amniotic fluid will later develop poor face processing in adulthood. Design a study to examine this claim.

END OF PAPER