follicle. When a girl reaches puberty, one or more eggs mature every month, stimulated by the release of a hormone from the pituitary gland. As the egg matures, it secretes the hormone estrogen, causing the uterine lining to thicken in anticipation of the implantation of a fertilized egg. This is followed by ovulation, as the follicle ruptures, releasing the mature egg which travels through the fallopian tube towards the uterus. If the egg is not fertilized by sperm, it disintegrates and the uterine lining leaves the body, a process called menstruation. Women remain fertile until menopause, which normally occurs around the age of fifty. Unlike the production of female eggs, the male production of sperm is not cyclical and men remain fertile throughout their lives, although they may produce fewer sperm as they age. A man produces several billion sperm each year, releasing 300 to 500 million sperm in an average ejaculation.

Unlike that of other species, human sexual behavior is not bound to the female reproductive cycle. Women may engage in or refrain from sexual intercourse at any time during the cycle. Some women have reported increased sexual interest at the time of ovulation, others around the time of menstruation, and still others experience no link at all between their sexual behavior and menstrual cycle. After their initial organizational effects at birth, hormone levels stay low until puberty when motivational effects first begin, triggering the reproductive system and generating an interest in sexual behavior. Whether or not sexual activity actually occurs at this point, however, depends on the interaction of physical readiness, social skills, and opportunity. For adults, as for adolescents, sexuality is not governed solely by hormones but also by a repertoire of learned attitudes and behaviors. This learning begins in childhood with the development of gender roles and continues throughout the life span, and it depends on attitudes prevalent in a culture at a given time.

The laboratory research conducted by William Masters and Virginia Johnson in the 1950s and 1960s yielded important information about the human cycle of sexual response. This cycle has four phases for both men and women: initial excitement, a plateau stage, orgasm, and resolution, during which the person returns to a state of relaxation. Males experience a refractory period after orgasm during which they are temporarily insensitive to sexual stimulation.

The same combination of physical, psychological, and social factors that govern sexuality may contribute to sexual dysfunction, any condition that inhibits the desire for, or ability to have, satisfying sexual experiences. In males, the most common dysfunction is impotence, or the inability to have or maintain an erection sufficient for intercourse. While impotence can have physical origins, including fatigue, diabetes, alcoholism, and the side effects of certain medications, it is usually psychological in nature. In females, a common sexual dysfunction is the inability to reach orgasm, also called arousal disorder, which is also associated with such psychological factors as self-consciousness, lack of self-confidence, depression, and dissatisfaction with the nature of the romantic relationship itself.

Although human sexual activity is primarily heterosexual, between 5 and 10 percent of males and 2 to 6 percent of females in the United States are homosexuals, individuals in whom sexual attraction and behavior are directed at members of their own sex. (Persons whose sexual behavior is directed at members of both sexes are known as bisexuals.) Researchers have found evidence of both biological and environmental origins of homosexuality. While no significant differences have been found in the levels of hormones that circulate in the blood of homosexuals and heterosexuals, exposure to high levels of certain reproductive hormones during fetal development has been linked to homosexuality. In addition, anatomical differences have been found between the hypothalamus of heterosexual and homosexual men, and studies of twins have found distinct evidence of a hereditary component to homosexuality. Environmental influences include early family relationships and the modeling of behaviors observed in the parent of the opposite sex, as well as social learning throughout the life span.

Sexual preference—the gender to which one is attracted—is only one aspect of human sexual orientation. Also involved is gender role, a general pattern of masculine or feminine behaviors that is strongly influenced by cultural factors. Distinct from this is sex identity, referring to whether individuals consider themselves to be male or female. Transsexualism, a condition in which a person believes he or she is of the wrong sex, occurs in approximately one in 20,000 in men and one in 50,000 in women. Today, these individuals have the option of a sex change operation that allows them to live as a member of the sex with which they identify.

See also Gender Identity Disorder; Heterosexuality.

Further Reading

David Shakow

1901-1981
American psychologist who conducted ground-breaking studies on schizophrenia.

In a career that spanned nearly 50 years, David Shakow conducted research that led to a vastly improved understanding of schizophrenia, one of the most complex mental disorders. Shakow’s research covered all aspects of the disease, but in particular he focused on the mental deterioration that accompanied its progression. He was a strong advocate for patients of schizophrenia, which helped lessen the stigma that so often accompanies them.

Shakow was born on January 2, 1901 in New York City. Growing up in the lower east side of New York, which he later described as a “most auspicious place to have one’s beginnings” because of the strength of the community, was an important influence on him.

Begins clinical work at Worcester

Shakow went on to Harvard, where he received both his bachelor’s and master’s degrees in science. He embarked upon a doctorate in psychology, but his dissertation research progressed more slowly than he had anticipated. He was married, and he and his wife Sophie had begun their family. Shakow decided that to support his family he needed to take a more practical career approach over the short term, and he accepted a position at the nearby Worcester State Hospital in 1932. It was at Worcester that he began his research into schizophrenia.

Schizophrenia is not a “split personality” disorder as many people mistakenly believed at that time. Rather, it is a disease in which symptoms can range from mild confusion to violent self-destructive outbursts. Those who suffer from the disease often show marked deterioration in their ability to function normally, frequently becoming less aware of their condition. (One of the common difficulties associated with schizophrenic patients is their refusal to take medication to control their symptoms.)

What Shakow tried to ascertain through his research was how much of the loss of normal function was the result of deterioration (which is reversible) and deficit (which is not). Among his findings, true deterioration in the schizophrenic occurs at a basic, reflexive level, while deficit occurs at the cognitive and perceptual levels.

Shakow entered the world of psychology at a time when the mentally ill were considered dangerous and untreatable. Through his work with patients, Shakow made clear that, whatever their condition, they were still human beings and needed to be treated compassionately. He put forth the idea that patients should be allowed to serve as “partners” in those studies in which they participated, not merely experimental subjects.

During his years at Worcester, Shakow began one of the nation’s first clinical psychology internship programs. He also continued his work on his doctoral dissertation, the focus of which he had shifted as a result of his research on schizophrenia. In 1946, the completed dissertation, *The Nature of Deterioration in Schizophrenia* was not only accepted enthusiastically, it was also recognized as a classic study on the psychology of the disease.

Shakow also chaired a committee of the American Psychiatric Association charged with defining the standards of education and training of the developing field of clinical psychology. Results of the committee report set the agenda for the famous Boulder Conference of 1949 that defined clinical psychology as a scientist/practitioner model.

Continues research at NIMH

Shakow left Worcester that same year, heading to the University of Illinois Medical School as a professor in the psychiatry department. He was named a professor of psychology at the University of Chicago two years later; he held both positions concurrently. After a few years of teaching, Shakow decided that he wanted to devote more time to research and accepted an appointment to the National Institute of Mental Health in 1954. There, he served as the first head of the Laboratory of Psychology in NIMH’s Intramural Research Program.

Under Shakow’s 12-year tenure, the laboratory developed special sections to study not only schizophrenia, but also perception, aging, childhood development, and personality. The laboratory published more than 500 articles highlighting its research during those years. Shakow retired from his position in 1966 but stayed on as senior research psychologist. During the 1970s he and his staff continued to do important research on schizophrenia. During these years he was awarded both the Distinguished Scientific Contribution Award and the Distinguished Professional Contribution Award of the American Psychological Association.

Shakow continued his work at NIMH, conducting research, writing articles, and working on his scientific memoirs. In late February 1981, he suffered a heart attack while at work and died a few days later on February 26.

George A. Milite