UNIT 4 APPLICATION OF PSYCHOLOGY TO DIFFERENT DISCIPLINES

Structure

4.0 INTRODUCTION

We have earlier discussed, how psychology is related to, and influenced by other academic disciplines. You have also come to know how the applied fields of psychology are contributing to solve various day to day problems of living beings. Thus, you have learnt that psychology is making significant contribution in the fields of health, education, sports, community, society, organisations and so on.

Psychology is however, applied to yet certain other disciplines.. In this unit, you will come to know how psychology is related to such disciplines and some interdisciplinary fields, such as, environmental sciences, medical sciences, cognitive science etc.

4.1 OBJECTIVES

On successful completion of this unit, you will be able to:

- Explain the interrelationship of psychology with other academic disciplines;
- Describe the application of psychology to biological sciences; and
- Identify the areas of application of psychology to physical, medical and social sciences.

4.2 PSYCHOLOGY AND THE SOCIAL/ BEHAVIOURAL SCIENCES

Behaviour mostly takes place in the context of social setting and in relation to other people. Different social/behavioural scientists emphasise on one or the other aspects of social life. However, psychology extensively studies behaviour. As you already know, human behaviour is determined by many factors, and one can explain behaviour from various viewpoints. That is why interest of psychology overlaps with that of some other social/behavioural sciences**.** Thus the relevance of other social/behavioural sciences to psychology is obvious.

Parameswaran & Beena (2002) have described the relationship of psychology with behavioural sciences, biological sciences, physical sciences, medical sciences as well as, with some other disciplines. Given below is the description of psychology with some of the disciplines of social sciences.

Anthropology is supposed to be the mother of all social/behavioural sciences. It is interested in the study of culture, customs, ritual and practices of different distinct groups of people and understand the variations among them. Many anthropologists have contributed to our understanding of the various factors which explain the homogeneity or similarity of behaviour among members of a particular group and also how such groups differ from each other. Researches in anthropology have thrown light on why people of a particular community or even whole nation behave as they do. Psychology is enriched by such findings.

Psychological theories have also contributed to our understanding of the origin of culture, customs, religious practices etc. Psychoanalysts like Freud, Jung and others have made notable/significant contributions in this regard. Thus, there is a reciprocal relationship between anthropology and psychology. In fact, psychoanalytic anthropology and psychological anthropology attempt to explain the origin of all customs, cultures and practices on the basis of psychological factors.

Sociology is another major social science, which is mainly concerned with social organisations of societies into family groups, kinship groups, caste groups, nation groups etc. Sociologists study variations in these group formations among different societies and also try to analyse their roles in social life. It is a well known fact that these factors influence behaviour.

The structure of the family, caste groups, class groups etc. influence human behaviour. To this extent, psychologists must understand the roles of these factors in influencing behaviour. Sociological researches have contributed a lot to the field of psychology. This is particularly so in understanding the behaviour of groups of people and organisations and also in understanding the impact of groups, group standards, group expectations etc., on behaviour**.**

Social psychology**,** organisational psychology and group dynamics are branches of psychology, which are very closely connected with sociology. In fact, the first book in social psychology was written by a sociologist and a psychologist. The psychologists, while studying the development of behaviour from infancy onwards, have to analyze the role of society and social customs on the development of social behaviour. Sociologists like Durkheim, Parsons, Bales and others have made important contributions to the development of psychology.

Psychology is also concerned about how members of groups are influenced by other members, as well as by the group norms, values, rituals and practices of particular groups. It also emphasises on leadership and group formation etc., which can contribute to the field of sociology. Sociology has gained a lot from psychology.

Psychological theories have contributed considerably to explain the origin and survival of social customs and institutions. Theories of learning, perception and motivation, have contributed to the development of sociology. Sociology has also gained a lot from methods of research, developed by psychologists. Moreover, sociology has widely used measurement techniques, such as, attitude scales, interaction analysis etc., developed by psychologists.

4.2.1 Psychology and Economics

Economics deals with the economic organisation of society like income, expenditure, the role of economic institution etc. Much of human behaviour can be called economic behaviour. Economic theories have for long, considered the role of psychological factors in economic behaviour. Thus, Mill and Bentham advanced the theory of economic utilitarianism. Subsequently, the role of psychological factors in economic activities has attracted the attention of many thinkers. In recent years, McLelland and his associates have stressed the role of what is known as the *achievement motivation,* in economic behaviour.

