

SCIENCE OF PSYCHOLOGY
Katrina A. Korb
Department of General and Applied Psychology
University of Jos

Korb, K. A. (2015). Science of psychology. In J. Orshi & K. A. Korb (Eds.), *Introduction to basic and applied psychology* (3rd ed.) (pp. 114-121). Abuja, Nigeria: Primeglamour Publishers.

Introduction

The American Psychological Association (APA) defines psychology as “the study of the mind and behavior” (APA, 2014a). The APA goes on to explain that the field of psychology includes every aspect of the human experience, ranging from infant development to the well-being of the elderly, and from the functions of the brain to the impact of human behavior on national development. Furthermore, psychology is relevant to a wide range of public sectors, from academic research to medical clinics, from the sports pitch to the classroom.

Psychology as a Scientific Study

Closely examining this definition of psychology will illuminate a number of principles about the science of psychology. First, notice in the definition that psychology is the *study*. More specifically, psychology is a systematic, scientific study (Plotnik & Kouyoumdjian, 2014). This means that all psychological principles are based on rigorous empirical research.

The fact that psychology is a scientific study is in contrast to *armchair psychology*, which is the practice of describing the mind and behavior through informal observation and speculation (Plotnik & Kouyoumdjian, 2014). Because psychology is defined as the *scientific study* of mind and behavior, psychologists use a different type of evidence to explain the mind and behavior than ordinary people. For example, women who sell in the market develop their own theories about the buying behavior of their customers. Their theories about which customers will buy from them and what they can do to improve sales are based on their personal experiences with customers. However, each market woman’s experience is different, so her *armchair psychological* theories will be influenced by her own beliefs and biases. Therefore, these *armchair psychological* theories will likely be incomplete and filled with inaccuracies.

Some people think that every person is a psychologist because every person seeks to understand the thought and behavior of others. This belief results in the conclusion that psychology is merely common sense because anybody can “do” psychology, or explain the mind and behavior based on their own experiences. To some extent this is true because everybody creates explanations about the mind and behavior based on their own experiences in the environment as described above. However, this amounts to armchair psychology, and many everyday beliefs about the mind and behavior turn out to be false when carefully studied through scientific observation.

For example, identify whether the following common sense principles are true or false (Coon & Mitterer, 2010; Fincham & Hewstone, n.d.; Kassin, 1998).

1. Personality tests describe your most basic motives, including sub-conscious motives.
2. To improve behavior towards individuals of other ethnic groups, attitudes must first be changed.
3. Most humans only use 10% of their brain.
4. If you need help from an unknown person passing by you, you are more likely to receive help if there are ten people than if there is only one person.
5. If you want a person to perform a behavior very frequently, you should reward that behavior every time it occurs.
6. The way that fish and birds learn behavior is different from how humans learn behavior.
7. Schizophrenics have a split personality.
8. People who think about themselves a lot are healthier and happier than those who do not.

9. Punishment is the most effective way to stop unwanted behaviors.
10. Human memory is limited and cannot be increased by memory tricks.

In fact, all of the principles listed above are false. When carefully planned research studies are carried out that minimize bias and errors, these common sense principles turn out to be incorrect. Therefore, the science of psychology requires the scientific method in discovering true principles about the mind and behavior based on the principles of empirical research.

Principles of Empirical Research

All psychological principles are based on rigorous empirical research using the scientific method. This means that psychologists, together with the broader community of scientists, only accept claims if they are based on three key principles: empiricism, objectivity, and control (Singleton & Straits, 2010). For example, suppose somebody says that you will become stronger if you eat a certain nutrient, perhaps Vitamin V. Psychologists will ask what evidence there is to support that claim. If the claim is not supported by evidence that is empirical, objective, and controlled, then the psychologist will reject that claim as false until proper empirical evidence has been gathered following the scientific method.

Empiricism. The first principle is the philosophical view called empiricism (Fincham & Hewstone, n.d.) This means that evidence comes only from systematic observations. Empiricism means that knowledge about the world can only come from observations experienced through the senses of sight, hearing, taste, smell, and touch (Singleton & Straits, 2010). Thus, all psychological principles must be supported by well-researched observations made by the senses. As such, scientific knowledge about the world is gained by observation of the world, not by someone's beliefs about the world.

