

## Testing the placebo effect

### Introduction

The effectiveness of many CAM therapies is often ascribed by sceptics to the 'placebo effect'. If time allows students might carry out a short experiment on their peers into the placebo effect. Ideally they should devise the experiment and procedures themselves, drawing upon their experiences of GCSE Sc1 investigations and what they have covered in the medical ethics section to ensure the experiment is reliable and ethically sound. However if time is limited or the students unimaginative you could suggest the following method.

### Possible method

This experiment purports (pretends) to test the effect of a 'caffeine containing pill' e.g ProPlus. These tablets are advertised as improving alertness and concentration and are sometimes used by students at examination time. In fact, the 'pills' under test will be placebos and should taste of nothing much. Some prior research by the teacher may be necessary to establish a good sweet to use as a placebo, as a strong 'sweet' taste will give the game away! TicTacs look suitably 'pill-like' and some don't taste of very much, but avoid the brilliantly coloured ones. The teacher should provide the 'pills' for the students to use. The discrete independent variable is therefore 'with or without pill'.

An alternative to 'pills', if suitable ones cannot be sourced, would be to test the effect of caffeine in a cola or coffee drink. The drink consumed by the subjects would however be decaffeinated.

The subjects in the experiment must carry out a task which they would be expected to carry out quicker having taken the pills. The dependent variable is therefore 'time taken'. Such a task could be a complicated 'dot to dot' tracing exercise, or sorting a set of shuffled playing cards or even a dexterity test e.g the wobbly wire game used at fetes.

A repeated measures design would be most appropriate, with each subject doing the task twice, with and without having taken the 'caffeine'. In order to minimise the practice effect, half the subjects must do the task first without the 'caffeine', and the other half do the task first with the 'caffeine'. The pill/drink should be consumed and 10 minutes should elapse before the task is undertaken, to give the 'active ingredients' time to have their effect. The second attempt at the task should be at least an hour after the first, or even the following day, so the effects of the 'caffeine' and any practice have worn off.

Data should be analysed descriptively to begin with, by calculating mean times with and without the 'caffeine'. Any differences (assuming the 'with' condition yields faster results) may be attributed to the placebo effect, since no active caffeine was given to the subjects. The size of the difference and the role of inferential statistics in determining whether there is a significant difference in the data can be covered, and a suitable inferential test (paired test if sufficient data and a normal distribution) may be attempted.

Confounding variables in this experiment include the effects of any other ingredients in the 'pill' or drink, most notably sugar.

### References

**Textbook**  
Chapter 5

**Specification**  
9.4 Alternative medicine

12.1 b,e Date and explanations  
12.3 b, d Causal links

## ***Testing the placebo effect***

The effectiveness of many CAM therapies is often ascribed by sceptics to the 'placebo effect'. A placebo is a 'non-treatment' but the person taking it is unaware of this and the belief that they are taking a 'treatment' is sufficient to cause an improvement in their condition. Most trials of drugs and therapies try to eliminate the placebo effect by blind testing, but this experiment tries to test for the placebo effect itself.

The people taking part in your experiment are called 'subjects'. The subjects are told that you are testing the effects of caffeine on their nervous systems. In actual fact you are not giving them any caffeine at all - they just think you are. You can either pretend to 'test' caffeine containing pills e.g. ProPlus, or a caffeine-containing drink e.g. coffee or cola. ProPlus tablets are advertised as improving alertness and concentration and are sometimes used by students at examination time.

The subjects in the experiment must carry out a task which they would be expected to carry out quicker having taken the caffeine. The dependent variable is therefore 'time taken'. Such a task could be a complicated 'dot to dot' tracing exercise, or sorting a set of shuffled playing cards into suits or ascending order or even a dexterity test like the 'wobbly wire buzzer' game used at fetes. You might need to carry out a feasibility study before choosing a suitable task.

A 'repeated measures' experiment would be best, with each subject carrying out the task twice, both with and without the caffeine. When a subject does a task twice, they might get better at it the second time purely because they have already practiced it, and this might confound your results. In order to minimise the practice effect, half the subjects must do the task first without the 'caffeine', and the other half do the task first with the 'caffeine'. The pill/drink should be consumed 10 minutes before the task is undertaken, to give the 'active ingredients' time to have their effect. The second attempt at the task should be at least an hour after the first, or even the following day, so the effects of the 'caffeine' and any practice have worn off.

Before you carry out any experiment, you must have prepared a through plan. Use your experiences of carrying out GCSE Sc1 investigations to help you plan, and also incorporate what you learned in the medical ethics section to ensure the experiment is reliable and ethically sound. Ask your teacher to check your plan before you start.

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