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Speaker spk\_0 00:00:00

He knows a lot about the science stuff, Professor Dave Explains.

Professor Dave 00:00:06

All sciences use the scientific method to understand how something works. Scientists use models to make predictions, collect data and then see if the data ultimately support their predictions. In the case of psychology, we are trying to understand how the mind works. Psychologists have come up with a variety of ways to collect data on the mind in order to test their hypotheses. So let's learn about some of those now.

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First, psychologists will sometimes use case studies to gather information about a phenomenon. In a case study, psychologists will create a detailed description about a single person or small group of people that demonstrate rare behaviors. Unlike other methods in psychology, case studies usually do not have a specific hypothesis attached to them. Instead of direct experimentation, psychologists in a case study are simply describing how a person is behaving. This means that case studies cannot be used to determine what actually caused the behavior. They can, however, be used to generate hypotheses that can later be tested experimentally.

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A famous case study is that of Phineas Gage, a railroad construction worker in the 1800s. In 1848, Gage was clearing rock to lay down new railroad tracks when an unexpected explosion shot a three foot long piece of iron through his head and damaged the frontal lobe of his brain. Amazingly, Gage survived the accident and was speaking and walking within a few minutes of the event. His personality, however, was forever changed. Specifically, he was known to be incredibly aggressive after the accident. Now, because this is a case study, we don't know exactly what caused this. Was this personality change due to blood loss, the shock of having iron go through his head, brain damage? There were too many variables to know for sure. But psychologists did use Phineas Gage's case study to generate hypotheses about what certain areas of the brain do. For example, because Gage became much more impulsive and aggressive after his frontal lobe was damaged, psychologists made specific predictions that the frontal lobe was responsible for executive and emotional functions. They then experimentally tested this prediction and found that the frontal lobe of the brain is indeed responsible for controlling emotions and decisions.

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Because case studies are rare and we can't use them to determine what is causing behaviors, psychologists rely on other methods to directly test the mind and gather data. One common method is to use observation. This method of data collection is pretty straightforward. Psychologists simply sit and watch what people do in different scenarios. They might sit on a playground and make notes regarding which kids play in groups versus alone or they might record people standing in a line and make note of when they decide to leave the line. Observations allow psychologists to get a glimpse of someone's mind through their behavior.

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Another method of data collection is self-report. To gather data, psychologists will give participants surveys and questionnaires to fill out regarding how they feel or what they are thinking. Self-reports are easy, inexpensive, and quick, but can also be filled with problems. The participants may fill out a questionnaire based on what they think the scientist wants to hear, not what they actually feel. They might also be dishonest with their answers in a variety of ways and for any number of reasons. Finally, neither self-reporting nor observation can inform us on what is causing a behavior, only what is correlated with it. Watching kids at a playground or asking them questions after they're done playing doesn't tell us why they are playing with certain kids and not others, simply that they are.

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To directly test predictions and better understand why people do things, psychologists rely on experimentation. This is the exact same process that other sciences use to test predictions. They will isolate potential variables affecting a behavior, manipulate one of them, which we call the independent variable and measure the outcome or the dependent variable. Ideally, participants will be randomly placed in either the control group, where there is no experimental manipulation, or the experimental group. When creating a psychological experiment, scientists must first ensure that the experiment is ethical and there is no lasting emotional or physical harm to participants. They also often have to simplify their experiments so that they are sure they are only testing one variable and that others are not interfering with the results.

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Psychologists may use a variety of tools to measure how the mind works during these experiments. They could use skin conductance or measure levels of stress hormones in saliva samples to determine physiological responses to experimental manipulations. Studies looking at attention often use eye tracking devices to directly measure where and how long people pay attention to different things in front of them. And psychologists interested in how the brain relates to the mind may measure how brain activity correlates with thoughts and emotions or even directly stimulate parts of the brain to see what behavior occurs as a result.

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Most psychologists use a mixture of observation, self-report and direct experimentation to test hypotheses on how the mind works. Correlating all three gives us a better understanding of how what people think measured with self-report relates to their behavior measured with observation and even bodily functions such as arousal and brain activity.

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Before we move on to some actual psychology, there is one more caveat we must discuss and that is so-called WEIRD populations in psychology. WEIRD stands for Western, Educated, Industrialized, Rich, and Democratic. Most psychological studies have a WEIRD bias, which means that their participants are usually from regions that are WEIRD. Only one eighth of people worldwide live in regions that are classified as WEIRD, but most studies are performed on these people and the results are then generalized to the entire world. This is a significant issue, especially since the little research done on

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non-WEIRD populations has shown differences in moral decision making, fairness and even visual perception.

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As we go through the series, I will point out when a phenomenon has been shown to be different across cultures. As psychological research continues, more and more studies will be done on non-WEIRD populations and we will gain a better knowledge regarding what sort of psychology is truly universal. But for our own purposes, let's move forward and get into some basic concepts in psychology.

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