Observations can be made directly through the senses, or they can also be made indirectly through instruments (Singleton & Straits, 2010). For example, I can observe how much time you spend studying, which is a direct observation. However, I cannot observe how much knowledge you have. Therefore, I have to use indirect observation to measure your knowledge through an examination. Thus, your performance on an examination is an indirect measure of your knowledge.

Objectivity. The observations made about the world must be objective. Because a psychologist seeks knowledge about the physical world through observation, it means that the truth about the physical world exists in reality, outside of the mind of the psychologist. Therefore, psychologists should be objective, meaning that their observations are free from emotion, guesses, or personal bias (Singleton & Straits, 2010). For example, I might guess that some students perform better in school because they have higher socioeconomic status. However, I cannot make this claim unless I have physical data, not just my own experiences with the world. In other words, I have to use carefully planned methods to measure the academic performance of students with high socioeconomic status and the academic performance of students with low socioeconomic status, and compare the performance of the two. If these observations support my claim, I could then make the conclusion that students perform better in school because they have higher socioeconomic status.

In scientific research, objectivity means that other researchers will make the same observations given the same settings. Therefore, psychologists must describe their research methods in detail. This means that the questions and methods of observation are thoroughly

explained together with the results so other psychologists can evaluate and repeat the experimental procedures.

Control. In order to improve the objectivity of scientific studies, a third principle is that of control. Control means that procedures are used to eliminate, as far as possible, sources of bias and error that can alter the study's results (Singleton & Straits, 2010). In other words, a psychologist will use carefully planned methods that enable them to rule out all explanations for the findings except for one. For example, in my study above about the effect of socioeconomic status on academic performance, perhaps the students with high socioeconomic status came from a good school and the students with low socioeconomic status came from a bad school. In this case, is the higher academic performance the result of higher socioeconomic status or a good school? Based on my poor research methods, it is impossible to know. Therefore, I should have measured the socioeconomic status of students within the same school so the quality of the school (an extraneous variable) would not be a possible explanation of the findings.

To ensure control, psychologists should use high quality research methods to choose a research design, select the sample from the population, use well validated instruments, and carefully planned procedures. These research methods are described in another chapter of this book. In addition to using high quality research methods, there are three other procedures used for control in empirical research (Singleton & Straits, 2010). First, several independent observers should be used in order to cancel out the personal biases of any one observer. For example, studies of aggression oftentimes use observation of behavior to determine whether a person is behaving aggressively or not. These studies should have multiple people observe the same behavior, perhaps through video recording of the behavior, to provide outside evaluations of whether a person is behaving aggressively.

Second, sometimes a psychologist will withhold information from participants in the study about the purposes of the study because their responses might be different if they knew exactly what the psychologist was studying. For example, imagine a psychologist wants to study the effect of noise on learning. If I tell participants that my study will examine the effect of noise on learning, then those students in the loud group might not give as much effort toward learning because they know what the psychologist expects to find, and they want to help the researcher, even if subconsciously. Therefore, the directions in the study should simply explain to participants that they will be participating in a learning activity. After the study has been completed, then a debriefing should be conducted to explain the complete purpose of the study. Likewise, when questionnaires are given to participants, the expected results of the questionnaire should not be explained anywhere on the questionnaire, either in the title or the directions. Instead, the instructions should simply explain the types of items that the participants should expect to find on the questionnaire.

Third, instruments such as audio or video recorders and systematic observational methods are used to eliminate errors in observation by researchers. For example, sometimes people only hear what they want to hear. Therefore, in an oral interview, sometimes a researcher might be tempted to only record information that confirms what they already believe. However, using a tape recorder of the interview will ensure that everything that is said by the participant will be recorded.

Scientific Method

The scientific method is a technique of gathering information so that errors and biases are minimized (Plotnik & Kouyoumdjian, 2014). The scientific method starts by asking a question about the physical world. Then, specific steps are followed to gather evidence to provide an accurate answer to the question. The steps in the scientific method have been developed in order to reduce error and bias so that the answer is a true reflection of the world, and not simply the result of a person's previous beliefs or a flawed process of collecting observations.

