THE MAJOR FEATURES OF SCIENCE

Whether a discipline is 'scientific' or not depends on what the word 'science' means. Philosophers of science generally agree that for a subject to be considered scientific, it must:

(1) Be satisfactorily defined, and study something that is capable of being studied in the first place
(2) Construct **theories** capable of explaining the discipline's concerns
(3) **Test hypotheses** using **objective empirical methods**
(4) **Discover general laws** (understanding allows prediction, which allows control – the goals of a science)

Only (2) and (3) need concern us here, although (1) and (4) are interesting issues particularly as far as Psychology is concerned.

Theory construction

Psychologists have constructed plenty of theories which try to explain why we behave the way we do. These include 'learning theory' and the 'dopamine theory' of schizophrenia. However, it is not sufficient for a subject just to construct theories. Those theories need to be 'good' theories. Exactly what constitutes a 'good' theory is debatable. However, **Murray (1985)** has proposed that 'good' theories satisfy several criteria (although we do *not* need to learn them):

Murray's (1985) criteria for 'good' theories

(1) They are **falsifiable** (i.e. capable of being disproved – for Popper, 1959, science proceeds by systematically attempting to disprove theories).
(2) They are **specific**, **precise**, and **simple**, such that they can be understood by any 'reasonable individual'.
(3) They **explain the past** and **predict the future**. And they do so **accurately**.
(4) They are **internally consistent**, in that there are no contradictions between one part and another.
(5) They are **parsimonious**, that is, they explain things in as simple a manner as possible ('Occam's razor) and require few if any assumptions to be made.
(6) They are **fertile**, that is, they stimulate interest, discussion, and further research.
(7) They offer **practical guidance** in solving everyday problems.
(8) They have **truth value**, that is, they accurately reflect the reality they are trying to explain

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It is certainly easy to think of 'bad' theories in Psychology. Some philosophers argue that Freudian theory satisfies criterion (6), but fails miserably on all the other criteria. What psychological theories do you think would be considered 'good' theories?

Testing hypotheses using objective empirical methods

A **hypothesis** is tested most **objectively** by conducting an **experiment**. The experiment is the most powerful method a scientist has. There are 3 reasons for this:

(1) Only an experiment allows us to talk about **cause and effect**. This is because in an experiment all variables except the one we are interested in (the *independent variable*) are held constant. Any change in the variable we are measuring (the *dependent variable*) must be a result only of the independent variable.

(2) Experiments are **replicable**. What this means is that provided we have enough detail about how an experiment was carried out, we can go and *repeat* it ourselves. If we get the same result as the person who originally carried out the experiment, then the result is said to be **reliable**. Thus, experiments allow us to check how reliable findings that other psychologists report are.

(3) Because an experiment holds all the variables constant except the one we are interested in seeing the effect of, an experiment permits **control**. The more control we have over variables the more **objective** (i.e. without bias) a method is. Experiments therefore increase **objectivity**.

Some people would argue that psychology experiments are not 'proper' experiments. For example, we have the issue of whether our results can be generalised, given the unrepresentative samples we typically study. The psychological laboratory is artificial, and participants' expectations can affect their behaviour (as can the experimenter's). Ways of overcoming these problems exist, but experiments with humans can never be as 'objective' as experiments with inanimate objects.