On the other hand, the economic structure of society and economic factors like income, facilities etc. have been found to influence behaviour. Psychologists have been interested in the analysis of the influence of economic factors like income, on the development of behaviour. The role of poverty and economic deprivation on the development of behaviour has been extensively studied by. Psychologists. They speak of the proverbial 'middle class child' and his characteristic behaviour like ambitiousness, high anxiety etc. Thus, psychology is also closely related to economics.

4.2.2 Psychology and Political Science

Political science is another discipline, which has developed extensively in recent times. Political science deals with the political organisations, institutions and government practices. In recent years, there has been a very close interaction between political science and psychology. Attempts have been made to study and analyse the influence of the political system on human character and behaviour. Psychologists have done extensive research on what is known as 'authoritarianism' and have tried to explain this as a product of certain types of political systems.

Similarly, concepts like Machiavellianism, autocracy, etc., which are generally applied by the political scientists to large societies, have been made use of by psychologists in studying small organisations. In a classical experiment, Kurt Lewin and his followers studied autocratic groups, democratic groups, and others and compared their functioning.

Psychologists have also attempted to study the role of psychological factors in leadership. Thus, the lives of several political leaders have been analysed from a psychological angle to understand their behaviour and the factors which made

them successful leaders. Examples of such leaders whose lives have been analysed are Mahatma Gandhi, Martin Luther King, Adolph Hitler and others. Psychological analysis has also been made of different aspects of political behaviour like propaganda, voting behaviour, emergence of public opinion, mob mentality etc.

4.2.3 Psychology and Education

Education is, perhaps, one of the oldest sciences with which psychology has been intimately connected. The field of education is primarily concerned with the development of effective approaches and techniques for imparting knowledge and skills which would make the people personally successful and happy and socially productive. Needless to say, in striving to achieve these, educators have to take into account psychological factors such as the nature of the learning process abilities of individuals, their needs and proper methods of teaching among other factors.

Psychologists have made extensive contributions by developing a wide variety of tests which help the educator to measure the abilities of pupils, their inclinations, and choose the proper educational levels and situations. Psychological theories of motivation have contributed to work out techniques of motivating students for improving their learning. Researchers in the psychology of perception, learning and communication have contributed in evolving effective methods of teaching, preparation of useful teaching aids etc. Thus, one can see that the relationship between psychology and education is very intimate.

Self Assessment Questions

1) Different aspects of political behaviour include:

   a) propaganda, b) crowding, c) mob mentality,
   d) a& b, e) a & c, f) b & c

2) ..... is supposed to be the mother of all social/behavioural sciences.

3) Psychological theories of ..... have contributed to work out techniques of motivating students for improving their learning.

Answers: 1) e), 2) Anthropology, 3) Motivation

4.3 PSYCHOLOGY AND OTHER SCIENCES

You already know the tasks of psychologists. They work in a variety of basic and/or applied fields. Though psychology has emerged as a science; due to developments in other sciences, the developments in psychology have also influenced the growth and development of other disciplines like sociology, anthropology, economics, political science, management etc. Let us , now look at the relationship of psychology and other sciences, i.e., biological sciences, physical sciences and medical sciences, as described by Parameswaran and Beena (2002).

4.3.1 Psychology and the Biological Sciences

We have already discussed about the intimate relationship between psychology and the biological sciences. All behaviour occurs through bodily processes. Hence, psychology, which is the science of behaviour, is naturally dependent on other sciences which deal with the nature of the human body, the organs of the body and their functioning. Sensations, perceptions and all forms of behaviour originate as physical or physiological reactions and often culminate in muscular actions and glandular secretions. We have earlier discussed how the brain plays a very important role in coordinating and organising the functions of the different organs of the body. Along with the brain, the entire nervous system plays a crucial role in behaviour. Hence, there is an intimate relationship between psychology and *neurology*, *neurophysiology*, *neurochemistry* and other branches of knowledge which are directly involved with the study of the nervous system, particularly the brain. The important role of *genetics*, another branch of the biology which deals with the nature of inheritance of different qualities in determining behaviour, is well known.

According to Darwin, species change via a process of natural selection. Studies of selective breeding support this view. Characteristics are passed on from one generation to the next via genes. Genetic factors influence individual differences in intelligence, personality, and mental disorder (Eysenck, 2004). *Evolutionary psychology*, an emerging field in the 21st century, is an approach that explains behaviour and the development of the mind in terms of their function and adaptiveness.

