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ENVIRONMENTAL PSYCHOLOGY

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BLOCK IV: RESEARCH AND DEVELOPMENT

INTRODUCTION

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The field of environmental psychology encompasses the study of transactions between people and their physical settings. In these transactions, people change the environment, and their behaviour and experiences are changed by the environment. Its primary goal is to improve the relationship of humans with the natural environment and making buildings more humane. Fields related to the subject of environmental psychology include behavioural geography, environmental sociology, social ecology, and others.

This book, *Environmental Psychology*, will discuss the relationship of the environment with various factors such as weather, altitude, perception, attitude, cognition, pollution, and others. It will also discuss how the physical environment impacts fields such as architecture, social behaviour and mental health.

This book is divided into 14 units. It is written with the distance learning student in mind. It is presented in a user-friendly format using a clear, lucid language. Each unit contains an Introduction and a list of Objectives to prepare the student for what to expect in the text. At the end of each unit are a Summary and a list of Key Words, to aid in recollection of concepts learnt. All units contain Self Assessment Questions and Exercises, and strategically placed Check Your Progress questions so the student can keep track of what has been discussed.

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BLOCK - I
CONCEPTS OF ENVIRONMENTAL PSYCHOLOGY

UNIT 1 ENVIRONMENTAL PSYCHOLOGY

Structure

1.0 INTRODUCTION

The word environment is derived from the French word "Environ" which means surroundings. An ecosystem refers to all the living and the non-living things present in the environment and it is a foundation of the Biosphere, which determines the health of the entire planet earth. Environment is a broad spectrum of factors that are vital for human existence such as air, water, oxygen, food, vegetation, etc. To live in harmony with the nature is the most important thing for human beings as our life support system depends on it. Thus, maintaining balance with the environment should be dealt with in the most sincere way. Environmental psychology is the study of interactions between individuals and their physical settings. In such interactions, people change the environment, and their behaviour and experiences are subsequently changed by the environment. The study of environmental psychology includes theory, research, and practice meant for improving our relationship with the natural environment and making the relationship more humane. In this unit, we will study in detail about the nature and characteristics of environmental psychology, research methods and data collection methods.

1.1 OBJECTIVES

After going through this unit, you will be able to:

- Describe the nature and characteristics of environmental psychology
- Explain the methods used for research in environmental psychology

- Discuss the advantages, disadvantages and limitations of various types of data collection methods

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1.2 INTRODUCTION TO ENVIRONMENTAL PSYCHOLOGY

Mutual co-existence of environment and human beings is important for survival of both. Environmental psychology is an interdisciplinary field of psychology that deals with the interaction of humans, the built up environment and the natural environment.

The present environment that we are living in is adulterated, i.e., air, water and soil are polluted. As a result, it is harming the existence of both human and nature.

Here arises a need to understand and think of ways for the mutual co-existence between humans and environment. Thus, environmental psychology is both value oriented and problem oriented aiming at solving complex environmental problems in pursuit of individual well-being.

This means that environmental psychology examines the influence of the environment on human experiences, behaviour, and well-being, as well as the influence of individuals on the environment, that is, factors influencing environmental behaviour, and ways to encourage pro-environmental behaviour.

The field develops a model of human nature while retaining a broad and inherently multidisciplinary focus. It explores dissimilar issues of great significance which are listed below:

1. Common property resource management
2. Wayfinding in complex settings
3. The effect of environmental stress on human performance
4. The characteristics of restorative environments
5. Human information processing
6. Promotion of durable conservation behaviour

1.2.1 Nature and Characteristics

From the present environment that we are living in, it has become evident that there are major environmental as well as health challenges that we are facing such as climate change, deforestation, rise of pollutants in air, soil and water which in return affect the health, economic prospects, food and water supply of the people across the globe.

One of the major factors in causing such changes is human behaviour. Humans react both consciously and unconsciously to the area where they live and work. Most psychologist still think that environmental problems are the concern of environmental scientists but environmental problems are basically caused by human

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behaviour, feelings and attitudes. We need to find ways to change people's behaviour to deal with environmental concerns which can in return be the cause of human well-being and quality of life.

To this end, we can conclude that there is a rising need of an inter disciplinary approach that caters to maintaining balance between man and environment and aims at designing effective ways of conserving the natural environment which in return are essential for better life and psychological growth of human beings.

Environmental psychology is oriented towards influencing the design of work of professional (architects, interior designers, urban planners, etc.) and thereby improving the human environment. Lately, efforts towards improving pedestrian landscapes have paid off to some extent.

Another scope of environmental psychology is to study and measure the aspects of environment such as lighting, noise, extreme temperatures, natural disasters, etc., which affect the human behaviour and well-being.

Environmental psychologists play a significant role in maintaining the balance between man and environment. They work in almost all environments (urban environment, rural environment, slum environment, work environment and institutional environment) because we humans continually interact with some kind of environment.

Characteristics of Environmental Psychology

The characteristics of environmental psychology are:

1. **Interactive Approach**: This approach deals with how the environment influences behaviour of an individual and vice versa, which factors affect behaviour that can help improve the quality of environment. The cognitive development of children is affected by their social, emotional and physical environment. A study published in 2019 in PNAS details results of the largest investigation of the association between green spaces and mental health and thus children grown in such environments would be less prone to mental illness and this may influence a child's connect and love towards nature and in return his willingness to support nature conservation methods. In turn, people's support for nature conservation measures may influence environmental conditions such as biodiversity.
2. **Interdisciplinary Collaboration:** Interdisciplinary collaboration has mostly occurred in three domains. First, environmental psychology has always worked closely with the disciplines of architecture and geography to ensure a correct representation of the physical spatial components of human–environment relationships. Second, theoretical and methodological development in environmental psychology has been influenced strongly by social and cognitive psychology. Third, when studying and encouraging pro-environmental behaviour environmental psychologists have collaborated with environmental scientists, among others, to correctly assess the environmental impact of different behaviours.

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3. **Problem Focused Approach**: Environmental psychology deals with the problems faced from bottom to the top level and finds solution to these problems for mutual co-existence. These problems may arise between humans and their immediate environment such as neighbourhood rising to cities, countries and even planet as a whole. The focus of research may be the problems that arise at the domestic level like sewage and littering and also their solutions such as sewage management and recycling.

At the national level, problems like loss of natural resources such as fossil fuels and animal species and solutions like ecological restoration can be studied. At the global level problems like global warming, climate crisis, clean energy, marine and wildlife conservation and solutions such as adaptation of new technologies and strategies and enforcement of new laws to combat such issues are of interest. Environmental psychology is concerned with problems at all scales, from local to global.

Check Your Progress

1. What is environmental psychology?
2. What problems is environmental psychology concerned with at national and global level?

1.3 RESEARCH: REASEARCH METHODS IN ENVIRONMENTAL PSYCHOLOGY

The main research methods used in environmental research include questionnaire studies, laboratory experiments, simulation studies, field studies, and case studies. They have been discussed below:

- **Questionnaire Studies:** Questionnaire studies are form of survey-based studies that consist of items (standardized questions) which primarily focus on a specific aim of knowing people's views, opinions, attitudes and beliefs over a certain issue. The main purpose of questionnaire is to extract data from the respondents. To construct a questionnaire a researcher has to know his question types, keeping them as brief as possible and should use a clear research process. They are also widely used to establish relationships between two or more variables. Questionnaire studies are mostly suitable in environmental psychology for several reasons. First, manipulation of environmental conditions (as experimental research), is often unethical or impossible. For example, while studying the effects of a certain climate change on the population of a particular area, it is practically impossible to create such climatic changes. Furthermore, external validity of questionnaire studies tends to be high, which is often regarded as crucial in studies on environmental issues. Finally, questionnaire studies are relatively inexpensive, quick and easy to administer. Large amount of information can be collected

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from a large number of people in short period of time and this is really an effective way. Another advantage of questionnaire is that it is practical and can be carried out by the researcher or by any number of people with limited effect to its validity and reliability.

- **Laboratory Experiments:** Laboratory experiments are the experiments that are conducted under highly controlled conditions where exact and accurate measurements are possible. These researches may not always be conducted in a laboratory, so mostly an artificial environment is created for the purpose of the research. The researcher decides where the experiment will take place, at what time, who will be the participants and under what circumstances using a standardized procedure. It has two variables; independent variable (the variable that is manipulated) and dependent variable (variable whose value depends on independent variable). In Laboratory experiment there is a deliberate attempt to manipulate a situation, in order to test a hypothesis to prove that a particular cause creates a particular effect. It can have a number of independent variables (causes or input) and one dependent variable (effect or output) with the goal to see that how the former affects the latter. The two basic features of experiments are manipulation and random assignment. Manipulation means alteration by the researcher of the input to check its effects on the output. Randomization means that all participants in the experiment have an equal opportunity of being assigned to each experimental condition. Randomization tends to balance prognostic factors across study groups. Imagine that a researcher would like to examine whether variable X (independent variable, e.g., presence versus absence of garbage bins) influences variable Y (dependent variable, e.g., littering). When only the independent variable is manipulated and all other variables are kept the same, it can be concluded with reasonable certainty that any difference in response to the conditions is due to manipulation. That is, in the example, if there is a difference in the amount people litter with and without a garbage bin, one of the causes for littering has been identified: the presence of bins. Because of this feature, internal validity of laboratory experiments is high.
- **Computer Simulation Studies:** Simulation is a model that mimics what might happen in reality. It is an approximate imitation or mathematical modelling of a process performed on a computer, which is designed to predict or forecast the outcome of a real world or physical system. In other words stimulation uses mathematical operations or models of a real system in the form of a computer programme. It may include entrancing virtual environments, 3D visualization created with the help of computers, that give the participant a realistic impression of what it would be like to experience particular environments or events in reality, for example the flight simulator model in which you create a computer program that is intended to model flying a plane. With the help of this model artificially recreated aircraft flights and the environment in which it flies can be demonstrated which can be

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used for pilot training, design or other purposes. In environmental psychology such models can be used to study the interaction of human behaviour with environment so that they can be implemented in practical settings.

Simulation solves real world problems safely and efficiently. It provides a method of analysis which can be easily verified, understood and communicated. Computer simulation can avoid danger and loss of life, conditions can be varied and outcomes can be investigated, it can help to solve critical situations without risk and simulation can also be slowed down to study behaviour more closely.

- **Field Studies:** Field studies are experiments conducted in real-life settings, and the use of laboratory settings is abandoned in favour of natural settings. Field studies are done in everyday routine (real life environment) of the participants as these are done in real life environments thus the researcher cannot really control the extraneous variables. In field study the general way of collecting data is through observation (participant, non- participant observation), intensive interviewing and thus research generally prohibits the direct manipulation of the environment by the researcher.

  Field studies aim at discovering the relations and interactions among sociological, psychological and educational variables in real social structures. The experimenter tries to control the situation by systematically manipulating independent variables (e.g., placing or removing a bin in the environment), and/or by trying to randomly assign participants to different study conditions (e.g., environments with and without bins). By doing so, researchers can be reasonably sure that any differences between conditions are due to the manipulations (and not due to, for example, individual differences), securing internal validity.

  Data analysis in field works is an ongoing process as there is constant interaction between data collection and data analysis. Selective perception can be a problem as the researcher keeps on learning more about the topic. Bracketing of biases (gender, age, ethnic or national identity, religion, political views) is important to conduct a field research as this may bias the efforts at research interviewing.

  Nevertheless, field study has various advantages as it helps in studying nonverbal behaviour. It is flexible in nature as it is conducted in natural environment and is relatively inexpensive.

  Certain disadvantages of field research include: non-application to large social settings, making generalization can be problematic and biases, attitudes and assumptions of the researcher can be a problem.

- **Case Studies:** A case study is an in-depth study of a particular situation. It tries to develop an understanding of a social process by studying one case in depth. This can be done by combination of intensive interviewing and observation. It is a descriptive approach to obtain an in depth analysis of a

person, group or phenomenon. Much of the Freud's work and theories were developed through the use of individual case studies. In the method of case study a very broad spectrum of research is narrowed down into one single case, i.e., a person, setting, situation, or event. In a case study, study is done within naturally occurring settings, such as home, playing field, university, street, etc. It studies a person, situation, or event deeply and thoroughly. It is quantitative as well as qualitative and covers sufficiently wide cycle of time. Case studies have continuity in nature. In a case study a researcher cannot manipulate the behaviour of those involved in the study. The primary advantage of case study is that it provides much more detailed information than what is available through other methods such as surveys. But at any time case studies can be lengthy because it provides detailed information about these and thus it may be difficult to hold readers interest if it's too lengthy. Case studies have not been seen systematic in their data collection and have allowed basis in their findings.

Check Your Progress

3. What are questionnaire studies?
4. What is the requirement for laboratory experiment?
5. What is the primary advantage of a case study?

1.4 DATA COLLECTION METHODS

Data might be characterized as the facts collected by the specialist through investigation. Data are prepared by using our senses. Gathering information is tricky, convoluted by the speed at which events happen and the time bound nature of perception. Given below are the various types of data collection methods:

1. **Observation:** It is the strategy that utilizes vision as its principle information collection method. It suggests the utilization of eyes. It is watching and taking notes of marvels exactly as they happen concerning the circumstances and logical results.

   Observation is an arranged methodological watching that includes practices to improve exactness.

   Six types of elements that can be noticed while making an observation are as follows:

   - Physical activities
   - Verbal conduct
   - Expressive conduct
   - Spatial relations

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- Temporal designs
- Verbal records

Characteristics of observation are as follows:

- It is direct in every case.
- It happens in natural setting.
- It is less organized.
- It makes only the subjective investigation.

