

Scientific & Psychological Research

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WHAT'S COVERED

While future lessons will be discussing how psychological research is actually conducted, this lesson will provide a general overview of the reasons and rationale behind scientific and psychological research, as well as the different methods used in psychology.

The specific areas of focus include:

- 1. The Scientific Method and Qualities of Research
 - a. Empirical
 - b. Measurable
 - c. Reasonable
 - d. Replicable
 - e. Falsifiable
- 2. Methods of Gathering Information
 - a. Experimentation
 - b. Naturalistic Observation
 - c. Correlation Study
 - d. Case Study
 - e. Survey

1. The Scientific Method and Qualities of Research

The **scientific method** is the method that underlies psychology, as well as the other scientific fields. This method is the way of discovering and modifying information on the world around us based on scientific principles and processes.

The use of the scientific method distinguishes psychology from other disciplines, like philosophy, which doesn't necessarily use that type of process.

There are several different terms used in the scientific method that describe the qualities of scientific

research. Understanding these terms will help you understand the principles and processes of science.

TERM TO KNOW

Scientific Method

Systematic process for answering scientific questions

1a. Empirical

Scientific research is empirical, which means that it's taken from observations or experimentation. Scientific research is not taken from somebody's subjective experience or from reports given by other people. This is the difference between objective and subjective information.

1b. Measurable

The next quality of scientific research is that it's measurable. This means that the research can be measured in some way.

This doesn't necessarily mean that it's physically measurable, like with a ruler, but rather that researchers can apply some amount or degree to what they're studying.

When it comes to mental states, this research usually can't be measured physically. Instead, researchers need to understand how much or how little of something there is in a given context.

1c. Reasonable

The third quality is that scientific research is reasonable; it is rational, and simply makes sense. A concept often used in science is Occam's Razor, which states that the simplest possible explanation is generally the correct one.

Psychologists and other scientists should have to make the fewest possible assumptions about the subject of their study to understand the activity occurring.

If they have to postulate about brain activity in order to understand what's occurring, then their theories are probably too complicated, and thus likely incorrect from a scientific point of view.

1d. Replicable

Scientific research is also **replicable**, meaning that it can be duplicated or seen again in another instance. If research is replicable, other scientists should be able to do the same research and come up with similar results.

In other words, scientific research isn't unique to specific situations; rather, it is something that is generally true in most circumstances.

TERM TO KNOW

Replicable

Can be duplicated or done again

1e. Falsifiable

Finally, scientific research is falsifiable, meaning it's able to be proven false. Through research, scientists have to be able to determine whether a hypothesis is true or false.

If it's neither true or false, or if it can't be determined as either of these through experimentation, then chances are that it doesn't fall under the realm of science.

☆ EXAMPLE The existence of God or gods is something that's not necessarily scientific because it can't be proven in any way. The same goes for the existence of an afterlife. Both of these things require somewhat of a leap of faith; they can't be experimented on or observed. Thus, they are considered unscientific.

2. Methods of Gathering Information

There are several different ways in which the scientific method can be applied to psychology to gather information.

2a. Experimentation

The first of these methods is experimentation. This involves performing some activity that can either confirm or disprove a hypothesis that a scientist has about causes and effects in the larger world. A hypothesis is a proposed explanation about something that's happening. In other words, it's an educated guess about what scientists see occurring in whatever subject they're studying. A hypothesis can either be proven or disproven through the experiment being performed.

☆ EXAMPLE If you wanted to know the effect that sugar has on children, you might do an experiment to show that sugar makes children more hyperactive. "Sugar makes children more hyperactive" would be your hypothesis, and you would either confirm or deny that through the use of your experiment.

2b. Naturalistic Observation

Another way that to gather information is through naturalistic observation. Experimentation and naturalistic observation are probably the two most commonly used methods in all of psychology. Sometimes it isn't possible to experiment on certain occurrences in the realm psychology. Instead, researches need to look at these subjects within their natural settings. The purpose of this would be to watch them, and gather information from what is being seen.

↔ EXAMPLE Returning to the example about the effects of sugar on children, you might go to a school and watch children after lunch to see whether the children that had more sugar were more hyperactive than the children that had less sugar.

2c. Correlation Study

Information can also be gathered through a correlation study, in which scientists measure the degree of a relationship between two or more events.

⇐ EXAMPLE You might look at the sales of sugary products during lunch or at a certain convenience store, and then look at instances of detention at the school. Again, you're trying to figure out whether the

sugary snacks have an affect on the children's behavior, making the children act out more.

The important thing to remember with correlation studies, as well as with a lot of other research methods, is that correlation doesn't necessarily equal causation. This means that just because you know about the existence of two variables, one of them doesn't necessarily make the other occur.

☆ EXAMPLE You can't assume that sugar makes children more hyperactive simply because you see instances of detention. There might be something else that's affecting the children outside of that environment.

2d. Case Study

Another way to gather information is through a case study, which involves looking at one subject or a small group of subjects in full detail.

☆ EXAMPLE As opposed to the experiment, which involves looking at a broad range of children in relation to sugar consumption, the case study focuses on specific children, detailing exactly what those children are doing. The actions of this specific group give you more depth versus the breadth of a lot of other research methods.

2e. Survey

The final method of gathering information is through a survey. This method is probably something you're familiar with in your daily life.

A survey is the use of a public polling technique; researchers mail out questionnaires, call people on the phone, or implement online questionnaires.

Through the survey, scientists hope to learn more information about whatever their specific psychological questions might be.

☆ EXAMPLE If you're studying sugar and its effects on children, you might poll parents to ask which children are eating more or less sugar. This allows you to gather a lot of information about your subject, as opposed to a case study involving a very small data set that only allows you to make very limited conclusions about the subject.

SUMMARY

In this lesson, you learned about **the scientific method and qualities of scientific research**. Psychology, like other sciences, uses the scientific method as a process for gaining the answers to research questions. According to the scientific method, research must be **empirical**, **measurable**, **reasonable**, **replicable**, and **falsifiable** in order to be considered scientific.

You now understand that there are several different **methods of gathering information** when conducting scientific research: **experimentation**, **naturalistic observation**, **correlation study**, **case study**, and **survey**.

Good luck!

Source: This work is adapted from Sophia author Erick Taggart.

TERMS TO KNOW

Replicable

Can be duplicated or done again.

Scientific Method

Systematic process for answering scientific questions.