

QUEEN MARY, UNIVERSITY OF LONDON

MAS 314

Design of Experiments

Assignment 7

For discussion on 27 February 2007

1 Describe the sort of design that would be most appropriate for each of the following situations:

- (i) investigating a new drug which purports to reduce high blood pressure;
- (ii) investigating a new ‘miracle’ cure for the common cold;
- (iii) finding out what teaching method is best for brilliant young mathematicians who go to university at age 14 or less;
- (iv) comparing four diets for piglets to see which gives the greatest weight gain in the first six weeks of life;
- (v) comparing three winter feed supplements for sheep to see how they affect the quality of the wool shorn the following spring;
- (vi) comparing two styles of conducting large amateur choirs;
- (vii) assessing whether ‘brisk’ or ‘motherly’ policewomen obtain the most useful information from rape victims in the interview immediately after the rape;
- (viii) seeing whether either of two proposed new drugs to help people give up smoking has any effect.

2 In the issue of the *New Scientist* dated 13 January 2007, there were three news items about investigations on people. In each case, say what sort of investigation it was, comment on what you think the design and randomization were (if any), and discuss any ethical issues involved.

- (a) On page 17, an opinion piece “The curse of being different” by Robert Adler reported as follows.

Between 2003 and 2006 Ilan Dar-Nimrod and Steven Heine at the University of British Columbia in Vancouver, Canada, tested the mathematical ability of 220 female college students (*Science*, vol 314, p 435). Before taking a maths test similar to one used by many colleagues to screen applicants to graduate programmes, some of the women read passages arguing that there are fixed gender differences in mathematical ability, while others read that differences in ability can be modified by experience. The researchers predicted that viewing ability as changeable would make it easier for women to overcome the negative stereotype that paints maths as a predominantly male pursuit.

They were right: the “changeable” intervention raised women’s maths scores by an astonishing 50 per cent.

- (b) A short item on pages 4–5, entitled “Perils of freedom” started as follows.

Being released from prison may be far riskier than anyone thought. Former inmates of Washington state prison were 3.5 times more likely to die during their first two years after release than people of the same age, sex and race who had never been incarcerated.

The danger was greatest during the first two weeks, when former inmates were 13 times more likely to die than their non-incarcerated peers (*The New England Journal of Medicine*, vol 356, p 157).

The study tracked 30,327 former inmates released between July 1999 and December 2003.

- (c) Here is the whole of the “60 seconds” item on page 5 called “Milk spoils tea party”.

Adding milk to tea may blunt its cardiovascular benefits. A study of 16 volunteers published in the *European Heart Journal* suggests that the effects of catechins—ingredients in tea thought to combat heart disease by dilating blood vessels—were blocked by casein proteins in milk.