Given below are the purposes:

- To catch human lead as it really occurs
- To give more realistic portrayal of cultural life
- To investigate significant occasions and recreations
- It can be utilized as an instrument of gathering information in circumstances where different strategies cannot be applied.

Classification of Observation

Table 1.1 *Classification of Observation*

◆ **Direct vs Indirect** Direct: Observes behaviour as it occurs Indirect: Observes the effect of behaviour ◆ **Dis-guided vs non dis-guided** Non dis-guided: Direct Dis-guided: Indirect	◆ **Structured vs Unstructured** Structured: Predetermine what to observe Unstructured: Monitor all behaviour ◆ **Human vs Mechanical** Human: Observation done by humans beings Mechanical: Observation done by machine

Advantages

- Greater information exactness than direct addressing; in normal settings people act normally
- Problems of refusal, not at home, bogus reaction, non-participation and so forth are missing
- No review mistake

Limitations

- Time is burned-through
- Too many things to notice
- May not be representative
- Difficulty in deciding the main driver of conduct techniques as perceptions end up of being not helpful

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2. Interview

Interviews are unique in relation to observation as they include social connection and meeting. Unlike questionnaires methods, analysts need to prepare how to talk with the candidates.

Researcher can pose various sorts of inquiries which thus generate different kinds of information. For instance, closed questions provide people with a fixed set of responses, though open inquiries permit individuals to communicate their opinion in their own words.

Frequent meetings will be held by the interviewer and the information is reviewed as a record (a composed record of inquiries questions and replies) which can be broken down sometime in the not too distant future.

It should be noticed that interviews may not be the best technique to use for exploring delicate themes (for example delinquency in schools, discrimination and so on) as individuals may feel better in finishing interview in private.

Structured Interview

A structured interview is a quantitative examination strategy where the questioner requests a set from prepared closed-ended questions in the type of a meeting plan, which he/she peruses out precisely as phrased.

Interviews schedules have a standardized format which means the same questions are asked to each interviewee in the same order

The questioner will not go astray from the meeting plan (but to explain the significance of the inquiry) or test past the appropriate responses obtained.

A structured interview is otherwise called a formal meeting (like a prospective employee meet-up).

Strength

1. Structured interviews are easy to duplicate as a fixed arrangement of closed-ended questions are utilized, which are anything but difficult to evaluate – this implies it is easy to test for reliability.
2. In structured interview numerous meetings can occur inside a short measure of time. This implies a huge amount of information can be acquired.

Limitations

1. Structured interviews are not flexible. This implies new questions cannot be asked (for example during the meeting) as a meeting plan must be followed.
2. The appropriate responses from organized meetings lack detail as only closed-ended questions are posed, which generates quantitative information. This means a researcher will not know why a person behaves in a certain way.

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Unstructured Interview

Unstructured interviews do not utilize any set inquiries or questions, all things being equal, the interviewer poses open-ended questions according to a particular examination. He attempts to let the meeting flow like a characteristic discussion or natural conversation. The interviewers alter their inquiries on the basis of the responses obtained from a candidate from previous questions. Unstructured interviews are sometimes referred to as the 'discovery interviews' as they are similar to a guided conversation than an organized meeting. They are at times called casual meetings or informal interviews.

Strength

1. Unstructured interviews are more adaptable or flexible as questions can be adjusted and changed depending upon the respondents' answers. The meeting can go amiss from the meeting plan.
2. Unstructured interviews produce subjective information using open-ended questions. This permits the respondent to talk in some profundity, picking their own words. This assists the interviewer in building up a genuine profile of an individual's understanding of a circumstance.
3. They likewise have increased validity because it offers the questioner the chance to get a more deeper understanding, request explanation and permit the interviewee to guide the course of the meeting and so on.

Limitations

1. It can be tedious and time consuming to lead an unstructured interview and dissect the subjective information (utilizing techniques, for example, thematic analysis).
2. Employing and preparing interviewers is costly, and not as modest as gathering information via questionnaires. For example, certain skills may be needed by the interviewer. These include the ability to establish rapport and knowing when to probe.

Focused Group Interview

Focused group interview is a subjective methodology where a gathering of respondents are met together and their in depth comprehension of social issues is obtained collectively. The method aims to obtain data from a purposely selected group of individuals rather than from a statistically representative sample of a broader population.

The part of the interviewer is to ensure the gathering cooperate with one another and do not float off-theme. In a perfect world, the mediator will be like the members in terms of appearance, have sufficient information on the point being examined, and practice gentle inconspicuous authority over prevailing talkers and modest members.

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An interviewer must be exceptionally talented to direct the meeting of gathering of interviewees. For instance, certain aptitudes might be required in a mediator including the capacity to build up compatibility and realizing when to test along with the ability to establish rapport and knowing when to probe.

Strength

1. Focused group interviews create subjective story or qualitative information using open ended questions. This permits the respondents to talk in some profundity, picking their own words. This assists the interviewer with building up a genuine feeling of an individual's comprehension of a circumstance. Subjective information additionally incorporates observational information, for example, non-verbal communication and outward appearances.
2. They additionally have increased validity because a few members may feel more good or comfortable being with others as they are accustomed to talking in gatherings, all things considered (for example it is more natural).

Limitations

1. The interviewer must guarantee that they keep all the interviewees' information private and regard their security. This is troublesome while directing a gathering meeting. For instance, the interviewer cannot ensure that the others in the gathering will keep data hidden.
2. Focused group interviews are less reliable as they utilize open ended questions and may stray from the meeting plan making them hard to rehash.
3. Focused group interviewes may at times lack validity as members may try to impress the other individuals in gathering. They may conform to peer pressure and offer bogus responses.

3. Questionnaire

A questionnaire is an examination instrument comprising of a progression of questions to accumulate data from respondents. Questionnaires can be thought as a sort of written interview. They can be done eye to eye, by phone, computer or post.

Questionnaire gives a generally modest, brisk and proficient method of acquiring a lot of data from a variety of individuals.

Information can be gathered moderately, rapidly or quickly in light of the fact that the researcher should not be available when the questionnaire was being completed. This is helpful for large population when meetings would be illogical and impractical.

However, an issue with questionnaires is that respondents may lie because of social allure. A great many people need to introduce a positive picture of themselves, therefore they lie or carve out their reality to look great, e.g., pupils would exaggerate revision duration.

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Questionnaires can be a viable method for estimating the conduct, mentalities, inclinations, assessments and, aims of generally enormous quantities of subjects more inexpensively and rapidly than different techniques.

Generally, a questionnaire utilizes both open and closed end questions to gather information. This is helpful as it implies both quantitative and subjective information can be obtained.

• Closed Questions

Closed questions structure the appropriate response by just permitting reactions which fit into pre-chosen categories.

Information that can be placed in a category is called nominal data. The classification can be confined to as not many as two choices, i.e., dichotomous (e.g., 'yes' or 'no,' 'male' or 'female'), or incorporate very intricate arrangements of choices from which the respondent can pick (e.g., polytomous).

Closed questions can likewise give ordinal information (which can be ranked). This regularly includes utilizing a continuous rating scale to measure the strength of mentalities or feelings. For example, strongly agree / agree / neutral / disagree / strongly disagree / unable to answer.

Strengths

1. They can be economical. This implies they can give a lot of examination information for generally low expenses. Thus, a huge sample size can be taken which should be representative of the population, which an analyst would then be able to sum up from.
2. The respondent gives data which can be effortlessly changed over into quantitative information (e.g., tally the quantity of 'yes' or 'no' answers), permitting factual investigation of the reactions.
3. The inquiries are normalized. All respondents are posed the very same inquiries in a similar request. This implies a questionnaire can be recreated effectively to check for reliability. Along these lines, a subsequent analyst can utilize the poll to watch that the outcomes are steady.

Limitations

They lack detail. As the responses are fixed, there is less scope for respondents to supply answers which reflect their true feelings on a topic.

• Open Questions

Open questions permit individuals to communicate their opinion in their own words. Open-finished questions empower the respondent to reply in as much detail as they like in their own words. For instance, "would you be able to reveal to me how cheerful you are feeling right now?"

On the off chance that you need to assemble more top to bottom answers from your respondents, at that point open questions will work better. These offer

no pre-set response choices and rather permit the respondents to put down precisely what they like in their own words. Open inquiries are frequently utilized for complex inquiries.

Strength

1. Rich qualitative data is acquired as open questions permit the respondent to expound on their answer. This implies that the exploration can discover why an individual holds a certain attitude.

Limitations

1. Time-taking to gather the information: It takes more time for the respondent to finish open inquiries. This is an issue as a little information might be acquired.
2. Time consuming to collect the data: It takes more time for the specialists to break down subjective information as they need to peruse the appropriate responses and attempt to place them into classes by coding, which is frequently abstract and troublesome.
3. It is not reasonable for less taught respondents as open questions require prevalent composing aptitudes and a superior capacity to communicate one's emotions verbally.

Ethical Issues

The specialist must guarantee that the data gave by the respondent is kept private and confidential, e.g., name, address, and other personal details.

This implies surveys are useful for investigating sensitive themes as respondents will be more honest when they cannot be recognized.

Keeping the questionnaires confidential would likewise decrease the probability of any mental damage, for example, shame.

Participants must provide informed consent prior to completing the questionnaire and should know that they reserve the privilege to pull out their data whenever during the study.

4. Survey

A survey is an information collecting tool used to assemble data about people. Surveys are regularly utilized in psychology research to collect self-report data from study members. A survey may focus on factual information about individuals, or it might aim to obtain the opinions of the survey takers.

Survey can be utilized to explore the attributes, practices, or assessments of a gathering of individuals. These research tools can be utilized to conduct inquiries about segment data and qualities, for example, sex, religion, nationality, pay, etc.

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Surveys can likewise gather data on encounters, suppositions, and even theoretical situations. For instance, analysts may give individuals a potential situation and afterward ask them how they may react in that situation.

Kinds of Surveys

Surveys can be executed in various manners. It is also likely to be possible that we or our friends have at some point of time taken an interest in various distinctive statistical surveying studies.

Following are the most common approaches which are used to conduct surveys:

- Mail
- Telephone
- Online
- At home meetings

Advantages

One of the best advantages of utilizing surveys in psychology is that they permit specialists to accumulate a huge amount of information generally rapidly and inexpensively. A survey can be regulated as an organized meeting or as a self-report measure, and information can be gathered face to face, via telephone, or a computer.

1. Surveys permit researchers to gather a lot of information in a moderately brief period of time.
2. Surveys are more affordable than other data collection methods.
3. Surveys can be utilized to gather data on a wide scope of things, including individual realities, thoughts, past practices, and assessments.

Disadvantages

1. One expected issue with surveys is the non-response bias. Specialists recommend that response rate of 85 per cent or higher are viewed as fantastic, however anything under 60 per cent may severely affect the representativeness of the sample.
2. Poor survey construction and administration can undermine otherwise well-designed studies.
3. The answer decisions gave in an overview may not be an exact impression of how the members really feel.
4. While random sampling is by and large used to choose members, response rate can bias the results of a survey.
5. The social allure bias can lead individuals to react in such a manner that it makes them look in a way which is better than they truly are. For instance,

a respondent may report that they participate in more solid practices than they do, in reality.

Check Your Progress

6. How can we characterize data?
7. List the six types of elements that can be noticed while making an observation.
8. What is a questionnaire?

1.5 ANSWERS TO CHECK YOUR PROGRESS QUESTIONS

1. Environmental psychology is an interdisciplinary field of psychology that deals with the interaction of humans, the built up environment and the natural environment.
2. At the national level, problems like loss of natural resources such as fossil fuels and animal species and solutions like ecological restoration can be studied. At the global level problems like global warming, climate crisis, clean energy, marine and wildlife conservation and solutions such as adaptation of new technologies and strategies and enforcement of new laws to combat such issues are of interest.
3. Questionnaire studies are form of survey-based studies that consist of items (standardized questions) which primarily focus on a specific aim of knowing people's views, opinions, attitudes and beliefs over a certain issue.
4. Laboratory experiment requires an artificial environment to be created for conducting research.
5. The primary advantage of a case study is that it provides much more detailed information than what is available through other methods such as surveys.
6. Data might be characterized as the facts collected by the specialist through investigation. Data are prepared by using our senses.
7. Six types of elements that can be noticed while making an observation are as follows:
   - Physical activities
   - Verbal conduct
   - Expressive conduct
   - Spatial relations
   - Temporal designs
   - Verbal records

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8. A questionnaire is an examination instrument comprising of a progression of questions to accumulate data from respondents.