It is a new theoretical approach that incorporates many of these ideas of *behavioural genetics*. Behavioural genetics is an approach to understanding the causes of behaviour that uses the degree of relatedness among different relatives to assess the role of genetic factors. The essence of evolutionary psychology, as pointed out by Buss (1999, p.3) and cited by Eysenck (2004) is as follows:

Evolutionary psychology focuses on four key questions: (1) Why is the mind designed the way it is? ... (2) How is the human mind designed?—what are its mechanisms or component parts, and how are they organised? (3) What are the functions of component parts and their organised structure—that is, what is the mind designed to do? (4) How does input from the current environment, especially the social environment, interact with the design of the human mind to produce human behaviour?

It could be argued that Buss's definition of evolutionary psychology is too broad, and is applicable to most approaches to psychology (David Carey, personal communication).

Pinker (1997, p. 23) addressed the issue of the historical origins of evolutionary psychology, arguing as follows:

Evolutionary psychology brings together two scientific revolutions. One is the cognitive revolution of the 1950s and 1960s, which explains the mechanics of thought and emotion in terms of information and computation. The other is the revolution in evolutionary biology of the 1960s and 1970s, which explains the complex adaptive design of living things in terms of selection among replicators (animals that reproduce).

The evolutionary process has resulted in species of animals that are structurally and behaviourally adapted to the environment, in which they live. Animals have evolved species typical behaviours to adapt to their environments. Evolutionary processes are also said to have produced brains that are specialised so that certain associations and responses are learned readily. Certain species are thus said to be ready, or predisposed, to learn some things easily; and such responses are often called *prepared behaviours*. Other responses are almost impossible for some species to learn; these are known as *contra prepared behaviours*. A third class of behaviours, the *unprepared behaviours*, can be acquired, but only when learning procedures are applied (Seligman, 1970)

Studies in the areas of health psychology and clinical psychology suggest how psychology also affects the physiological and biological processes. For example, *placebo effect* (changes in behaviour due to expectations that a drug or other treatment will have some effect) can be powerful. A *placebo* is a fake pill or injection. Inert substances such as sugar pills and saline (saltwater) injections are common placebos. Thus, if a placebo has any effect, it must be based on suggestion, rather than chemistry (Moerman, 2002). According to Kirsch & Lynn (1999), a saline injection is 70 percent as effective as morphine, in reducing pain. That is why doctors sometimes prescribe placebos. Placebos have been shown to affect pain, anxiety, depression, alertness, tension, sexual arousal, craving for alcohol, and many other processes.

Research also indicates that, in addition to exercises, there are some reliable, drug free ways of relaxing, when you are under stress. Meditation is one of the most effective ways to relax (Deckro et al., 2002). But be aware that listening to music, taking nature walks, enjoying hobbies and the like can be meditation of sorts. Anything that reliably interrupts upsetting thoughts and promotes relaxation, can be helpful. Also, Vipassana meditation(A Buddhist technique) has many beneficial effects including reduction/tolerance of pain.

It is also possible to relax systematically, completely, and by choice by a method called progressive relaxation. It is a method for producing deep relaxation of all parts of the body. Yet another technique called guided imagery can also be used for relaxation. In this technique, people visualise images that are calming, relaxing or beneficial in other ways.

Research shows that about 94% of diseases have psychological origin. These psychosomatic diseases (Asthma, ulcers, even cancers) can be cured by application of psychology. It has also been reported by many studies that optimistic outlook and positive thinking help patients in speedy recovery.

Thus, knowledge of psychology, such as perception, thinking, motivation, personality etc., can be applied by professionals like doctors, psychiatrists and counselors.

4.3.2 Psychology and the Physical Sciences

Physical sciences like physics and chemistry have also influenced the development of psychology. In fact, early experiments in psychology were very much modeled after and inspired by experiments in physics. Psychophysics appeared as an area of research in psychology due to the interaction between psychology and physics. The outstanding British thinker, John Stuart Mill suggested that psychology should

be a type of mental chemistry. From the early Greek period onwards researchers have tried to investigate and establish the chemical basis of human behaviour. Psychology has been influenced by the developments in physics like the work of Ehrenfels in acoustics. In fact, *gestalt psychology* (one of the early schools of psychology), was primarily/mainly inspired by this work. The developments in quantum-physics, magnetic field theories etc., have also revolutionalised psychological thinking. More recently, engineering sciences, particularly cybernetics and information theory have also influenced psychology. These developments have led to development of modern computers. Today, attempts are being made by psychologists to draw analogies between computers and human behaviour, particularly in areas like thinking, memory, learning, decision making etc. Thus, psychology is very closely related to physical sciences.

4.3.3 Psychology and the Medical Sciences

Medical sciences attempt to find out the causes of disfunctioning or malfunctioning of the body system. In fact, medical sciences are a branch of biological sciences. Advances in the medical sciences have resulted in a considerable amount of knowledge about the structure and function of the brain, the nervous system and the endocrine glands, which are crucial to the study of behaviour.

Medical sciences have contributed significantly to the understanding of abnormal behaviour. Actually, many of the leading thinkers in psychology such as Freud, Jung, Adler, Horney, Rogers, McDougall, Goldstein and some others were originally medical persons. They have contributed a lot to the understanding and treatment of human behaviour, as they were not only interested in treating physical diseases but also in dealing with psychological abnormalities. The development of the fields of abnormal/ clinical psychology as well as the psychodynamic approach to personality is due to the contribution of medical sciences.

While interacting with mentally ill and emotionally troubled people, these medical doctors developed useful insights to human behaviour.

Self Assessment Questions

1) ..... psychology, an emerging field in the 21st century, is an approach that explains behaviour and the development of the mind in terms of their function and adaptiveness.

2) A ..... is a fake pill or injection.

3) In fact, medical sciences are a branch of ..... sciences.

Answers: 1) Evolutionary, 2) placebo, 3) biological

4.4 PSYCHOLOGY AND SOME OTHER DISCIPLINES

We have so far examined the relationship between psychology and different groups of sciences. But psychology is connected not only with the sciences but also with other disciplines which are not generally regarded as sciences. For example, the relationship between psychology and philosophy is well known. Modern psychology grew out of philosophy and philosophers have always influenced theories in psychology. Even today, this is quite true.

Literature and art are the other fields of knowledge which are also related to psychology. In recent years, extensive investigations have been made in to the role of psychological factors in the production of literary pieces and works of art. Freud, Jung and several outstanding psychologists have tried to analyse the role of psychological factors like ego, motivation and personality in literary and artistic conditions.

Architecture is yet another field which has begun to take in to account psychological factors in designing buildings, town planning etc. One may therefore, say that the science of psychology as a very intimate relationship with almost every other discipline. This is naturally so because psychology is the basic science which is directly concerned with the study of human behaviour and evolving of techniques and strategies to improve human behaviour. Most other disciplines are also concerned with human behaviour or products of human behaviour directly or indirectly. Hence, this intimate connection of psychology with other fields of knowledge, is only natural.

You may be wondering that if psychology is so intimately related to other branches of knowledge and it has borrowed extensively from developments in other sciences, can we regard psychology as an independent discipline? The answer to this is strongly in the affirmative. While psychology might have leaned very heavily on discoveries and developments in other fields, it has an identity of its own. While other disciplines may be concerned with different aspects of behaviour, psychology alone is concerned with behaviour in totality. Further, if it has borrowed from other subjects, it has also contributed as much or more, to the growth and development of other subjects. In fact, this trend is steadily on the increase.

This is particularly so when it comes to the question of application of scientific knowledge to action programs. You can now appreciate the extensive and wide scope of psychology in a better light. It is no more a subject limited to philosophical speculations. It is now considered as a science and to be more exact, a psycho-socio-biological science. While it is related to other branches of knowledge, at the same time it is independent; perhaps, much more extensive in its scope and far more deeper in its implications. (Parameswaran and Beena, 2002).

We will now discuss the interrelationship of psychology to other fields like engineering, cognitive science, environmental sciences, law, and criminology.

4.4.1 Psychology and Engineering

Human factors engineering, as a branch of applied psychology, has made important contributions in the field of engineering. Industrial psychologists have helped in designing the right type of machines which would make would make it possible for the workers to do their best by eliminating unnecessary operations, minimizing strain and eliminating possibilities of confusion and oversight. This aspect of adjusting the job to the employee is known as *human engineering*. Human engineering has played a major role in developing ultra-comfortable automobiles, aircrafts, etc., in order to minimize stress strain and maximize efficiency and work output.

