vation of animals in their natural habitats. In order to make observations about the behavior of an animal in its environment, ethologists often modify that environment. In a now-classic experiment, Lorenz managed to substitute himself for a mother goose, whose goslings then proceeded to follow him in single file wherever he went. In another well-known experiment, Tinbergen conducted a study of ground-nesting black-headed gulls to explain why a mother gull removes all traces of eggshell from its nest after a chick hatches. He hypothesized that the eggshell might be removed to prevent injuries, disease, or the attention of predatory birds. By placing pieces of shell in exposed locations away from the gulls’ nests, Tinbergen found that the white interior of the shells were visible from the air and did indeed attract predators.

The ethologist’s method of studying an animal begins with the creation of an ethogram, an objective description of its behavior patterns, including hunting, eating, sleeping, fighting, and nest-building. Four types of questions are raised about each activity: the cause of the behavior, development (within the lifetime of the individual animal), evolution (within the lifetime of the species), and adaptive function (how it helps the animal’s species survive). Then, the researcher may turn to existing data on related species in various habitats and/or conduct independent research with reference to the animal’s natural environment. Experiments may be conducted within the environment itself, or by investigating the effects of removing the animal from that environment. Laboratory studies may also be done, but these will usually be in relation to some aspect of the animal’s own habitat.

Early theories of ethology focused on instinctive behaviors called fixed action patterns (FAPs), unlearned actions activated by “innate releasing mechanisms” that were thought to occur in response to specific stimuli. For example, submissive behavior could be regarded as a stimulus triggering an end to aggression on the part of a dominant animal. More recently, the focus of ethological theory has shifted to include an increasing awareness of behaviors that cannot be attributed to innate genetic processes, and learning has come to play a greater role in explanations of animal behavior. One example is the changing attitude toward the key concept of imprinting, first used by Lorenz to describe a nonreversible behavioral response acquired early in life, normally released by a specific triggering stimulus or situation. The differences between imprinting and ordinary learning include the fact that imprinting can take place only during a limited “critical period;” what is imprinted cannot be forgotten, and imprinting does not occur in response to a reward. Imprinting was initially regarded as totally innate, but subsequent research has found that conditioning plays a role in this process.

Initially, ethology encompassed broad areas of behavioral study. More recently it has emphasized detailed study of particular behaviors. An emerging subfield, molecular ethology, focuses on how behaviors are affected by a single gene. Additional subdisciplines derived from classical ethology include sociobiology, which also involves gene study, and behavioral ecology, which relates behavior to the ecological conditions in which it occurs.

See also Adaptation; Comparative psychology

Further Reading
the psychologists who proposed this new etiology had studied under Freud but ultimately looked further to explain the nature and causes of psychological disorders. **Carl Jung**, for example, believed that a person’s need for spirituality lead to dissatisfaction if it were not met. The inability to thus define oneself spiritually contributed to the rise of psychological or neurotic disorders. For **Alfred Adler**, feelings of inferiority captured the focus of conflict. Others, including Harry Stack Sullivan, **Karen Horney**, and Erick Fromm, used Freud’s theory as a basis for their thought but emphasized instead the importance of social, cultural, and environmental factors in uncovering the causes for psychological problems.

Another type of etiology that emerged after Freud is called behavioral etiology. This focuses on learned behaviors as causes of mental disorders. **Ivan Pavlov** and **B. F. Skinner** are two famous behavioral psychologists. Behaviorists argue that the mind can be “trained” to respond to stimuli in various ways. A **conditioned response** is one which is learned when a stimulus produces a response, and that response is somehow reinforced. A young girl, for example, is told she is cute for screeching at the sight of a spider. She learns that this screech produces a favorable response from onlookers. Over time, this learned behavior may develop into a truly paralyzing **fear** of spiders. Behaviorists believe that just as a person can be conditioned to respond to a stimulus in a particular way, that same person can be conditioned to respond differently. In other words, more appropriate behavior can be learned, which is the basis for behavioral therapy.

With modern approaches to therapy, including the existential and cognitive approach, psychology has moved away from depicting mental illnesses as emerging from one root cause. For example, clinical psychologists generally search for a complexity of issues that stem from emotional, psychosexual, social, cultural, or existential causes. The cognitive approach, such as that developed by **Aaron Beck**, attempts to readapt behavioral responses through a rational process that demands an honesty and discipline to undo fears and anxieties. Cognitive therapies might even have a positive role in treating **schizophrenia** without medication.

While psychologists have focused on the mind itself as the location where psychological impairment might begin, medical doctors and researchers have continued to understand the biology that might influence mental disorders. Many of these studies have resulted in the refinement of prescription medications that alter a person’s biochemistry to prevent or control various illnesses such as **depression** or schizophrenia. Neuropathology, or damage to **brain** tissue, can also serve as a biological cause of psychological disorders. Genetic research has been conducted to determine causes of certain disorders at the level of DNA. Researchers have been working for decades to isolate a gene that contains the “program” for schizophrenia. In fact, reports of fully recovered schizophrenics treated without medication continued to rise by 2000. Psychological intervention seems to be just as effective as medical treatment for schizophrenic episodes.

Crucial to the treatment of any disorder is an understanding of its possible causes. Psychologists need to determine the etiology of a disorder before they can modify behavior.

See also **Behaviorism; Cognitive therapy**

Jane Spear

**Further Reading**

**Further Information**

**Eugenics**
The systematic attempt to increase desirable genetic traits and to decrease undesirable genetic traits in a population.

As **Charles Darwin**’s ideas on evolutionary theory gained acceptance in the late 1800s, the public’s faith in science as a source for social remedies increased in popularity, and scientists have looked for ways to “improve” humanity. British scientist **Francis Galton** introduced the ideas that led to a scientific approach to eugenics, including the concept of “positive eugenics” in which he encouraged the healthiest and most intelligent to marry one another and procreate. Although Galton’s theories did not gain widespread acceptance in England, in the United States his ideas were interpreted in programs of “negative eugenics,” designed to keep certain people from bearing children. Negative eugenics included such extreme measures as castration and sterilization as well as the institutionalization of people considered “defective” or “undesirable.”

Racial, social, and moral issues were key factors in the American eugenics movement. Its victims included