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1.6 SUMMARY

- Environmental psychology examines the influence of the environment on human experiences, behaviour, and well-being, as well as the influence of individuals on the environment, that is, factors influencing environmental behaviour, and ways to encourage pro-environmental behaviour.
- From the present environment that we are living in, it has become evident that there are major environmental as well as health challenges that we are facing such as climate change, deforestation, rise of pollutants in air, soil and water which in return affect the health, economic prospects, food and water supply of the people across the globe. One of the major factors in causing such changes is human behaviour.
- Environmental psychology is oriented towards influencing the design of work of professional (architects, interior designers, urban planners, etc.) and thereby improving the human environment.
- At the national level, problems like loss of natural resources such as fossil fuels and animal species and solutions like ecological restoration can be studied. At the global level problems like global warming, climate crisis, clean energy, marine and wildlife conservation and solutions such as adaptation of new technologies and strategies and enforcement of new laws to combat such issues are of interest.
- The main purpose of questionnaire is to extract data from the respondents.
- Laboratory experiments are the experiments that are conducted under highly controlled conditions where exact and accurate measurements are possible. These researches may not always be conducted in a laboratory, so mostly an artificial environment is created for the purpose of the research.
- Data might be characterized as the facts collected by the specialist through investigation. Data are prepared by using our senses. Gathering information is tricky, convoluted by the speed at which events happen and the time bound nature of perception.
- Observation is the strategy that utilizes vision as its principle information collection method.
- Interviews are unique in relation to observation as they include social connection and meeting. Unlike questionnaires methods, analysts need to prepare how to talk with the candidates.
- A questionnaire is an examination instrument comprising of a progression of questions to accumulate data from respondents. Questionnaires can be thought as a sort of written interview.

- A survey is an information collecting tool used to assemble data about people. Surveys are regularly utilized in psychology research to collect self-report data from study members. A survey may focus on factual information about individuals, or it might aim to obtain the opinions of the survey takers.

1.7 KEY WORDS

- **Research methods:** These are the strategies, processes or techniques utilized in the collection of data or evidence for analysis in order to uncover new information or create better understanding of a topic.
- **Interview:** It is essentially a structured conversation where one participant asks questions, and the other provides answers.
- **Questionnaire:** It is a research instrument consisting of a series of questions for the purpose of gathering information from respondents.
- **Survey:** It is a research method used for collecting data from a predefined group of respondents to gain information and insights into various topics of interest.

1.8 SELF ASSESSMENT QUESTIONS AND EXERCISES

Short-Answer Questions

1. Mention the issues which environmental psychology explore.
2. What do you mean by computer simulation studies?
3. What are the ethical issues related to questionnaires?
4. Write a brief note on the advantages and disadvantages of survey.

Long Answer Questions

1. Why is there a rising need of an interdisciplinary approach to maintain balance between man and environment? Explain.
2. Describe the characteristics of environmental psychology.
3. What is field study? What significance does it have in environmental psychology? Explain.
4. How interviews are used as a tool to collect data? Describe its types.
5. Differentiate among various methods of data collection.

1.9 FURTHER READINGS

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UNIT 2 ENVIRONMENTAL PERCEPTION

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Structure

2.0 INTRODUCTION

Environmental perception orients us in our surroundings. It gives us information about the systematic relationships and components of the world and furthermore the methods whereby we can relate our own 'goal striving' to the environment in which we live. The general capacity of environmental perception is neither to uncover the present reality nor to review past the real world; rather it is to foresee what is to come. Perception is anticipatory. This anticipation is absurd without our involvement in the recording of past environments. We can allude our past experiences, our past perceptions and furthermore our past assumption to establish and keep a steady environment. To have a broad perspective on human behavior in large ecological settings, it is fundamental to know the environmental perception and cognition of people. Physical and social environment are linked with individuals and different psychological environments. It implies that man travels through different environments with clear expectations of how others will behave. Environmental perception views the perceptual experience as more encompassing, including cognitive, affective, interpretive and evaluative responses. In this unit, we will study in detail about the environmental perception, habituation and adaptation, perception of change and movement and cognitive map.

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2.1 OBJECTIVES

After going through this unit, you will be able to:

- Describe the meaning of environmental perception and conventional approaches to it
- Explain the perception of movement, change, habituation or adaptation and natural cognition
- Discuss the concept of cognitive mapping

2.2 ENVIRONMENTAL PERCEPTION: CONVENTIONAL APPROACHES TO PERCEPTION

In this section, we will study about the conventional approaches to perception.

Ecological Theory of Perception

During World War II, many challenges were experienced in the flying of an airplane, especially while landing and in pilot training. Tests were given for insightful discernment utilizing the static, frozen-in-time, stimulus presentations in two dimensions that are meant to evaluate perception of monocular and binocular depth cues. Tests might be for linear perspective or apparent size, or other monocular or binocular cues of depth. None of these tests, as it ended up, show the ability to foresee how well a trainee pilot would perform. The traditional hypothesis of depth perception was not working; it failed to apply where it ought to have. Gibson considered this and came to understand that the Traditional theory of depth perception was not right. Helmholtz (1866, in F. H. Allport, 1955) had battled with the reality that visual perception of three measurements depended on a two-dimensional structure—the retina (the retina was flat and visual sensations without depth; Gibson, 1966). It was definitely not possible, given that obstruction, to see the three measurements right away. Helmholtz proposed that cues, which were signs of distance, provided the basis for making unconscious inferences regarding size and distance.

In view of his exploration, Gibson (1979/1986) started to suspect that the traditional list of depth cues was simply not sufficient. Contemplating the circumstances, he speculated that light provided information and that the changes occurring in the surrounding field of light (an array of reflections from objects) gave a type of information that the static displays did not. In the "optic array," an "optic flow pattern" was given, by the adjustments in the structure of surrounding light, with information about one's position comparative with environmental objects, and changes in that relation as one travels through time and space. It was obvious to Gibson that each approach—the classical approach and his—had an altogether

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different conception regarding stimulus of perception. Gibson was of the view that visual perception is because of the reality that the ambient light passes on visual data that is available straightforwardly rather than being founded on visual clues or hints from the retina which must be interpreted.

Gibson was working on the assumption that people effectively extricate information from the environment that they use to guide their deliberations with respect to how to behave next. More than that, Gibson was advancing an "ecological theory" that recommended that there was no absolute division between subject and object, perceiver and perceived (comparable to the accepted division into the stimulus response arrangements of discrete occasions). There was a cooperation between the perceptual apparatus and the environment that it evolved to perceive, perceiver and the thing perceived were a framework where there was a consistent, continuous provision of feedback that served as information for the purposeful regulation of continuing activities. Psychology has long paid homage to evolutionary theory without valuing the full implication of the theory for psychology. Darwin, on the other hand, was totally aware of the possible contribution of his hypothesis to psychology:

> In the distant future I see open fields for far more important researches. Psychology will be based on a new foundation, that of the necessary acquirement of each mental power and capacity by gradation. Light will be thrown on the origin of man and his history. (Darwin, 1859/1979)

Mental powers evolved are not of a separate realm called mind nor are they apart from the world of nature; they are processes of nature, natural and material. Humans do not gaze upon the world from some distant, non-organic, supra-natural, plateau, separate from and independent of the remainder of living forms. We are of nature, bound to nature, its product.

Mental processes are material processes (not of some separate substance called mind) that evolved because they were serviceable to continued existence in a material world.

Darwin's hypothesis was that nature gives hindrances or obstacles to survival, e.g., drought, famine, epidemic, evolving atmosphere, etc., and that those people that were fit to these changed conditions would flourish, survive and endure. This implied that fluctuation of qualities in a species would improve chances for the endurance of the species (not specific people). Those people, from the species as a whole, that could adjust to evolving conditions would be the ones that would convey the species forward (regarding transformative advancement). The adapting individuals were chosen by nature (a simply arbitrary, non-conscious, unexpected cycle) to proceed to exist and have offspring. The adaptive characteristics were passed on to offspring through reproduction. By these methods versatile attributes would be passed on to generations by reproduction, and they could bring about modifications of the species attributes (morphologically or typically). Darwin

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construed that psychological cycles, after showing up, were workable to proceed with presence and would thusly be supported by random selection process.

Functional psychologists, as would Gibson later, were concerned about exploring the relationship, or capacity of psychological process with the natural environment. It was the acknowledgment of the significance of the evaluation of development of psychological processes that drove the functional psychologist (James and Dewey) to argue that mental processes should be viewed as functions of a living organism that supported continued existence. This denoted an extreme move for psychology. Psychologists, in the last part of the nineteenth century, had been focusing on states of consciousness and on what the structural makeup of these psychological states was (e.g., Wundt's examination of the brain through contemplation and Titchener's primary brain science). This set a breaking point to psychological investigation and rendered consciousness free of the processes of living (at least in its examination).

James clearly was of the view that consciousness was something that came into existence and that its first appearance was because of its being functional to continued existence, i.e., to managing the issues that face a living being in its battle to keep up its existence.

Dewey (1910/1951) built up this line of speculation further by tending to what he felt was the problem of focusing upon the "mind" as opposed to focusing upon the "mind-in-the environment."

To Dewey, there had been a failure to appreciate that it was only in, and through, life in the environment that these have their existence:

What we are really after is the process of experience, the way in which it arises and behaves. We want to know its course, its history, its laws. We want to know its various typical forms; how each originates; how it is related to others; the part it plays in maintaining an inclusive, expanding, connected course of experience. (Dewey, 1910/1951, pp. 248 249)

It was Dewey's contention that the psychologist has, as information, not isolated mental processes, yet, operations and acts, e.g., perceiving not perception, remembering not memory, loving not love, and so forth. Gibson, as well, would be building up this line of intuition by recommending that perception is not passive reception of stimulus, it is dynamic and intentional (Lombardo, 1987). In Dewey's origination, it is the acts themselves that are concrete experiences, not their content. To comprehend them we need to consider the conditions under which they emerge. The methods of consciousness have no significance, to Dewey, except if they are interpreted back into acts.

It is just through our active engagement with the environment that we advanced into the species that we are and it is just through active engagement with the climate that each of us keeps up their own reality. We are what we are is a direct result of the environment that we evolved to work in and, in particular, we function in our environment rather than precisely interface with it as a complete

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independent agent. Humans and their environment, as are different species and their environments (the planet shaping various conditions that are species explicit, i.e., environmental specialties), are in solidarity. We may conceptualize them, in idea, as unmistakable, e.g., person and environment, subject and object; but, these are abstractions, concepts. The actual conditions of existence, people are intimately and essentially connected with the environment, there is a mutualism, an embeddedness, within the environment.

Gibson's Ecological Theory

In his environmental hypothesis, Gibson (1966, 1979/1986) underscores the indivisible connection between perceptual frameworks and the physical environment in which they evolved. The words 'creature' and 'environment', from this viewpoint, imply each other that they cannot be disengaged. Reciprocity exists between creature and environment and, while they are distinguishable, they are mutually supportive.

The ecological approach taken by Gibson stresses over the inseparable connection between perceptual systems and the physical world in which they evolved. The relations within this system are reciprocal, with the reciprocity including a species evolving in an environment to which it becomes adapted, and an individual acting in its own niche, developing and learning.

In this reciprocal interaction, the environment makes available resources, opportunities and information for action. Actions themselves bring about feedback (more information) that can lead to adjustments in real life. When pursuing down prey, for example, if it starts to pull away from one, speed can either be increased to compensate and overtake, or the chase broken off if that is not possible. In progressing toward some end, whatever that may be, one can continuously monitor one's progress and make adjustments as required.

Perception can be thought about as an evolved adaptation to lawful relations between the environment and the energy clusters, e.g., optic, acoustic, chemical, that encompass individuals also, and act upon their sensory receptors. It is through the ecological reciprocity that Gibson rises above the obstruction of the senses and discovers the basis for direct realism. This was not a position, however, that Gibson arrived at effectively or without a lot of thought and experimentation. To get to that point, Gibson, originally aligned with the constructionists, had to realize that issues existed for that point of view.

In Gibson's theory, information plays a central role. The natural stimulation for perception has certain qualities. To begin with, it generally has adjacent order in which it has a pattern in space—a structure, e.g., various patterns of reflectance from different shapes of items. Second, there is a structure in time, e.g., a melodic song. In such phenomena there are advances that occur in the stimulus over time so, given that, the stimulus cannot be a single instance. Finally, there are elements of change and of non-change and these instances of change and non-change are themselves stimuli.

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Changes in patterns are similarly as stimulating as steady patterns. Change over the time was something that Gibson decided to focus on and he found, accordingly, that critical perceptual information shows up in the form of temporal patterns and structures that don't exist at a single instant, e.g., object development (Neisser, 1985). Events would be essential to understanding perception. Events are parts of reality that go through change after some time and in space. An obvious example is that of speech perception since a sequence of sound utterances are involved. Touch may also serve as an example if one considers the exploration of an object with the hands, e.g., the feel of a sculpture.

We should remember that Gibson bases his theory of information pickup upon the theory of evolution. In the battle to survive and satisfy ecological demands, organisms have developed perceptive capacities that have proved valuable in proceeding with existence and reproduction. Species that possess diverse environmental niches create perceptual frameworks that facilitate effective functioning in that niche. Thus human perceptual frameworks also work in ways that adjust us to, or organize us with the states of our reality and, accordingly, advance endurance. Through the course of evolution people have set up perceptual frameworks rather than senses that include exercises instead of passive receipt of stimulation, e.g., sniffing, looking and tasting. Such frameworks are for the most part subordinate to an orienting aspect:

"a system can orient, explore, investigate, adjust, optimize, resonate, extract, and come to an equilibrium, whereas a sense cannot" (Gibson, 1979/1986, p. 245).

A perceptual framework has a more capacity with regards to extricating information than a sense.

Check Your Progress

1. What was Gibson's point of view about visual perception?
2. On what assumption was Gibson doing his work?
3. What did the 'ecological theory' forwarded by Gibson recommend?

2.3 ENVIRONMENTAL PERCEPTION: MOVEMENT, HABITUATION AND THE PERCEPTION OF CHANGE

Environmental perception may consider the frameworks or transactional perspectives. Environmental perception includes activity on our part, particularly regarding investigating the environment to figure out what necessities to meet.