The scientific method is a tool that helps psychologists be specific and precise in their research. There are six steps in the scientific method (Plotnik & Kouyoumdjian, 2014). The first step in the scientific method is to ask a question. There are two requirements that make a good psychological question (Singleton & Straits, 2010). First, the question should relate to phenomenon about an individual, such as how a person or animal acts, thinks, or feels. For example, a question about how corruption influences the economy would not be a psychological question because it does not relate to an individual. However, a question about how attitudes toward money relate to corrupt behaviors does relate to an individual, so this question would be a psychological question. Second, the question has to be answered by making observations about the physical world. For example, a question about whether corruption is ethical is not a psychological question because this requires logic and analysis, not observations from the physical world. However, a question about the degree to which civil servants engage in bribery is a psychological question because the researcher can make observations of civil servants to answer the question.

Questions should also be about very specific phenomenon. For example, a bad question would be "How many students participate in corrupt behaviors?" What is meant by corrupt behaviors? There are many ways to conceptualize corrupt behaviors, ranging from exam malpractices to internet fraud (aka *yahoo-yahoo*). A better question would be "How many students participate in examination malpractice?" Then the variable of examination malpractice should be well defined so that the researcher and others will have a definite understanding of the psychological variable under study.

The second step in the scientific method is to review the literature. Read research conducted by other scholars to determine what others have found about your variables of interest. Sometimes, your question has already been exhaustively researched by other researchers. This means that your answer to the question can come by citing the research of others without spending your own time and resources conducting a study that has already been done. Reading other research about your variables will also help you get a better understanding of the phenomenon you are studying, as well as help you get ideas on how to design a scientific study to effectively answer your question

The third step is to design a study using strict methods. This step requires careful planning and analysis. Some people try to rush a research study without carefully thinking about how they will conduct the research. This always leads to errors and bias in the research. There is a common saying that if you fail to plan, you plan to fail. Thus, psychologists must pay careful attention to this step and ensure they plan a study carefully, keeping in mind how confounding variables or bias may negatively influence the results of the study. The scientific method requires that psychologists plan the study in such a way that error, bias, or confounding variables are minimized.

The fourth step in the scientific method is to collect the data. After the psychologist has carefully planned the research design, then these procedures must be followed exactly in the data collection process.

The fifth step is to draw conclusions based on the data that was collected. The data must be analysed using appropriate statistical techniques. Then answers are given to the question that was asked in the first step. It is very important that the answers that are given are based solely on the data that was collected. Some novice psychologists offer answers to the questions that are not supported by the data that was collected, but based on their own preconceived ideas and biases. This is a serious error.

The final step in the scientific method is to report the findings. The best place to publish the results is in a professional journal, which will allow other psychologists to learn from the results of the study. However, it is also important that psychologists use the findings of their research to improve society when and where possible (Singleton & Straits, 2010). Therefore, psychologists should also try to communicate their findings to ordinary people through more popular means, such as magazines, blog posts, and radio talk shows.

Psychology as the Study of the Mind and Behavior

Psychology as the Study of Behavior

Recall that the definition of psychology is “the study of the mind and behavior.” Thus, the next key point is that psychology studies the mind and behavior. Because behavior is simpler, it will be discussed first.

Behavior is an observable action or response (Plotnik & Kouyoumdjian, 2014). It can include everything from eating to smoking, laughing to going to the hospital, speaking to bribing, and reading to fighting. Because behaviors are observable by other people, the scientific study of behavior is typically straightforward. Psychologists can directly observe people and animals by carefully recording their behavior using video recorders or systematic observation schedules. Alternatively, psychologists can observe behavior indirectly by asking people to report their own behaviors on a questionnaire, such as asking students how often they drink alcohol.

Psychology as the Study of the Mind

For decades, certain groups of psychologists called behaviorists only studied behavior because only behavior can be directly observed. However, around the 1960s, psychology broadened its focus to also include the study of the mind (Kalat, 2011). The mind includes phenomenon such as thought processes, learning, memory, beliefs, values, attitudes, knowledge, and emotions.

Phenomenon of the mind are not directly observable like behavior. Therefore, psychologists have to use indirect methods to observe the mind. For example, a score on an examination is an indirect observation of knowledge. Answers on a self-report questionnaire can measure beliefs, values, attitudes, and emotions. Observations of physiological processes such as heart rate can indirectly measure emotions such as fear and anxiety. Responses to tests of recall can indirectly measure memory. Through the years, psychologists have creatively developed methods of indirectly measuring the processes of the mind so that these very important influences of behavior can be scientifically studied.

Goals of Psychology

There are four goals of psychology: describe, explain, predict, and control (Plotnik & Kouyoumdjian, 2014).