Every industry depends on its ability to sell its products, not only for its survival but also for its growth and expansion. Therefore, it is important to know the

needs, likes, dislikes, preferences and habits of people who buy these products. In a watch company, the product in-charge for a new range of watches which were believed to be exquisite, took informal feedback from their own friends and peers within the company. What they omitted to do was to check formally with consumers. They went ahead with production.

But, they had unsold inventory for many months because consumers rejected it, the chief reason being difficulty in reading time on those beautiful dials. Somewhere, in that quest to deliver cutting edge, perhaps, they had forgotten the basics. This highlights the importance of *consumer psychology*, yet another branch of psychology, which not only attempts to understand consumer needs and preferences through consumer surveys, but also contributes in the field of advertising. Effective advertisements help industries to influence consumers to buy their products. Psychologists have been helping in designing advertisements which would attract the attention of consumers and effectively convey the messages so that they are motivated to buy the products.

4.4.2 Psychology and Cognitive Sciences

Cognitive science is the interdisciplinary study of mind and intelligence, e.g., how information is represented and transformed in a brain or in a machine. It consists of multiple research disciplines, including psychology, artificial intelligence, philosophy, neuroscience, learning sciences, linguistics, anthropology, sociology, and education. It spans many levels of analysis, from low-level learning and decision mechanisms to high-level logic and planning; from neural circuitry to modular brain organisation. The term *cognitive science* was coined by Christopher Longuet-Higgins in his 1973 commentary on the Lighthill report, which concerned the then-current state of Artificial Intelligence research. In the same decade, the journal *Cognitive Science* and the Cognitive Science Society were founded. (http://en.wikipedia.org/wiki/Cognitive science).

The cognitive processes such as cognitive learning, memory, creative thinking, problem solving, decision making are being studied by psychologists and have been contributing to the field of cognitive science. For example, many modern organisations are using computers for routine kind of decision making.

4.4.3 Psychology and Environmental Sciences

An off shoot of human factors engineering, is a relatively recent field of psychology called *environmental psychology* . This is a broad area of enquiry and interdisciplinary in nature. The focus of investigation of environmental psychology is the interrelationship between the physical environment and human behaviour and experience(Holahan, 1982). Since its inception, environmental psychology has attracted scholars, researchers and practitioners from a variety of disciplines, including sociology, geography, anthropology, medicine, architecture and planning, as well as psychology (Craik, 1970; Prashanky and Altman, 1979). The study of human behaviour in physical settings requires the work of researchers in many social sciences as well as that of architects and planners responsible for the design for the design of human settings.

According to Holahan (1982), the label "*environmental psychology*" should be understood to describe the problem area of the field rather than a disciplinary restriction. Researchers in environmental psychology investigate wide range of

questions that involve psychological content—spatial behaviour patterns, mental images, environmental stress, attitude change. The researchers themselves, however, represent many disciplines including psychology. Research in environmental psychology is oriented toward both the resolution of practical problems and the formulation of new theory. Environmental psychologists have worked in such topics as environmental perception, environmental cognition, environmental attitudes, performance in learning and work environment, coping with environmental stress, coping with crowding, privacy and territoriality, personal space, affiliation and support in the urban environment. These have applications to environmental planning, for example, reducing urban noise, designing for the elderly, design strategies in dense environments, territoriality in institutional environments, humanizing the design of high-rise housing, citizen participation in urban planning etc.

4.4.4 Psychology, Law and Criminology

Forensic psychology is the intersection between psychology and the criminal justice system. It involves understanding criminal law in the relevant jurisdictions, in order to be able to interact appropriately with judges, attorneys and other legal professionals. An important aspect of forensic psychology is the ability to testify in court, reformulating psychological findings into the legal language of the courtroom, providing information to legal personnel in a way that can be understood. A forensic psychologist can be trained in clinical, social, organisational or any other branch of psychology. Generally, a forensic psychologist is designated as an expert in a particular jurisdiction. The number of jurisdictions in which a forensic psychologist qualifies as an expert, increases with experience and reputation.

Questions asked by the court of a forensic psychologist are generally not questions regarding psychology but are legal questions and the response must be in language the court understands. For example, a forensic psychologist is frequently appointed by the court to assess a defendant's competency to stand trial. The court also frequently appoints a forensic psychologist to assess the state of mind of the defendant at the time of the offense. This is referred to as an evaluation of the defendant's sanity or insanity (which relates to criminal responsibility) at the time of the offense. These are not primarily psychological questions but rather legal ones. Thus, a forensic psychologist must be able to translate psychological information into a legal framework.

Forensic psychologists provide sentencing recommendations, treatment recommendations, and any other information the judge requests, such as information regarding mitigating factors, assessment of future risk, and evaluation of witness credibility. Forensic psychology also involves training and evaluating police or other law enforcement personnel, providing law enforcement with criminal profiles and in other ways working with police departments. Forensic psychologists work both with the Public Defender, the States Attorney, and private attorneys. Forensic psychologists may also help with jury selection. (http://en.wikipedia.org/wiki/Cognitive_science).

A whole range of topics like criminal profiling to psychopathic personality to eye witness testimony, to mental and emotional states of victims/witnesses, to decision making process by the jury members and judges etc., are studied by

forensic psychologists. The findings of these researches have been very helpful for the legal system to do justice to the honest and punish the guilty.

Self Assessment Questions

1) Environmental psychology is an off shoot of .....

2) Forensic psychology is the intersection between ..... and the .....

3) Environmental psychology has attracted scholars, researchers and practitioners from a variety of disciplines, including sociology, ..., anthropology, ..., and architecture and planning

Answers: 1) human factors engineering, 2) psychology, criminal justice system, 3) geography, medicine

4.5 LET US SUM UP

Application of psychology to other disciplines cannot be overemphasised, even though, many disciplines have influenced the developments in psychology,

As we have seen in this unit, psychology has significantly contributed in many ways, to other disciplines, be they physical sciences, biological sciences, social/ behavioural sciences, medical sciences, environmental sciences, cognitive science or disciplines like engineering, law and criminology. Thus psychology, in spite of being an independent academic discipline, has close interrelationship with other disciplines.

4.6 UNIT END QUESTIONS

1) Explain the relationship of psychology with other academic disciplines.

2) Discuss the application of psychology to biological sciences.

3) How psychology is applied to physical sciences and medical sciences?

4) Briefly discuss the application of psychology to social sciences.

5) Describe some other disciplines, where psychology is applied.

4.7 SUGGESTED READINGS

Eysenck, M. W. (2004). *Psychology: An International Perspective*. New York: Psychology Press.

Morgan, C. T., King, R. A., Weisz, J. R. & Schopler, J. (1986). *Introduction to Psychology* (7th edition) New Delhi: Tata McGraw-Hill

Parameswaran, E.G. & Beena, C. (2002) *An Invitation to Psychology*. Hyderabad, (India): Neelkamal Publications Pvt. Ltd..

References

Buss, D. M. (1999). Evolutionary psychology: The new science of the mind. Boston: Allyn & Bacon.

Craik, K. H. (1970). Environmental psychology. In *New directions in psychology*, Vol. 4, New York: Holt, Rinehart & Winston.

Deckro, G. R., Ballinger, K.M., Hoyt, M., Wilcher, M., et al. (20020. The valuation of a mind/body intervention to reduce psychological distress and perceived stress in college students. *Journal of American College Health,* 50(6), 281-287.

Eysenck, M. W. (2004). Psychology: An International Perspective. New York: Psychology Press.

Holahan, Charles J. (1982). Environmental psychology. New York: Random House.

Kirsch, I. & Lynn, S.J. (1999).Automaticity in clinical psychology. *American Psychologist,* 54(7), 504-515.

Moerman, D.E. (2002). The meaning response and the ethics of avoiding placebos. *Evaluation & the Health Professions. Special Recent Advances in Placebo Research,* 25(4), 399-409.

Parameswaran, E.G. & Beena, C. (2002) An Invitation to Psychology (2nd edition), Hyderabad, (India): Neelkamal Publications Pvt. Ltd.

Pinker, S. (1997). How the mind works. New York: Norton.

Proshanky, H. M. & Altman, I. (1979). Overview of the field. In W. P. White (ed.) *Resources in environment and behaviour*. Washington D. C.: American Psychological Association.

Seligman, M. E. P. (1970). On the generality of the laws of learning. *Psychological Review*, 77, 406-418.

Web reference.

http://en.wikipedia.org/wiki/Cognitive_science