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2.3.1 Perception of Movement

When a stimulus changes its position with the passage of time it is called as motion. To detect the motion in an object is called motion perception or perception of movement.

Movement perception is a process through which people and different creatures orient themselves to their own or others' physical movements. Most creatures, including people, move to look for food that itself regularly moves; they move to maintain a strategic distance from hunters and to mate. Animals must perceive their own movements to adjust themselves and to move effectively; without such perceptual functions the odds for survival would be strongly diminished.

Movement can be of two types:

1. Real movement
2. Apparent movement

Real movement: When a stimulus or object actually changes its position with the passage of time, it is called real movement. E.g., human beings, animals, vehicles.

Apparent movement: When a stimulus does not change its position with the passage of time it is called apparent movement, e.g. phi phenomenon, Auto kinetic effect.

Phi phenomenon occurs when two stationary spots of lights in different positions in the visual field are turned on and off alternatively at the rate of about 4 to 5 times per second.

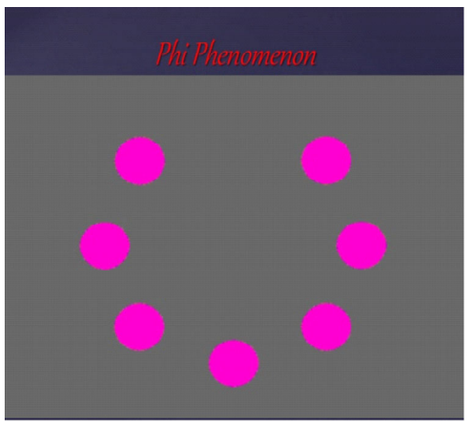

Fig 2.1 *Phi Phenomenon*

Auto kinetic effect is composed of two terms, viz., auto means 'self' and kinetic means 'motion'. When you see a tiny point of light moving, it is often because you yourself are moving or your eye is moving. The human eye is always making tiny involuntary motions as well as opposing small movements that

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compensate for the involuntary ones.

Fig 2.2 *Auto-kinetic Effect*

Factors in perception of movement are as follows:

- Speed: If stimulus is too low then its movement cannot be detected. We cannot detect the motion of progress. For example growth of children and plants.
- Size: Besides the speed, size of stimulus is also very important. Extraordinarily big or small stimulus may move at same speed but their perception of movement cannot be the same.
- Distance: Distance also plays an important role in perception of movement. For example, when aeroplane flies at a high speed, we perceive that it is moving at a slow speed.

Visual cues to movement

The eye is by far the best organ for detecting movement. A few creatures are particularly sensitive to visual stimuli that move specifically. For example, electrical properties of the eye of a frog show that a few elements in the organ react just when the stimulus is about the size of a fly moving in the bug's scope of speed. For the most part, the eyes of lower creatures appear to react specifically to what exactly is important for survival. In these creatures the eye's retina does a large part of the visual processing. This is an economical arrangement since the creature will in general react only to essential stimuli, the brain having little work to do transfer signs to the motor system. It is an inflexible mechanism, however; higher creatures measure visual data in more intricate manners, the mind being all the more vigorously included. In this manner, a few cells in the visual areas of the cat's brain react just to moving stimuli, sets of movement detector cells working explicitly for every direction across the field of view. Highlights of human visual experience additionally propose that movement detectors exist in the human mind.

Relative visual movement

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A visual field containing familiar objects gives a stable framework against which relative movement might be judged. People often report that the light emanating from a source in a dark room is moving when it is not; the experience is known as autokinetic effect. It was seen in 1799 by Alexander von Humboldt while he was watching a star through a telescope, and he credited it to movement of the star itself. Not until about 60 years later was the effect shown to be subjective, apparently arising from instability in the sense of eye position without a visual frame of reference.

Also, if a small object is introduced in the frame with nothing else in view, movement typically is credited to the object in any event, when just the frame moves. This induced movement effect reflects our tendency to utilize the larger space as a steady frame of reference. Rewind the illusion that a train is moving when it is actually the moving train alongside it, seen through the window, is falsely acknowledged as the frame of reference. People cannot see slow movements below a minimum speed (like the movement of hour hand in a watch). And at high speeds, one sees an obscured streak instead of a definite object in motion.

Movement aftereffect

At a point when a parade is hindered after some minutes, the pavement may appear to move the other way to the marchers who have passed. Phenomena similar to this movement aftereffect occur in other senses. For example, subsequent to landing, a mariner feels the land to be moving like a boat due to kinesthetic and vestibular eventual outcomes. The visual movement aftereffect may emerges when movement detectors in the brain that react to the original direction of motion become exhausted, leaving predominant those detectors that react to opposite movement.

Non visual cues

Auditory: Sound waves travel well in water, and fish are accordingly able to rely on acoustic cues to recognize moving objects. Land creatures, although typically more visually oriented, also utilize such cues, including changes in intensity and subtle differences in the time at which the wave reaches to every ear. A few creatures (e.g., bunny, horse) have versatile external ears that track moving sound sources. Bats express high-recurrence waves and can distinguish objects by sonic reflection (a sonar like technology).

Kinesthesis: Kinesthesis here alludes to encounters that emerge during movement from sense organs in the membranes lining the joints and from the sense of effort in voluntary movement; receptors in muscles appear to have little job in the perception of bodily movements. Depending on speed of movement and the joint in action, blindfolded individuals can identify a passive joint movement as little as a fourth of a degree. Individuals shift generally in the exactness with which they can effectively create movement of a given degree; this ability also varies with direction of movement and the opposing friction, mass, and springiness.

Vestibular system: Vestibular structures, encased in a liquid filled cavity in

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the area of each internal ear, include the utricle, a little sac containing minute hairs related with minuscule sand-like granules called otoliths. The utricle functions as a linear accelerometer. When the head inclines with gravity or is accelerated, the moderately thick otoliths avoid the hair cells and nerve driving forces are communicated to the mind. At steady speed the otoliths become stable, stimulation stops, and an individual should depend on other cues (e.g., by noticing the passing scene) to recognize his movement.

2.3.2 Habituation or Adaptation

Introduction to a specific environment may bring about habituation or adaptation, i.e., how the weakening of responses follows repeated exposure to a stimulus. Personal differences in the ways individuals consider and think about the everyday physical environment are thought to be perceived by environmental disposition including preservation, recreation, amusement and relaxation exercises, science and innovation, metropolitan life and culture, aesthetic choices, privacy and adaptation and so on.

Habituation is a decrease in response to a stimulus because of recurring introductions to it. For instance, a new sound in our current situation such as a new mobile ringtone may at first draw your attention. Over the long run, as you become acquainted with this sound, you pay less heed to the noise and your reaction to the sound will lessen gradually. This reduced reaction is habituation.

Examples

To see how habituation functions, it very well may be useful to take a look at a couple of various models. This phenomenon assumes a part in a wide range of learning and perception activities.

Learning

Habituation is one of the least difficult and most regular types of learning. It permits individuals to block out insignificant stimuli and focus on the things that truly request attention. Habituation is something that happens routinely in our regular daily lives, yet we are likely to be uninformed about it.

For instance, we are studying with the TV playing in background. The TV may distract us at first, but habituation allows us to block out the distraction from the TV and focus on the thing we are attempting to learn.

Perception

Consider that you are on your terrace when you hear a boisterous slamming noise from your neighbour's yard. The bizarre sound promptly draws your attention and you cannot help thinking about what is happening or what may be making the noise. For next few days, the slamming noise continues at a constant rate. Ultimately, you simply block out the noise. It is not just sound that makes us to become

habituated. Other senses can also be influenced by habituation.

Another example would be, applying perfume before you leave for work. After some time in at the workplace, you do not feel the fragrance of your perfume anymore, however others around you may feel the smell even after you have become unaware of it.

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Characteristics

Habituation generally does not happen in the same way and there are various components that can impact how rapidly you become habituated to a stimulus. following are the characteristics of habituation:

- **Change**: Changing the intensity or length of the stimulus may bring about a reoccurrence of the first reaction. So if that slamming noise developed stronger after some time, or halted unexpectedly, you would probably notice it again.
- **Duration:** If the habituation stimulus is not introduced for a long enough period of time before an abrupt renewed introduction, the reaction will indeed reappear. So if that boisterous neighbour's slamming noise (from the model above) were to stop and begin, you are more averse to get habituated to it.
- **Frequency**: The more often a stimulus is introduced, the quicker habituation will take place. For example, when you apply the same perfume consistently, you will probably stop noticing it earlier each time.
- **Intensity**: Very intense stimulus in general result in gradual habituation. Sometimes, for example, loud noise of vehicles in traffic or an alarm, habituation will never happen (a car alarm will be less effective if people stop noticing it after some time, for instance).

Humans also adapt according to the environment or get habituated, for example in high altitude areas people adapt by greater depth of breathing, high capacity of lungs and larger tidal volumes. Blood has a higher affinity for oxygen.

Human adaptation

Changes in the environment can be characterized as intentional, accidental, favourable or destructive.

All the environments are meant to be changed. We as humans need to determine if the costs are worth the benefits or how to offset the negative consequences associated with it.

Like all, people must adapt to the climate, landforms, vegetation, and natural resources to find a place to live. However unlike most animals humans have the ability to modify or change the environment.

There are numerous factors that affect our survival such as water bodies, landforms, climate, seismic activities, etc. Humans must respond to the conditions of extreme environment or weather such as floods, tsunamis, volcanoes, etc.

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Humans sometimes modify the environment in order to adapt to it. They modify the environment by following ways:

- Agriculture: growing of food
- Urban growth: people modify the nature by building towns and cities
- Dams: dams swaps and prevents swamps and store water
- Energy: humans modify the environment to fulfill their energy needs

We constantly keep on searching for the best place to live. And the outcome of such a mentality is that we are still unable to trace any ideal place in this world which is swayed by unending pleasure. There is no idyllic setting where the problems of living can be universally eliminated. Those who dwell in rural areas consider the fact that rural life is clean and simple, full of honesty, religiosity and a strong sense of individualism. But to the urban dwellers, the rural folks are naive, unsophisticated and also ignorant. The contradiction of goodness and badness of urban vs rural life is hard to reconcile. It is more practical to view the problem from a more practical point of view rather than from a broader view point. Thus, it will be better to deal with the ways in which particular settings help to shape their inhabitants' belief regarding their own effectiveness and competence, as well as their feelings of futility and fatalism. People in urban and rural settings learn to be effective in some realms of their lives, each setting has its own set of experiences that may facilitate the growth of perceived competence in certain realms of experience, though not in many others.

2.3.3 Perception of Change

In addition to scale and causation, equally important to local perceptions is cognition: the rates of temporal change in local perceptions, perceptibility itself, and the role that the reception of external scientific information may play in influencing local perceptions. Understanding the role that cognition plays in Global Environmental Change (GEC) perceptions is important for at least three main reasons. First, studies indicate that different psychological processes play a key role in shaping individual framings of environmental change. Examples of such processes include memory illusions, change blindness, and the Shifting Baselines Syndrome. Memory illusions refer to exaggerations of the extent of trends, which may also have been caused by the influential memory of extreme events. Change blindness refers to the failure to observe local indicators of climate change; that is, the desensitization to change. Shifting Baselines Syndrome refers to a type of change in how a system is measured or perceived, usually against previous reference points (baselines), which themselves may represent significant changes from an even earlier state of the system. Second, many works describe how experiential knowledge acquired through daily observation of the environment—accurate or not—generally overrides descriptive knowledge gained through the uptake of scientific information. In other words, agents make decisions (e.g., on the use of natural resources) based on

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individual perceptions rather than on measured variables or more diagnosed criteria. And third, the research to date suggests that the way in which people perceive environmental changes influences how they respond to them.

Yet, human perceptibility of GEC (particularly climate change) has been somewhat disputed in the last decades. While some argue that global changes are beyond the threshold of human perception over the course of a lifetime, others claim that the effects of GEC are visible to the naked eye. Responses to this debate are blurred by the meagre empirical research on the topic and partially explain the increasing interest in understanding the way in which people frame environmental changes from a psychological point of view. Nevertheless, our current understanding of psychology in GEC remains poor and biased, the latter in that the cognitive science that has been carried out to date has been limited largely to climate change perceptions and to what Henrich et al. (2010) term as "WEIRD" (Western, Educated, Industrialized, Rich, and Democratic) societies. Such biases are of concern, especially as local knowledge and individual perceptions often form the basis upon which many small-scale societies monitor availability and thus manage natural resources. In other words, local perceptions are critical in designing successful and sustainable natural resource management schemes among small-scale societies wherever they may be.

2.3.4 Perception of Natural Cognition

Perception of natural cognition includes, besides the senses listening, seeing, smelling, tasting and feeling, the way in which we deal with information. While perception alludes to methods of getting information from our environment, cognition tells about the processes such as remembering, learning, solving problems and orientation.

The process involved in environmental perception is closely connected to and interacts with other processes relating to environmental cognition and attitudes. All these processes constantly influence each other. Environmental cognition refers to the process by which information is categorized, sorted, organized and structured, and placed in meaningful categories.

Check Your Progress

4. What is perception of movement?
5. Name the factors in perception of movement.
6. What is habituation?
7. Give an example of habituation.
8. How can the changes in the environment be characterized?

2.4 COGNITIVE MAPPING

NOTES

Cognitive maps otherwise called mental guides, mind maps, psychological models, or mental models are a kind of mental processing made of a series of psychological changes by which an individual can obtain, code, store, recall, and decrypt data about the relative areas and characteristics of phenomena in his everyday or metaphorical spatial environment. The credit for the formation of this term is given to Edward Tolman. Intellectual maps have been studied in different fields, such as psychology, archaeology, planning, geography, cartography, architecture, landscape architecture, urban planning and management. As a result these psychological models are frequently alluded to, differently, as psychological guides, mental guides, contents, schemata, and frames of reference.

Placing it into easier terms, psychological guides are a technique we use to build and collect spatial information, allowing the "mind's eye" to visualize images in order to reduce cognitive load, improve recall and learning of data.

This sort of spatial reasoning can likewise be utilized as an illustration for non-spatial errands including memory, and imaging. The most established known proper technique for utilizing spatial areas to recollect information is the "method of loci". This method was originally used by students of rhetoric in ancient Rome while memorizing speeches.

The neural correlates of a cognitive map have been guessed to be the place cell framework in the hippocampus and the recently found grid cells in the entorhinal cortex.

There is a well-known view that individuals' psychological portrayals or mental representations of environment are typified in 'cognitive maps'. Like many useful concepts the term cognitive map has many meanings, prompting unavoidable errors and leading to inevitable misunderstandings. One view is that cognitive maps are map-like mental builds that can be intellectually examined. They are presumed to be learned by gradually acquiring elements of the world, first landmarks (point like elements), then routes (line like elements), and finally unifying the landmarks and routes with metric survey information.

As maps they are presumed to resemble real maps available to genuine examination. In numerous occurrences particularly for conditions not known in detail, the data applicable to memory or judgment may be in various structures some of them not map like in any way. In these cases, as opposed to resembling maps, individuals' inside portrayals appear to be more like collages, which are thematic overlays from various perspectives. In different circumstances, where conditions are simple, basic and well learned, individuals are seen to have very precise mental portrayals of spatial formats. These are relations that are effectively understood from language as well as from direct experience.

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In the event of a familiar environment, the vast majority of us will discover our ways more often. Or on the other hand we use guides or guidelines or ecological signs or every one of them. In well learned environments, people find themselves capable to have correct mental representations of spatial layouts. In such cases the information frequently has (i) the form of locating elements relative to one another from one's point of view or of (ii) locating an element relative to a higher order environmental feature or reference frame.

These two basic relations can frame an establishment for spatial information from which memory and judgment are associated. These relations likewise structure the reason for spatial language utilized in the description of environment. Perception has consistently been conceptualized as one of the most relevant processes inside General Psychology. Environmental perception assumes a similar part in the framework of Environmental Psychology. Research and theories in environmental perception are essentially centered around the development and processing of mental representations by subjects to decipher more readily and comprehend their environmental factors.

One of the first and principal concepts developed to investigate the mental representations of an environment is the cognitive map. Studies on spatial orientation and spatial perception primarily focus on the way that physical characteristics of the environment influence knowledge or the way of finding ability or orientation capabilities of the subjects.

The idea of mental or cognitive maps represents the complex character of environmental perception. It is one method of approaching the perception of your room, home or city. We as a whole convey a cognitive map of our surroundings and this map is generally more significant in determining our orientation toward an environment than a specific component or gathering of highlights which may exist in that circumstance.

A cognitive map of an environment is our internalized image of that environment. It need not really be an exact portrayal. Ability to imagine and making an image is not generally visual. Sounds likewise add to our feeling of space and our inclination to it. It is true that the cognitive map is neither pure perception nor pure cognition or pure memory but it is in fact what comes to mind when we ask ourselves to visualize any particular environmental situation.

A psychological picture of the environment which we envision for our activity is an important piece of this ability to design our behaviour.

Check Your Progress

9. What are cognitive maps?
10. What is the resemblance between cognitive maps and the map of an area?

2.5 ANSWERS TO CHECK YOUR PROGRESS QUESTIONS

NOTES

1. Gibson was of the view that visual perception is because of the reality that the ambient light passes on visual data that is available straightforwardly rather than being founded on visual clues or hints from the retina which must be interpreted.
2. Gibson was working on the assumption that people effectively extricate information from the environment that they use to guide their deliberations with respect to how to behave next.
3. Gibson was advancing an "ecological theory" that recommended that there was no absolute division between subject and object, perceiver and perceived (comparable to the accepted division into the stimulus response arrangements of discrete occasions).
4. When a stimulus changes its position with the passage of time it is called as motion. Detecting the motion in an object is called motion perception or perception of movement.
5. The factors in perception of movement are speed, size and distance.
6. Habituation is a decrease in response to a stimulus because of recurring introductions to it.
7. Humans also adapt according to the environment or get habituated, for example in high altitude areas people adapt by greater depth of breathing, high capacity of lungs and larger tidal volumes.
8. Changes in the environment can be characterized as intentional, accidental, favourable or destructive.
9. Cognitive maps are a kind of mental processing made of a series of psychological changes by which an individual can obtain, code, store, recall, and decrypt data about the relative areas and characteristics of phenomena in his everyday or metaphorical spatial environment.
10. One view is that cognitive maps are map-like mental builds that can be intellectually examined. They are presumed to be learned by gradually acquiring elements of the world, first landmarks (point like elements), then routes (line like elements), and finally unifying the landmarks and routes with metric survey information.

2.6 SUMMARY

- The traditional hypothesis of depth perception was not working; it failed to apply where it ought to have. Gibson considered this and came to understand that the Traditional theory of depth perception was not right.

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- Gibson was of the view that visual perception is because of the reality that the ambient light passes on visual data that is available straightforwardly rather than being founded on visual clues or hints from the retina which must be interpreted.
- Gibson was advancing an "ecological theory" that recommended that there was no absolute division between subject and object, perceiver and perceived (comparable to the accepted division into the stimulus response arrangements of discrete occasions).
- It was Dewey's contention that the psychologist has, as information, not isolated mental processes, yet, operations and acts, e.g., perceiving not perception, remembering not memory, loving not love, and so forth. Gibson, as well, would be building up this line of intuition by recommending that perception is not passive reception of stimulus, it is dynamic and intentional.
- The ecological approach taken by Gibson stresses over the inseparable connection between perceptual systems and the physical world in which they evolved.
- When a stimulus changes its position with the passage of time it is called as motion. Detecting the motion in an object is called motion perception or perception of movement.
- Movement perception is a process through which people and different creatures orient themselves to their own or others' physical movements.
- Habituation is a decrease in response to a stimulus because of recurring introductions to it.
- Changes in the environment can be characterized as intentional, accidental, favourable or destructive.
- Understanding the role that cognition plays in Global Environmental Change (GEC) perceptions is important for at least three main reasons.
- Perception of natural cognition includes, besides the senses listening, seeing, smelling, tasting and feeling, the way in which we deal with information. While perception alludes to methods of getting information from our environment, cognition tells about the processes such as remembering, learning, solving problems and orientation.
- Cognitive maps otherwise called mental guides, mind maps, psychological models, or mental models are a kind of mental processing made of a series of psychological changes by which an individual can obtain, code, store, recall, and decrypt data about the relative areas and characteristics of phenomena in his everyday or metaphorical spatial environment.
- One view is that cognitive maps are map-like mental builds that can be intellectually examined. They are presumed to be learned by gradually acquiring elements of the world, first landmarks (point like elements), then

routes (line like elements), and finally unifying the landmarks and routes with metric survey information.

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2.7 KEY WORDS

- **Cognitive maps:** It is a type of mental representation which serves an individual to acquire, code, store, recall, and decode information about the relative locations and attributes of phenomena in their everyday or metaphorical spatial environment.
- **Spatial orientation:** It refers to the ability to identify the position or direction of objects or points in space.
- **Habituation:** It is the diminishing of a physiological or emotional response to a frequently repeated stimulus.

2.8 SELF ASSESSMENT QUESTIONS AND EXERCISES

Short-Answer Questions

1. Mention the role of information in Gibson's ecological theory.
2. How is a cognitive map used to investigate the mental representations of an environment?
3. How do humans modify their environment to adapt to it?
4. Mention the various types of movement.
5. What do you mean by movement aftereffect?

Long-Answer Questions

1. 'A perceptual framework has a more capacity with regards to extricating information than a sense.' Explain.
2. Describe the characteristics of habituation.
3. Explain the non visual cues.
4. Discuss the cognitive mapping.

2.9 FURTHER READINGS

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UNIT 3 COGNITION AND ATTITUDES

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Structure

3.0 INTRODUCTION

Everyone forms attitudes, or ways of thinking about some topics and people. We create impressions of the people we meet, and assign reasons to their behaviour. Moreover, our own behaviour is also influenced by other individuals and groups. Under some circumstances, people show pro-social behaviour, that is, assisting the needy and the distressed, without expecting anything in return. Many of such social behaviours seem to be simple. Yet, explaining the processes that lie behind these behaviours is a complicated matter. In this unit, we will study about the Tolman's experiment, the procedure and result of which are presented to show the necessity of cognitive factors for explaining learning (Tolman's cognitive map) and to show that behavioral explanations are inadequate due to their insistence that reinforcement is necessary for learning to occur. The hippocampus has been proposed to support a cognitive map, a mental representation of the spatial layout of an environment as well as the nonspatial items encountered in that environment. This unit will describe the basic ideas related to cognitive maps and the relation between memory and cognitive maps.

3.1 OBJECTIVES

After going through this unit, you will be able to:

- Describe the components, uses and characteristics of cognitive maps
- List the factors affecting cognitive maps

- Discuss the functions of cognitive maps
- Explain the relation between memory and cognitive maps

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3.2 COMPONENTS OF COGNITIVE MAPS

A typical way to deal with studying spatial cognition is that the individuals draw "sketch maps" of environments. Research shows that sketch maps are a reliable for information or data collection.

Lynch (1960) led one of the principal exhaustive investigations of the nature of cognitive maps when he requested inhabitants from three American urban communities (Boston, Los Angeles, and Jersey City) to draw maps of their city surroundings. He investigated these drawings for common traits in people's mental images of their cities. It led to the identification of five significant characteristics, which are as follows:

1. Paths: significant veins of traffic flow through the city (e.g., Main Street)
2. Edges: significant lines (either natural or constructed) that make partition of the city or delimit the limits (e.g., river)
3. Districts: huge segments of the city that have a distinct identity (e.g., "Chinatown")
4. Nodes: point of intersection of major paths (e.g., the corner of Twelfth Street and Vine)
5. Landmarks: structurally important structures that can be seen from a good distance and can be utilized as reference points (e.g., a tall structure). Thus, the objective physical setting comes to be represented as "cognitive space," organized and structured mentally in terms of distinct "regions" of the environment.

As per the "anchor-point" hypothesis the regionalization and hierarchical organization of cognitive space is achieved by the active role of salient cues in the environment. For example primary nodes or other reference points "anchor" distinct regions in cognitive space. These parts or reference focuses give the "skeleton" of the person's guide. As we will see, the degree and precision of the detail of the rest of the guide is an element of the two parts of the environment and individual differences.

A cognitive map is any visual portrayal of an individual's (or a group's) mental model for a given process or concept. Cognitive maps have no visual principles that they need to comply: there is no limitation on how the ideas and the connections between them are visually represented.

History

The idea of cognitive maps was originated from the work of psychologist Edward Tolman, who is popular for his investigations of how rats figured out how to navigate

mazes. In psychology, it has a solid spatial connotation —cognitive maps for the most part allude to the representation of a space (e.g., a maze) in the brain. Cognitive maps have since been utilized in a range of fields; Colin Eden, an operations researcher, utilized the term from a more extensive perspective to refer to a mental model representation of any type of process or concept (whether spatial or not).

Characteristics

- Diverse in nature and purpose: Cognitive mapping is utilized in an expansive range of disciplines for an assortment of purposes. Cognitive maps are the well-known mental-model perception.
- No limitations on structure or form: Cognitive maps do not need to stick to a particular format. In this manner, they are often abstract and have no steady hierarchy. They are flexible and can accommodate a wide arrangement of ideas or circumstances that need to be represented.

Uses

- Externalize knowledge: Visualizations (of any sort) help in cognitive processing; they can assist us with refining our thinking, break down thoughts, and capture them. For instance, a perception turns into a supportive device for portraying where another element is available or when another colleague is introduced to a new complex system.
- Identify themes across various concepts: Presenting concepts in a visual form can help in forming new patterns and connections. In a research, some members were requested to make a cognitive map from the authoritative structures in their organizations. After mapping, they were able to identify similarities (like team makeup, pain points, or bottlenecks) across siloed teams.
- Mental-model elicitation: Cognitive mapping can help specialists comprehend users' mental model of a system or of a process. This understanding can be significant while exploring complex frameworks or in any event, while embarking in the plan of another item. Mental-model elicitation is typically helped out through individual meetings in which the member assembles a visual portrayal of her psychological model of the research subject. The subsequent cognitive map represents a tangible representation of the participant's thoughts and can fill in as a discussion prompt for the facilitator. A few such guides can be grouped depending on their qualities; these types can guide the design cycle.

3.2.1 Factors Affecting Cognitive Maps: Familiarity, Gender and Socioeconomic Class

Given below are the factors that affect cognitive maps:

1. **Environmental Differences:** Environments vary in the ease with which individuals can create cognitive maps of them. Lynch (1960) coined the

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term legibility to allude to the extent to which the spatial arrangement of a city encourages a clear and unified picture in the brains of its inhabitants. For instance, Boston gives a clear centre, the Boston Common, around which individuals arrange their cognitive maps. On the other hand, Los Angeles does not seem to have any clear centre, yet spreads out in all directions, which restrains an coordinated mental representation. Milgram and his associates (Milgram, Greenwald, Kessler, McKenna, and Waters, 1972) contended that recognizable areas of an environment are significant for creating precise cognitive maps. They proposed a formula for predicting the recognizability of an area:

$$R=f(CxD)$$

This formula sites, "The recognizability of a territory (R) is controlled by its centrality to population flow (C) and its architectural or social distinctiveness (D)." Thus, environments that have structures that stand out, (for example, a hilltop church) and are every now and then passed by individuals help in making a clear picture in the minds of the inhabitants.

Both of these environmental differences can be understood in terms of the "anchor-point" theory in spatial cognition. That is, salient, objective physical cues in the environment assist the precise organization of cognitive space, and the absence of such points focuses hinders accuracy.

2. **Individual Differences:** Specialists have additionally proposed that a few people appear to be better at making cognitive maps than others. For instance, gender differences have been reported. Appleyard (1970) detailed that the cognitive maps of men are by and large more precise than those of women. Recently Ward, Newcombe, and Overton (1986) analyzed how people gave directions from maps that had been learnt. Men displayed more significant levels of cognitive organization, for example, utilizing more mileage estimates and cardinal directions (i.e., east, west, north, and south) and made lesser mistakes of commission or omission than women. Bets, McBride, and Collins (1988) revealed that distance judgments of women were more influenced by a change in travel path through a city occasioned by the development of another connecting road than men. They proposed that women took their decisions with respect to inferences from travel paths while men took on a challenge in a more spatial way. Orleans and Schmidt (1972) revealed that maps prepared by the women were more exhaustive for the home and neighborhood than those of men, though men's cognitive maps were more extensive and complete for the larger surrounding environment. At last, a few specialists reported socioeconomic differences, recommending that the cognitive maps of individuals low in socio economic status are additionally less complete and more precise than those of people of higher financial status (Goodchild, 1974; Orleans, 1973).

Note that the individual differences recorded above may not be because of differences in capability, but due to differences in familiarity. That is, there is proof

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that individuals draw more point by point and precise maps of regions about which they have more information and are familiar to than the regions where they have spent brief period of time. (e.g., Appleyard, 1970; Evans, 1980; Holahan and Dobrowolny, 1978; Moore, 1974). Obviously, it stands to reason that we would have better pictures of settings that are familiar to us than those of new places. Indeed, some of the studies on errors in cognitive maps discussed earlier also indicated that the extent of error can be moderated by experience. For instance, the investigation by Herman et al. (1987) demonstrated that the assessments of distances to campus location associated with positive and negative effect were not significantly different for upperclassmen.

Furthermore, there are generally differences in mobility among the groups examined above (i.e., opportunity for travel through the setting), for instance, if a husband works and the wife remains at home, it is not surprising that the husband would build up a superior cognitive map of regions past the immediate neighborhood while the wife would build up a more detailed map of the nearby environment. Likewise, individuals of higher socio economic status have greater mobility to acquire insight in the larger environment than the people of lower socio economic status. These recommendations are upheld by the research of investigators who have controlled for mobility (e.g., Appleyard, 1976; Karan, Bladen, and Singh, 1980; Maurer and Baxter, 1972). While the individual differences reported above could be because of inherent differences in spatial ability, this seems unlikely to be a chief reason. An investigation by Pearson and Nicholas S. Ialongo (1986) measured spatial ability and environmental knowledge independently.

Spatial ability represented just 14 per cent of the variance in environmental knowledge. Accordingly, learning achieved by relevant experience in an environment is probably going to be a more significant determinant of the precision of cognitive maps than the individual or social differences discussed previously.

Developmental Aspects of Environmental Cognition

Various changes happen in environmental cognition as youngsters develop and as grown-ups become acquainted with a new place. Two basic highlights of such cognitive growth are the increasing differentiation and abstractness in cognitive representations of the environment. Also, the expanding capacity to think about the environment from various geological points of view. The first of these is delineated by a progressive shift from enactive to iconic to symbolic portrayal of the environment and, match with Piaget's formative stages: sensorimotor, preoperational, concrete-operational, and formal operational (Flavell, 1977). The second one is delineated by a move from an egocentric spatial reference, to a fixed spatial reference, to a coordinated system of reference. These patterns represent progressive increases in the complexity and sophistication of the cognitive styles and sets for organized and interpreting environmental information (Leff, 1978). These patterns likewise relate to the phases of responses to novel environments as talked above.

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3.2.2 Functions of Cognitive Maps

Cognitive maps are significant for our very capability to move around in our environments. They facilitate the ease of adjusting to our surroundings. The most important function of cognitive maps is their adaptive value.

Kaplan (1973) proposed that the capability of ancient people to create intellectual maps had an essential survival value in a threatening world. 'How would I get from where I am to my cave and where, comparative with where I am presently, did I hide those ostrich eggs I found a day or two ago?' – These are the some of the questions that primitive people probably asked themselves—the responses to which more likely than not needed a type of cognitive map.

Downs and Stea (1977) examined the part of cognitive map in problem solving (i.e., in guiding us settle on choices about where things that we need are and how to get them). This function is also represented in the above example, in that I utilized my cognitive map to solve the issue of where I expected to go corresponding to the time I had in between classes. Consequently, maps encourage adapting methodologies and coping strategies associated with planning our daily lives.

Cognitive maps also serve an important social function of communication. While we build up our own particular maps of the environment, we also get familiar with certain shared images (Strauss, 1961) that permit us to speak with others about a similar actual environment. It is this system of signs and symbols that allows the out-of towners to navigate their way in response to the statement "turn left at the second intersection, at that point make a right at the first stop sign and search for the carry out store." These shared symbols likewise assist us in deciding whether to visit a specific city in first place. For instance, we might tell a European friend planning to visit the United States to be sure to include New York, the "Big Apple", on the itinerary, but forget Cleveland, the "Mistake by the Lake".

Both the turn of events and the utilization of shared symbols or images to speak with others about the environment rely upon the encoding processes discussed before.

Thus far, we have considered the significant and interrelated processes of environmental perception and cognition. We have seen that the capacity to frame mental pictures of our current environment is firmly identified with the capacity to see and interpret the spatial components of the setting, and that both of these processes are strongly influenced by our learning encounters in the environment.

Cognitive mapping has a clear function. It is a fundamental ability for some living creatures, and it is the explanation of why we do not get lost in the places where we have been in previously.

Tolman was of the belief that cognitive mapping is a type of latent learning in which individuals collect a large number of signs or signals from their environments and utilize them to prepare a mental image of their environment or a cognitive map.

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When you drive or walk on a similar route each day, you get familiar with the locations of different buildings and structures and make mental images of these routes. The cognitive processes happen automatically and generally we are unaware of this hidden learning. When you need to discover a structure or building on that specific route, your intellectual planning of that route becomes an integral factor. Your cognitive process utilizes existing information on the environment to create new information or pathways to discover the structure or objects. You generally do not have an issue finding a familiar spot, regardless of whether you approach a wide range of mental models.

Check Your Progress

1. What is the 'anchor-point' hypothesis?
2. What are the characteristics of cognitive maps?
3. List the two highlights of cognitive growth.

3.3 MEMORY AND COGNITIVE MAPS

Cognitive mapping utilizes spatial memory, however it is more than that. Spatial memory records information about one's current environment and spatial orientation.

Now, here's the main point to understand:

The fact that you can remember the sequence of streets or roads and way to your home is spatial memory. And when you see these streets or roads in your "mind's eye" as you give directions – that is cognitive mapping.

The process to design cognitive maps in the brain. Your mind makes a cognitive map utilizing various sources. It utilizes visual stimulus and different prompts like olfaction and hearing to deduce your location inside an environment as you travel through it.

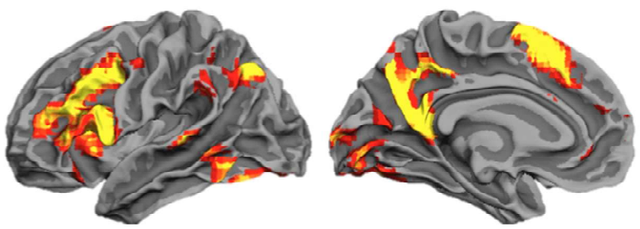

Fig 3.1 *Human Mind*

Utilizing these signals, a vector is made that represents your position and way inside an environment. The vector is then passed to the hippocampal place cells where it is deciphered, and the mind gets more information about the environment and your relative location inside the setting of the cognitive map.

The whole action may appear to be complex, however it happens automatically.

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Over 50 years of research have prompted the general understanding that the hippocampus adds to memory, yet there has been a significant faction among hypotheses of hippocampal work throughout this time. A few researchers argue that the hippocampus assumes a specific role in episodic and declarative memory, while others contend for a specific role in the production of spatial cognitive maps and navigation. Although the two perspectives have merit, neither gives a total record of hippocampal work. Guided by late surveys that endeavour to connect between these perspectives, here we propose that compromise can be refined by investigating hippocampal work from the viewpoint of Tolman's (1948) unique origination of a cognitive map as organizing experience and guiding behaviour across all domains of cognition. We underline ongoing investigations in animals and humans demonstrating that hippocampal networks uphold a broad range of domains of cognitive maps that these networks organize specific experiences within the contextually relevant map, and that network activity patterns reflect behavior guided through cognitive maps. These outcomes are steady with a system that spans hypotheses of hippocampal work by conceptualizing the hippocampus as getting sorted out approaching information inside the setting of a multidimensional cognitive map of spatial, temporal, and associational context.

The hippocampus plays an important role in spatial memory for both humans and rodents. Discoveries from numerous investigations in rodents show that the hippocampus upholds memory for locations referred to external landmarks, a limit that O'Keefe and Nadel (1978) depicted more than 30 years back as a "cognitive map" (utilizing a term they acquired from Tolman 1948). In the time since that pioneering theory, it has become certain that the rodent hippocampus is also significant for nonspatial memory. Harm to the rodent hippocampus leads to impairment on nonspatial tasks, including object recognition memory (Clark et al. 2000; Fortin et al. 2004), transitive odour association, memory for temporal order, and social transmission of food preference.

The circuitry by which information arrives at and exits from the hippocampus is consistent with the idea that the hippocampus is important for both spatial and nonspatial memory. In both rats and macaques, detailed anatomical studies have indicated that spatial information arrives at the hippocampus via the postrhinal cortex (parahippocampal cortex in primates) and the medial entorhinal cortex, whereas nonspatial information takes a path largely through the perirhinal cortex and lateral entorhinal cortex. Thus, the hippocampus is ideally situated to combine spatial and nonspatial information in the service of remembering item–location associations.

Single-unit recording studies in the rat hippocampus have largely focused on the spatial correlates of hippocampal pyramidal neuron firing rates. Fewer studies have investigated nonspatial correlates of hippocampal activity during memory tasks for nonspatial items. However, in one such study, Wood et al. (1999) found that some individual hippocampal pyramidal neurons responded to particular odours and that others responded to particular odours in specific locations

during an odour recognition memory task. Thus, activity of individual cells appeared to contain information about nonspatial items as well as spatial locations.

Tolman's Experiment

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Edward Tolman's experiment including rats and mazes was the way he was able to visualize the significance of cognitive mapping in the human brain. Tolman set a rat in a cross-formed maze and permitted it to investigate the maze.

After the rat had investigated the maze for a bit, it was set at one arm of the cross, and food was kept at the following arm to the immediate right. Since the rat was familiar with the layout, it figured out how to turn right at the intersection to get to the food.

Next, the rat was put at a different arm of the cross maze. Tolman earnestly wanted to check whether there was any change in the behaviour.

The rat did not get lost and it moved towards the food regardless of where in the maze it was put. Changing the rat's position did not make a difference. Tolman expressed that this was a result of the underlying cognitive map of the maze it had made. Experiments conducted by Tolman gave the idea of the cognitive maps to cognitive psychology.

Interestingly, both birds and animals make cognitive maps utilizing the brains hippocampus.

In *The Hippocampus as a Cognitive Map* (1978), neuroscientist John O'Keefe and neuropsychologist Lynn Nadel, state that neurons in the hippocampus create a memory of the animal's environment. At that point when the creature goes to another place, these neurons are reminded of that place, as if they were reading from a map. The book gave a more allocentric interpretation of cognitive maps.

Different examinations by Torkel Hafting and Marianne Fyhn – part of team headed by Edward and May-Britt Moser at the Norwegian University of Science and Technology – found the presence of grid cells in the brain. They utilized procedures used by O'Keefe to examine inputs to the hippocampus.

The scientists found another sort of spatial cells in the entorhinal cortex. The entorhinal cortex is the part of the brain that sends more information to the hippocampus than elsewhere. Shockingly, the scientists found that these cells fired only when the rat went into specific places in the environment and that they fired in many places.

More interestingly, these cells formed a hexagonal pattern wherein each firing place was at the same distance from all its neighboring ones.

The study guided researchers to the discovery that metric data is innate in the brain, wired into the grid cells, regardless of its prior experience.

The discovery ended up being both astounding and a dramatic discovery. Researchers drew a significant inference. They comprehended that the hippocampus is both a map and a memory system.

3.4 COGNITIVE ORGANIZATION OF THE ENVIRONMENT

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For a system to adapt to its environment, its internal variety must match that of its environment (Law of Requisite Variety, Ashby's, 1956). Using an analogy to the human brain, Conant and Ashby (1970) state that for the brain to adapt in both an effective and efficient manner it must learn by forming a model (or models) of its environment. Whether the unit of analysis is the individual, group, or organization, the greater the variety and integration of the unit's parts (e.g., ideas, roles, skills, knowledge), the more environmental stimuli is processed and the greater the variety of decisions and behaviors.

The cognitive organization of the new environment becomes increasingly differentiated and integrated over the course of exposure to the setting. Furthermore the process of cognitive organization is based on the use of a personally salient location as an anchor-point in relation to which the other parts of the environment are established and articulated. There have been two general kinds of research on cognitive organization. One is about the way in which relatively small subsets of cognitions are interconnected and the related governing laws. The second research is about the effects and determinants of general characteristics of cognitive structure. The understanding of the interconnectedness of cognitions is based upon the assumption that the subjects manage their beliefs and attitudes in a consistent manner. Although the organization of all cognitions cannot be governed by a single law, the number of laws required to govern the organization is small.

Check Your Progress

4. What does the spatial memory record?
5. What is the hippocampus?

3.5 ANSWERS TO CHECK YOUR PROGRESS QUESTIONS

1. As per the "anchor-point" hypothesis the regionalization and hierarchical organization of cognitive space is achieved by the active role of salient cues in the environment.
2. The characteristics of cognitive maps are:
   - Diverse in nature and purpose: Cognitive mapping is utilized in an expansive range of disciplines for an assortment of purposes
   - No limitations on structure or form: Cognitive maps do not need to stick to a particular format.
3. Two basic highlights of cognitive growth are the increasing differentiation and abstractness in cognitive representations of the environment. Also, the

expanding capacity to think about the environment from various geological points of view.

4. Spatial memory records information about one's current environment and spatial orientation.
5. The hippocampus is both a map and a memory system.

3.6 SUMMARY

- A typical way to deal with studying spatial cognition is that the individuals draw "sketch maps" of environments. Research shows that sketch maps are a reliable for information or data collection.
- Five significant characteristics of maps are paths, edges, districts, nodes and landmarks.
- As per the "anchor-point" hypothesis the regionalization and hierarchical organization of cognitive space is achieved by the active role of salient cues in the environment.
- Environments vary in the ease with which individuals can create cognitive maps of them. Lynch (1960) coined the term legibility to allude to the extent to which the spatial arrangement of a city encourages a clear and unified picture in the brains of its inhabitants.
- Specialists have additionally proposed that a few people appear to be better at making cognitive maps than others. For instance, gender differences have been reported.
- Two basic highlights of such cognitive growth are the increasing differentiation and abstractness in cognitive representations of the environment. Also, the expanding capacity to think about the environment from various geological points of view.
- Cognitive mapping has a clear function. It is a fundamental ability for some living creatures, and it is the explanation of why we do not get lost in the places where we have been in previously.
- Cognitive mapping utilizes spatial memory, however it is more than that. Spatial memory records information about one's current environment and spatial orientation.
- The hippocampus plays an important role in spatial memory for both humans and rodents. Discoveries from numerous investigations in rodents show that the hippocampus upholds memory for locations referred to external landmarks, a limit that O'Keefe and Nadel (1978) depicted more than 30 years back as a "cognitive map".
- Different examinations by Torkel Hafting and Marianne Fyhn – part of team headed by Edward and May-Britt Moser at the Norwegian University of Science and Technology – found the presence of grid cells in the brain.

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- There have been two general kinds of research on cognitive organization. One is about the way in which relatively small subsets of cognitions are interconnected and the related governing laws. The second research is about the effects and determinants of general characteristics of cognitive structure.

3.7 KEY WORDS

- **Cognitive map:** It is a type of mental representation which serves an individual to acquire, code, store, recall, and decode information about the relative locations and attributes of phenomena in their everyday or metaphorical spatial environment.
- **Legibility:** It is the quality of being clear enough to read.
- **Hippocampus:** It is the elongated ridges on the floor of each lateral ventricle of the brain, thought to be the center of emotion, memory, and the autonomic nervous system.

3.8 SELF ASSESSMENT QUESTIONS AND EXERCISES

Short-Answer Questions

1. What are the significant characteristics of maps?
2. Mention the uses of cognitive maps.
3. What is the process to design cognitive maps in your brain?
4. How does the hippocampus play an important role in spatial memory?

Long-Answer Questions

1. Describe the factors that affect the cognitive maps.
2. Explain the functions of cognitive maps.
3. What was the Tolman's experiment all about? Analyse its findings.

3.9 FURTHER READINGS

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UNIT 4 ASSESSING THE SCENIC ENVIRONMENT

Structure

4.0 INTRODUCTION

In the previous unit, you learnt about cognition and attitudes. In this unit, the discussion will turn towards the assessment of the scenic attitude. It will begin with a discussion on landscape assessment. Landscape assessment is a sub-category of environmental impact assessment (EIA) that is concerned with quality assessment of the landscape. Landscape quality is assessed either as part of a strategic planning process or in connection with a specific development which will affect the landscape. The discussion will then turn towards the relationship between attitudes and the environment. It will discuss how environmental attitudes predict environmental behaviour.

4.1 OBJECTIVES

After going through this unit, you will be able to:

- Discuss landscape assessment
- Examine the formation of attitudes towards the environment
- Explain how one measures attitudes towards the environment

4.2 LANDSCAPE ASSESSMENT

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Effective landscape management is underpinned by landscape assessment. Assuming that it is thoroughly applied, landscape evaluation ought to illuminate both the approach and decision making process relating to how landscapes are managed, and accordingly lessen resulting costs in the policy making process or proposed project. For example, landscape assessment in New Zealand centres around guaranteeing that landscape is reasonably managed and developed. The cycle for every specific evaluation is explicitly custom-made to the zone, issue or proposition being considered and the decision making context. The methodology and scope of a landscape appraisal is normally dictated by the reason for which it is required. It is critical to distinguish the most fitting scale as well as specific landscape pressures to choose a methodology that is appropriately fit for purpose.

This process, which works inside the larger system of Environmental Impact Assessment, endeavours to guarantee that any of the impacts of progress are considered in the decision making process of a project. It is basic that any conceivable change or advancement to the landscapes or views around a project be assessed throughout the planning and design phase of the project. Accordingly, landscape evaluation is sub-separated into two parts: visual assessment and character assessment.

Visual assessment

This would see how changes in the landscape can modify the nature and extents of visual effects and qualities relating to locations and proposals and how they influence specific people or groups of individuals.

Landscape assessment

This incorporates evaluation of the impact of a development or proposal on the character of the landscape. Ordinarily the character of the landscape, resulting from a combination of aspects such as geology, hydrology, soils, ecology, settlement patterns, cultural history, scenic characteristics, land use etc.

4.2.1 Aesthetics and Preference

Landscape aesthetics and environmental psychology together speak to an area of scholastic interest to specific groups and individuals. It is an interest that has been continuous for various years and although not an exclusive interest the vital players with a vested interest in the field are: some select and all the more academically focused landscapes architects and planners, certain geographers, and some psychologists.

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Landscape

In the dictionary, the word landscape refers to 'any realm of the visible, natural geographical world'. The word landscape accordingly grasps all its numerous variations which occur through: climatic, edaphic, geological, ecological, cultural or agricultural impacts, to eventually mould unique regional landscapes of distinctiveness. The word landscape covers the whole built environments of humanity, and the whole natural or semi-natural terrestrial environments on planet earth. The range of variety is huge and begins with the smallest private nurseries, through bigger private and public nurseries, city, nation and amusement parks, cityscapes, never-ending suburbia, agrarian land, woods and fields, to whole regions like the savannah and rainforest. Landscape as a term really grasps everything up to the limits of the biosphere – the overall sum, all things considered, but clearly from a landscape architectural orientation this needs to avoid the seas and oceans.

Aesthetics

In the dictionary, the word aesthetic means something 'pertaining to the appreciation of beauty or good taste' or/and: 'relating to the enjoyment or study of beauty.' Therefore, in light of the above, one can characterize landscape aesthetics as: 'appreciation and enjoyment of beauty in any landscape type'. It should in this way be obvious that when we are discussing landscape aesthetics we are discussing an enormous topic with a very complicated scope of great variation.

In the above definition of landscape aesthetics, the word 'visual' was left out, which one sees in most dictionary definitions. This was intentional, in light of the fact that the term aesthetic grasps more than the visual domain, it relates to all our five essential detects: vision (seeing), touch (contacting), try-out (hearing), olfaction (smelling), gustation (tasting), and maybe even beyond to the sixth sense (non-corporeal intuition).

For instance, a visually impaired individual will acknowledge more in the auditory and sensory system, and mental faculties than somebody not disabled in the visual sense. They will smell the aroma of lavender and honeysuckle, hear the trees above stirring in the breeze, and the creek chattering underneath as they feel the surface of the knoll grass whereupon they sit significantly more expressly. Their appreciation of landscape beauty will be more noteworthy in these domains despite the fact that the visual domain is disabled or missing. They may even have a solid spatial awareness dependent on sound and aroma, that a non-impaired individual will surely not have. Thus one cannot restrict aesthetics to the visual domain, or some other domain so far as that is concerned.

Environmental psychology

We can define environmental psychology as 'an interdisciplinary field that centres on the interplay among people and their environmental factors.' Therefore,

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environmental psychology discusses an individual's own interaction with his landscape climate, whichever specific one he turns out to be in at any time as expected; and whichever unique individual turns out to perceive that landscape. That is a fascinating idea. A native's viewpoint of the landscape from the perspective of aesthetics will be altogether different to someone else and the other way around. Nonetheless, one of the primary premises of landscape aesthetics theory are from an ancient evolutionary imperative and thus are common.

4.2.2 Physical Perceptual Approach to Scenic Value

Consider the number of various environments you may go through in a solitary ordinary day of your life. It may include a city, a beach, a public park, a commercial establishment, and so on. These are a lot of environmental interaction where these is a wide scope of information processing. In all these diverse landscape conditions something is occurring inside us that we typically don't know about. Our psyches are sorting out every one of those various conditions. We are decidedly pulled in to the beauty of a scene and repulsed by the ugliness of a landscape. Thus, a landscape is present in a material form surrounding us any place we end up going, and we each have a novel, individual and significant response to it. This response is in any case, both physical and nonphysical. These responses are likewise involuntary; we don't deliberately decide to have them, they simply occur. One could maybe gracefully express that the landscape is addressing us, yet clearly not in words that we have learned in school. The language of the scene is basic and it is a typical language which we as a whole comprehend from birth paying little mind to ethnicity – it addresses our five primary senses.

The Nature of Human Aesthetic Perception: Descriptive System of a Scenic Value

From this we can see that landscape aesthetic and environmental psychology are two sides of the same coin. One is relating to the inward universe of the human psyche, and the other to the external universe of actual reality. One is referring to what we understand is there through our sensory perception, while the other is alluding to how we comprehend and experience what has been seen.

The human emotive responses stimulated by the environment are fundamental positive and negative dualities on a linear spectrum: beautiful (attraction) vs ugly (repulsion), pleasure vs displeasure, comfort vs discomfort, likes vs dislikes, safety (security) vs danger (fear), happy vs sad, interesting vs boring, comprehension vs confusion etc. Certain variables will be related with specific senses. So in the most fundamental evaluation, the more ticks we jump on the positive side of the duality and the less we jump on the negative side of the duality the more we will discover that the environment is aesthetically pleasing. There can be various diverse dualistic

variables attached to each sense, and a portion of these can be variations on intensity or they can be unique in their own right.

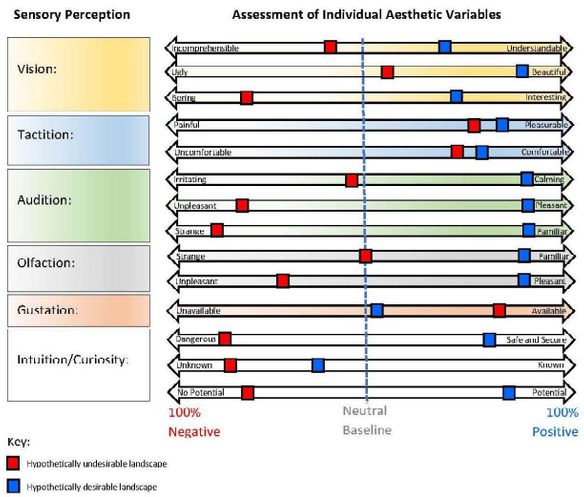

Fig 4.1 *Human Aesthetic Perception*

In Figure 4.1, there are two hypothetical landscapes: one desirable represented by the blue slide bars, and one undesirable delineated by the red slide bars. In spite of the fact that they are hypothetical landscapes, one can imbibe this model with reality by portraying two different landscapes based on real personal experiences.

The aesthetic desirability, and pleasurable positive memorability of a landscape is related to how many variables pass the neutral point to the right of the spectrums. On the opposite end, the aesthetic undesirability, and negative memorability of a landscape is identified with the number of factors pass the unbiased highlight the left of the range. The human evaluation of each dualistic variable on the ranges of plausibility will change from individual to individual, contingent upon: age, sex, culture, training, insight, past encounters, and these appraisals will be made intentionally or subliminally, unbiasedly or emotionally. The aim of good landscape and garden design is thus to create a sequence of positive and pleasurable emotional reactions in humans, (see sequential journey, and sense of place) – this is how landscape aesthetics and environmental psychology is practically applied.

4.3 FORMING ATTITUDES TOWARD THE ENVIRONMENT

An attitude is a general and lasting positive or negative opinion or feeling about some individual, item, or issue. Attitude development happens through either direct insight or the influence of others or the media. Attitudes have three foundations:

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affect or emotion, behaviour, and cognitions. In addition, evidence proposes that attitudes may create out of psychological needs (persuasive establishments), social interactions (social establishments), and genetics (biological establishments), in spite of the fact that this last idea is new and controversial. Revelations in environmental science are the fundamental basis for developing social attitude objects, individual attitudes, and broad public concerns.

Emotional Foundations of Attitudes

A key part of an attitude is the affect or emotion attached with the attitude. At an essential level, we know whether we like or dislike something or discover a thought to be pleasant or unpleasant. For example, we may state that we know something "in our heart" or have a "gut feeling." In such cases our perspectives have been framed, however, our feelings are opposed to logic or thinking. This can occur through (a) sensory reactions, (b) values, (c) operant/instrumental conditioning, (d) classical conditioning, (e) semantic generalization, (f) evaluative conditioning, or (g) mere exposure.

Sensory Reactions

Any immediate experience with an object through seeing, hearing, smelling, tasting, or touching will prompt a quick evaluative response. We are experts at knowing whether we find a specific sensory encounter pleasant or unpleasant. For instance, promptly after tasting another kind of candy, you know if you like it or not. This additionally applies to aesthetic encounters, for example, liking the colour or organization of a craftsmanship. We structure attitudes about items quickly after encountering them.

Values

Some attitudes come from our larger belief system. We may come to hold certain attitude since they approve of our fundamental values. Numerous attitude beliefs come from religious or moral convictions. For instance, for some individuals their perspectives about abortion, birth control, same-sex marriage, and capital punishment follow from their moral or religious convictions and are profoundly intense subject matters for them.

Instrumental or Operant Conditioning

Operant or instrumental conditioning is the point at which an attitude forms or structures since it has been strengthened through remuneration or a reward or a pleasant experience or discouraged through punishment or an undesirable encounter. For instance, a parent may applaud a youngster for assisting at an after-school program with small children. Thus, the adolescent may build up an inspirational attitude toward humanitarian efforts. Also, numerous individuals find that broccoli has an awful taste, thus they dislike broccoli in light of its punishing flavour.

Classical Conditioning of Attitudes

Classical or Pavlovian conditioning happens when a new stimulus comes to evoke a passionate response due to its relationship with a stimulus that already evokes that response or reaction. The Russian physiologist Ivan Pavlov took dogs, which normally salivate to meat powder, and prepared them to salivate at the sound of a bell by persistently ringing the bell as the meat powder was introduced. In people, a portion of our attitudes have gotten adapted similarly. For instance, a few people have a negative attitude towards 'dirty' words. Simply the prospect of a dirty word will make a few people blush. The words themselves have come to evoke a passionate response in light of the fact that their utilization is disliked in our way of life in many settings.

Not only would we be able to get conditioned to a particular stimuli, but this initial conditioning can generalize or spread to similar stimuli. For instance, a bell higher or lower in pitch to the first conditioned sound may evoke a similar response. In people, the underlying moulding can spread even to words or ideas. Therefore, we can frame perspectives about an item or thought without having direct contact with it. At the point when this sort of speculation happens, the cycle is called semantic speculation. For instance, human subjects who have been conditioned to the sound of a bell may likewise show a reaction to seeing a bell or just by hearing the word bell. Semantic generalization can account for formation of attitudes like prejudice where individuals have shaped an attitude without having direct contact with the object of that attitude.

Evaluative Conditioning

An object need not straightforwardly cause us to feel wonderful or unpleasant for us to shape an attitude. Evaluative conditioning happens when we structure attitudes toward an object or individual in light of the fact that our experience to them harmonized with a positive or negative feeling. For instance, a couple may come to feel good toward a specific tune that was playing on the radio during their first date. Their positive attitude to the melody is an aftereffect of its relationship with the glad experience of a date.

Mere Exposure

At long last, when we see a similar object or individual again and again, we will for the most part structure a positive attitude toward that item or individual. This is valid for an item or individual we feel neutral or good about, as long as we are not overexposed to it. For instance, numerous well known styles of dress appear to be strange from the start, however then as we see a greater amount of them we may come to acknowledge and even like them.

Social Learning of Attitudes

Social learning of attitudes refers to the learning of attitudes that occurs in social contexts. More precisely, it refers to adaptive behaviour change (learning) stemming from observing other people (or other animals), rather than learning from one's

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own direct experience. People acquire and change social attitudes from observing and imitating the actions demonstrated by models such as parents or peers. This learning occurs from merely observing the actions of others and from observing the consequences of their actions.

4.3.1 Measuring Attitudes towards the Environment

Maybe the most direct method of getting some answers concerning somebody's attitudes is to ask them. Be that as it may, attitudes are identified with self-image and social acknowledgment. To safeguard a positive self-image, individuals' reactions might be influenced by social appeal. They may not well tell about their actual perspectives, however answer in such a way that feels socially acceptable. Given this issue, different strategies for measuring attitudes have been created. Be that as it may, every one of them have limitations. Specifically the different measures focus around different components of attitudes – cognitive, affective and behavioural – and as we probably are aware, these segments don't necessarily coincide.

Attitude measurement can be separated into two essential classifications. These are:

- Direct Measurement (Likert scale and semantic differential)
- Indirect Measurement (projective techniques and the implicit association test)

Assessment of Direct Methods

An attitude scale is intended to give a valid, or precise, proportion of a person's social attitude. Nonetheless, as any individual who has each "faked" an attitude scale knows there are shortcomings in these self-report scales of attitudes. There are different issues that influence the validity of attitude scales. Notwithstanding, the most well-known issue is that of social desirability.

Socially desirability refers to the tendency for individuals to give "socially desirable" to the questionnaire items. Individuals are frequently motivated to give replies that make them appear "well adjusted", unprejudiced, open minded and democratic. Self-report scales that measure perspectives towards race, religion, sex and so forth are intensely influenced by socially desirability biases. Respondents who harbour a negative demeanour towards a specific groups may not wish be admit to the experimenter (or to themselves) that they have these sentiments

Evaluation of Indirect Method

The significant criticism of indirect method is their lack of objectivity. Such techniques are informal and don't impartially measure attitudes similarly as a Likert scale. There is additionally the ethical issue of deception as often the individual doesn't realize that their attitude is really being examined when utilizing the indirect method. The benefits of such indirect techniques of attitude estimation are that they are less inclined to create socially desirable response, the individual is probably not going

to think about the thing is being measured and conduct should be natural and reliable.

4.3.2 The Search for the PEQI

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More individuals walking leads to a healthier populace, more secure roads, more grounded networks, and higher natural quality. Nonetheless, policy and planning for transportation, land use, and community design have brought about critical natural restrictions to selecting walking as a method of transport. Today, various hindrances hamper people from walking, including the significant distances between work, home, and goods and services, fast vehicles, risky convergences, and lacking walkways.

Procedures that advance walking can possibly improve wellbeing and natural quality, uphold neighbourhood union, and construct social capital. Down to earth planning and determining strategies that assess pedestrian needs in land use and metropolitan spacing measures give a way to assess boundaries to walking and organize approaches and ventures to expand pedestrian movement. The San Francisco Department of Public Health created one such strategy in 2008, the Pedestrian Environmental Quality Index (PEQI), as an instrument to evaluate pedestrian wellbeing and requirements, as well as collect consideration and interest for pedestrian planning.

The PEQI is a quantitative, observational instrument used to portray and sum up the road and convergence ecological variables known to influence individuals' movement practices. The PEQI draws on examination from different transportation planning sources and specialists, just as work done in the urban communities across the United States and Canada.

Data for the PEQI is gathered utilizing the PEQI overview that is finished dependent on a visual appraisal of road sections and crossing points by a prepared observer. The attached PEQI survey and instructional pamphlet (manual) will help anybody keen on gathering pedestrian environmental quality data.

The Pedestrian Environmental Quality Index (or ¯PEQI) is a survey of the road climate from the viewpoint of pedestrians. This overview permits a local area to gather explicit information about the components of the actual climate that decide on the walkability of their area. It depends on trained observers who round out a bunch of explicit inquiries regarding the components they see on each square and crossing point in your study. This data can be totalled to create a file of walkability, known as the PEQI. Information about walkability can be utilized to distinguish need territories for improving the walkability of a territory. Either the individual information components or the record, or both together, can be utilized to show what components and what explicit roads/crossing points need the most help.

The original survey instrument and materials about its development are available at their website: http://www.sfphes.org/HIA_Tools_PEQI.htm

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4.3.3 Changing Attitudes toward the Environment: A Prelude

Every day we encounter numerous attempts to persuade us to change our attitudes; parents, teachers, peers, religious leaders, salespersons, politicians, media and several other agents engage in acts of persuasion. The traditional approach to attitude change began with the Yale social psychologists in the 1950s. They used the pre-post design to study the existing attitudes. They attempted to change attitudes by applying different conditions. Their findings can be presented as follows:

- Experts are more persuasive than non-experts.
- Persuasion is higher if the message is perceived as not deliberately intended to manipulate the receiver.
- People with low self-esteem are persuaded more easily as compared to those with higher self-esteem.
- Popular and attractive communicators are more successful in bringing about attitude change, than unpopular and unattractive communicators.
- People are more susceptible to persuasion when they are distracted, than when paying full attention to the messages when the persuasive messages are simple in nature.
- When the audience holds a position that is contrary to what the persuasive message is suggesting, it is more effective to use two-sided arguments, than the one-sided argument.
- People who speak rapidly are more persuasive than those who speak slowly.
- Persuasive effectiveness can be enhanced by messages that arouse fear among the listeners/viewers

Some of these techniques work, while others do not. The type of audience, the type of messages, and the existing attitude in the group are all important in determining the success of attitude change.

Cognitive Dissonance

When we are faced with a choice and we opt for one, we still have some regrets about what we did not choose. There are times we do or say things against our own convictions. Both these are examples of conditions that create feelings of discomfort caused by conflicts between various beliefs/attitudes that we hold. Sometimes the conflict arises due to the inconsistency between attitudes and behaviour; for example, some people love animals, but still are non-vegetarians.

Dissonance is the struggle a person experiences when inconsistencies occur between attitudes that we hold, or between our attitudes and actions. Dissonance can be seen as a motivational state. Individuals experiencing dissonance are motivated to reduce it, also, it produces a feeling of discomfort. There are three ways in which dissonance can be reduced and they are as follows:

(i) Change your attitudes and/or behaviour, so as to make them consistent.

(ii) Obtain or recruit new information that supports one's attitude or behaviour.

(iii) Minimize the importance of the conflict.

Change of one or both attitudes is needed for reducing dissonance. Change follows the path of least effort, as in other situations.

In terms of the environment, solving environmental problem cannot be addressed just by creating laws or rules that prohibit destroying the environment. Since the problem is rooted in the culture, then solving environmental problem requires changing of culture or mindsets. Changing culture means changing people's belief, their views, value, perceive and only then they can change their attitude toward the environment or nature. Thus, it needs to introduce new views about the environment that people need to adopt to replace the old view of environment.

According to Maloney and Ward, psychologists have long recognized that environmental problems are caused by maladaptive human behaviour. Supporting such idea, Oskamp stated that human behaviour was the culprit of the environmental problems. He argued that human behaviours or actions have caused many harmful and many possible irreversible changes to the environmental conditions that support life on earth. He then proposed that possible solution to environmental problem is to change humans' understanding and attitude toward the environment

4.3.4 Environmental Attitude Predicts Environmental Behaviour

Global ecological issues of shrinking natural resources, contamination and populace development challenge the ways individuals live. Likewise with numerous other disciplines, psychology endeavours to create human societies that are less exploitive in their utilization of the world's characteristic assets.

Since psychologists refer to individual behaviour instead of behaviour of entire societies they inquire questions such as what decides a person's ecological behaviour, i.e., activities which contribute towards ecological safeguarding or preservation or how might behaviour be changed in a more ecological direction. In addressing these inquiries, ecological attitude is viewed as perhaps the most promising idea. Indeed almost two-third of all environmental psychological publications include environmental attitude for one way or another.

As anyone might expect, the relationship between environmental attitude and environmental behaviour is very much investigated. However, the relationship gives off an impression of being, best case scenario, moderate across various contemplates. This absence of a more grounded relationship sporadically results in rather sceptical perspectives on the value of ecological attitude as an indicator of biological conduct.

There are three reasons, one hypothetical and two methodological, that influence the predictive power of environmental attitude concepts. From a

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hypothetical perspective, there are at least three primary that research traditions that use quite different attitude concepts. The differences confuse the correlation of examination results in the environmental space. The two methodological reasons blemish that effect any attitude behaviour relationship additionally influence the ecological attitude and environmental behaviour relationship. These two flaws are the lack of measurement correspondence and the lack of consideration of situational influences on a given behaviour.

Measurement correspondence alludes to measurement of attitude and behaviour on a similar level of specificity. Due to the multitude of situational impacts, the degree of specificity should be somewhat general. Situational impacts allude to constrains and facilities on behaviour beyond individuals' ability to control. Considerations of such behavioural impacts are seen as especially significant in the ecological domain. Such impacts are typically considered either as moderator effects on the connection between environmental attitude and ecological behaviour or as direct influences on ecological behaviours. The two methodologies require a rather arbitrary selection of possible influences. