Experience Psychology. As you read, keep in mind that psychology is a science in which psychologists work together collaboratively to examine a wide range of research questions. Indeed, many times scholars from different specialties within psychology join forces to understand some aspect of human behavior. It is the purpose of the Intersection feature to review research that represents a collaboration among scientists from different specialties to answer the same question.

1. The approach to psychology that is most interested in early childhood relationships is
   A. evolutionary psychology.
   B. cognitive psychology.
   C. psychodynamic psychology.
   D. behavioral psychology.

2. The approach to psychology that views psychological distress as a result of persistent negative thoughts is
   A. the humanistic approach.
   B. the behavioral approach.
   C. the sociocultural approach.
   D. the cognitive approach.

3. The approach to psychology that focuses on self-fulfillment, altruism, and personal growth is
   A. the cognitive approach.
   B. the behavioral approach.
   C. the psychodynamic approach.
   D. the humanistic approach.

Apply It 4. In 2007 a father posted a video clip of his young sons on YouTube. Widely known as “Charlie Bit My Finger,” the clip, which quickly went viral, shows a British baby laughing hysterically as he bites his crying brother’s finger. The clip is still one of the most popular videos on YouTube. If you haven’t seen it, take a look: www.youtube.com/watch?v=_OBiPgSz8sSM. What explains the clip’s enduring appeal? Each of the contemporary approaches we have reviewed might offer an explanation. Which of the following is most like what a psychodynamic thinker might say?

A. Human beings have been rewarded for watching children bite each other.
B. Adorable children are universally loved.
C. Human beings have an unconscious desire to harm their siblings, which is disguised by the humor of the clip.
D. This clip demonstrates that cuteness is an important adaptation. Cute kids are more likely to survive and reproduce.

Psychology’s Scientific Method

Science is not defined by what it investigates but by how it investigates. Whether you study photosynthesis, butterflies, Saturn’s moons, or happiness, the way you study your question of interest determines whether your approach is scientific. The scientific method is how psychologists gain knowledge about mind and behavior. A key theme in the scientific method is that knowledge comes from empirical research.

It is the use of the scientific method that makes psychology a science (Ray, 2012). Indeed, most of the studies psychologists publish in research journals follow the scientific method, which may be summarized in these five steps (Figure 3):

1. Observing some phenomenon
2. Formulating hypotheses and predictions
3. Testing through empirical research
4. Drawing conclusions
5. Evaluating conclusions

1. OBSERVING SOME PHENOMENON The first step in conducting a scientific inquiry involves observing some phenomenon in the world. The critical-thinking, curious psychologist sees something and wants to know why or how it is. Inspiration for scientific inquiry can come from contemporary social problems, current events, personal experiences, and more. The phenomena that scientists study are called variables, a word related to the verb to vary. A variable is anything that can change.

For example, one variable that interests psychologists is happiness. Some people seem to be happier than others. What might account for these differences? As
Scientists consider answers to such questions, they often develop theories. A theory is a broad idea or set of closely related ideas that attempts to explain observations. Theories seek to explain why certain things are as they are or why they have happened. Theories can be used to make predictions about future observations. For instance, some psychologists theorize that the most important human need is the need to belong to a social group (Leary & Guadagno, 2011). This theory would seek to explain human behaviors through the need to belong.

A key characteristic of a scientific theory is that it must be falsifiable, meaning that even a scientist who believes that a theory is true must be able to generate ideas about research that would prove the theory wrong and test those ideas. This is what separates scientific theories from beliefs and opinions.

2. FORMULATING HYPOTHESES AND PREDICTIONS

The second step in the scientific method is stating a hypothesis. A hypothesis is a testable prediction that derives logically from a theory. A theory can generate many hypotheses. If more and more hypotheses related to a theory turn out to be true, the theory gains in credibility.
So, a researcher who believes that social belonging is the most important aspect of human functioning might predict that people who belong to social groups will be happier than others, or might hypothesize that individuals who are excluded by a social group will be more aggressive. Each of these hypotheses would lead to specific predictions within a particular empirical study.

3. TESTING THROUGH EMPIRICAL RESEARCH The next step in the scientific method is to test the hypotheses by conducting empirical research—that is, by collecting and analyzing data. At this point, it is time for the researcher to design a study that will test his or her predictions. We will review the specifics of various research methods for testing predictions later in this chapter. Whatever the method used to test a prediction, the first thing a researcher needs in order to conduct a study is a concrete way to measure the variables of interest.

An operational definition provides an objective description of how a variable is going to be measured and observed in a particular study. Such a definition eliminates the fuzziness that might creep into thinking about a problem. Imagine, for example, that your psychology class is asked to observe a group of children and to keep track of kind behaviors. Do you think that everyone will define “kind behaviors” in the same way? An operational definition allows the class to be sure that everyone agrees on what a variable means. To measure personal happiness, for example, prominent psychologist Ed Diener and his students (Diener & others, 1985) devised a self-report questionnaire that measures how satisfied a person is with his or her life, called the Satisfaction with Life Scale. You will get a chance to complete the questionnaire later in this chapter. Scores on this scale are then used as measures of happiness. Research using this scale and others like it has shown that certain specific factors are strongly related to being happy: marriage, religious faith, purpose in life, and good health (Diener, 1999; Diener & Chan, 2011; Pavot & Diener, 2008; Tay & others, 2013).

Importantly, there is not just one operational definition for any variable. For example, in a study that examined happiness as a predictor of important life outcomes, Lee Anne Harker and Dacher Keltner (2001) looked at the yearbook pictures of college women who had graduated three decades earlier. They coded the pictures for the appearance of Duchenne smiling—that is, genuine smiling, the kind that creates little wrinkles around the outer corner of the eyes. Duchenne smiling has been shown to be a sign of genuine happiness. (If you want to see whether someone in a photograph is smiling genuinely, cover the bottom of the person’s face. Can you still tell that he or she is smiling? A genuine smile can be seen in the eyes, not just the mouth.) So, while Diener and colleagues operationally defined happiness as a score on a questionnaire, Harker and Keltner operationally defined happiness as Duchenne smiling. Harker and Keltner found that happiness, as displayed in these yearbook pictures, predicted positive life outcomes, such as successful marriages and satisfying lives, some 30 years later.

Coming up with operational definitions for the variables in a study is a crucial step in designing psychological research. To study anything, we must have a way to see it or measure it. Clearly, to devise an operational definition for any variable, we first must agree on what it is that we are trying to measure. If we think of happiness as something that people know about themselves, then a questionnaire score might be a good operational definition of the variable. If we think that people might...
not be aware of how happy they are (or are not), then facial expression might be a better operational definition. In other words, our conceptual definition of a variable must be set out clearly before we operationally define it. An operational definition is how a variable is defined in a particular study. Whether that operational definition fully captures the variable of interest outside the study may be an important matter of debate.

Because operational definitions allow researchers to measure variables, they have a lot of numbers to deal with once they have conducted a study. A key aspect of the process of testing hypotheses is data analysis. Data refers to all the information (all those numbers) researchers collect in a study—say, the questionnaire scores or the behaviors observed. Data analysis means “crunching” those numbers mathematically to see if they support predictions. In other words, data analysis involves applying mathematical procedures to understand what the numerical information means (Howell, 2015). Many psychology students are surprised to learn that much of psychologists’ work relies heavily on sophisticated statistics, numbers that help them describe what the data have to tell them.

Let’s pause and examine an example that demonstrates the first three steps in the scientific method. One theory of well-being is self-determination theory (Ryan, Huta, & Deci, 2008; Ryan & Deci, 2011). This theory states that people are likely to feel fulfilled when their lives meet three important needs: relatedness (warm relations with others), autonomy (independence), and competence (mastering new skills).

One hypothesis that follows logically from this theory is that people who value money, material possessions, prestige, and physical appearance (that is, extrinsic rewards) over the needs of relatedness, autonomy, and competence (intrinsic rewards) should be less fulfilled, less happy, and less well adjusted. In a series of studies entitled “The Dark Side of the American Dream,” researchers Timothy Kasser and Richard Ryan asked participants to complete self-report measures of values and of psychological and physical functioning (Kasser & Ryan, 1993, 1996; Kasser & others, 2004). Thus, the operational definitions of values and psychological functioning were questionnaire scores. The researchers found that individuals who value material rewards over intrinsic rewards do indeed tend to suffer as predicted, and similar findings have emerged in nations throughout the world (Kasser, 2011).

4. DRAWING CONCLUSIONS Based on the results of the data analyses, scientists then draw conclusions from their research. If the results of a study (or a series of studies) support predictions, then a theory may gain credibility. A theory, however, is always open to revision. Before a theory is accepted or changed, the scientific community must establish that the research can be replicated, or repeated, by other scientists using different methods. If a particular research finding is demonstrated again and again across different researchers and different methods, it is considered reliable—in other words, it is a dependable result.

5. EVALUATING CONCLUSIONS The final step in the scientific method, evaluating conclusions, is one that never ends. Researchers submit their work for publication, and it undergoes rigorous review. Afterward, the published studies are there for all to see, read, and evaluate continually.

Although the published research literature represents the current state of scientific knowledge about various topics and areas, the research community maintains an active conversation about this knowledge and constantly questions conclusions. Inspired by published studies, a scientist might come up with a new idea to be tested, one that will eventually change the thinking on some topic. Steps 3, 4, and 5 in the scientific method are thus part of an ongoing process. That is, researchers go back and do more research, revise their theories, hone their methods, and draw and evaluate their new conclusions.