Describe

One goal of psychology is to describe the mind and behavior (Singleton & Straits, 2010). For example, developmental psychologists describe the changes that occur to humans over the course of the lifespan, including changes in behavior, knowledge, memory, values, and psychological well-being. Clinical psychologists describe psychological disorders such as post-traumatic stress disorder (PTSD) and autism. Forensic psychologists describe the reliability of eyewitness testimony.

The descriptions of mind and behavior must be clear, precise, and reliable (Singleton & Straits, 2010). This is why psychologists are so particular about language and the use of proper terminology. The way that ordinary people use a certain term or the way that a dictionary defines a term may be vastly different than the way psychologists use a term. For example, the term *random* is used entirely differently by psychologists than by laypeople.

Explain

A second goal of psychology is to explain the causes of behavior and mental processes (Plotnik & Kouyoumdjian, 2014). Thus, once a description of behavior and thought processes has been made, then psychologists work towards identifying causes of behavior. For example, a key question to clinical psychologists is what causes psychological disorders such as phobias and conduct disorders. Educational psychologists are interested in what causes academic performance to improve or decline. Industrial/organizational psychologists are interested in what causes absenteeism by employees.

Predict

Third, psychology aims to predict behavior. In other words, psychologists try to predict how a person will behave, think, or feel in a certain situation. For example, sports psychologists try to predict how athletes will perform given certain conditions on the sports pitch such as the quality of the athlete's training. Health psychologists try to predict whether patients will follow the doctor's orders given certain conditions, such as the type of medical advice given. Social psychologists try to predict a person's behavior towards others given specific conditions, such as the person's attachment history.

Prediction requires that description and explanations have already been made. Psychologists must first describe a behavior, and then know what causes behavior before prediction of a behavior in a specific situation can be made.

Control

Fourth, psychologists try to control behavior. For example, many individuals suffer from psychological disorders such as autism and schizophrenia. Psychological principles can be used to minimize negative behaviors and thought processes for these individuals. Even people without psychological disorders can benefit from psychological principles to help control behavior by reducing negative behaviors, thoughts, or emotions as well as increasing positive behaviors, thoughts, and emotions. Psychological principles can also improve society by controlling individuals' behaviors by increasing altruism, forgiveness, and empathy. Indeed, much of the research by educational psychologists, industrial/organizational psychologists, and sports psychologists is done to try to control people's behavior and

thoughts in school, the workplace, and on the sports pitch. Research in social psychology also has the goal of persuading others to adopt certain attitudes and behaviors.

However, there can be a negative aspect to controlling people's behavior. Psychological principles can be used for good, but they can also be used to harm others physically or psychologically. For example, torture has a strong psychological component, which can include exploitation of phobias and placing individuals in stressful positions (American Psychological Association, 2014b). Psychological variables such as blaming another group for difficulties, destructive ideologies, and devaluing of human beings all have played strong roles in genocides around the world (Staub, 2011). This means that psychologists can use their knowledge to promote genocide by spreading ideas that foster fear, hate, and mistrust between groups. On the other hand, psychologists can also use their understanding to counteract these destructive ideologies and prevent violence and genocide.

In summary, a key goal of psychology is to control behavior and thought processes. However, psychologists must be aware of the potential negative impact that their knowledge and practice can have on individuals and society. This calls for a greater understanding of ethical principles in psychological research and practice.

Psychological Knowledge as Tentative

A final point to keep in mind is that all knowledge of the physical, social, and psychological world is tentative (Singleton & Straits, 2010). Psychologists can never completely understand behavior and mental processes. One reason this is true is because the human mind and behavior are very complex. Research methods are continually being refined to enable psychologists to have a better understanding of the mind and behavior. Furthermore, psychological research builds on itself, and new research refines and clarifies old research.

In addition, individuals and societies are continually changing, so some psychological principles that held true in one generation might not hold true in new generations. Therefore, psychological principles should be considered tentative, meaning that they could be refined based on new findings and new research methods.

Domains of Psychology

Psychology is a very diverse field with a range of specialties (Fincham & Hewstone, n.d.). The science of psychology can be divided into the categories of basic research and applied research. The goal of basic research is to build a foundation of knowledge about the mind and behavior by testing theories and discovering general principles (Kassin, 1998). On the other hand, the goal of applied research is to use psychological research to solve practical problems.

Basic Psychology

There are many sub-fields in psychology (American Psychological Association, 2014c). Examples of sub-fields that typically focus on basic psychology, or conducting research simply to understand the mind and behavior, can include the following.

- Developmental psychology studies how individuals grow and adapt throughout the lifespan.
- Experimental psychology examines processes that influence human and animal behavior.
- Quantitative psychology studies and develops methods to measure human behavior and mental processes.

- Social psychology studies how humans view themselves in relation to the social environment and how this influences choices, behaviors, and beliefs.

Applied Psychology

Examples of sub-fields of psychology that focus on studying real-world settings in order to solve practical problems include the following.

- Clinical psychology integrates psychological research with the treatment of complex human problems.
- Counseling psychology facilitates personal and interpersonal growth of individuals throughout the lifespan.
- Educational psychology studies learning and teaching in order to improve educational practice.
- Forensic psychology uses psychological research to support the judicial system and public safety.
- Health psychology uses principles of psychology to promote health and prevent illness.
- Industrial and organizational psychology uses psychological principles to study human thought and behavior in the workplace and other organizations.
- Sport psychology uses psychological principles to study behavior and abilities in sport, exercise, and performance.

Careers in Psychology

Well trained psychologists are useful in a wide range of professions (Fincham & Hewstone, n.d.). Many psychologists conduct scientific research in universities, research institutions like the National Institute for Policy and Strategic Studies (NIPPS), and industries. Other psychologists diagnose and treat emotional and behavior problems at hospitals, private medical centers, and community service agencies. Well informed psychologists can advise the government on policies related to human behavior and thought. In educational institutions, psychologists are involved in teaching and developing training programs, as well as diagnosing and treating learning difficulties, emotional challenges, and behavioral problems. In industries, psychologists can be involved in designing the workplace to maximize productivity. In advertising, psychologists can develop marketing strategies as well as experimentally test products to ensure customer satisfaction. In athletics, psychologists can help athletes improve their performance.

Conclusion

In conclusion, psychology is the study of the mind and behavior. Psychology differs from everyday observations because psychologists use the scientific method to support their knowledge. As a scientific field, all psychological knowledge requires empirical observation as proof of evidence. This means that evidence results from objective observation with strict principles of experimental control. Psychology studies both observable behavior as well as mental processes through indirect observations.

The goal of psychology is to describe, explain, predict, and control behavior. The field of psychology includes many sub-fields that are divided into basic psychology, which studies the mind and behavior simply to understand, and applied psychology that aims to solve real-world problems. Psychologists can gain employment from a wide variety of sectors, including research, teaching, and practice.

References

- American Psychological Association. (2014a). *How does the APA define “psychology”?* Retrieved from <http://www.apa.org/support/about/apa/psychology.aspx#answer>
- American Psychological Association. (2014b). *Position on ethics and interrogations.* Retrieved from <http://www.apa.org/ethics/programs/position/>
- American Psychological Association. (2014c). *Science of Psychology.* Retrieved from <http://apa.org/action/science/index.aspx>
- Coon, D., & Mitterer, J. O. (2010). *Introduction to psychology: Gateways to mind and behavior* (12th ed.). Belmont, CA: Wadsworth.
- Fincham, F. D., & Hewstone, M. (n.d.). *The Science of Psychology.* Retrieved from [http://faculty.rio.edu/rfish/My%20Faculty%20Website/11103%20General%20Psychology/Chapter%201%20Study%20Guide/Psych%20101,%20Chapter%201%20-%20Outline%20\(Comprehensive\).pdf](http://faculty.rio.edu/rfish/My%20Faculty%20Website/11103%20General%20Psychology/Chapter%201%20Study%20Guide/Psych%20101,%20Chapter%201%20-%20Outline%20(Comprehensive).pdf)
- Kalat, J. W. (2011). *Introduction to psychology* (9th ed.). Belmont, CA: Wadsworth.
- Kassin, S. (1998). *Psychology* (2nd ed.). Upper Saddle River, NJ: Prentice Hall.
- Plotnik, R., & Kouyoumdjian, H. (2014). *Introduction to psychology* (10th ed.). Belmont, CA: Wadsworth.
- Singleton, R. A. Jr., & Straits, B. C. (2010). *Approaches to social research* (5th ed.). New York: Oxford University Press.
- Staub, E. (2011). *Overcoming evil: Genocide, violent conflict, and terrorism.* New York: Oxford University Press.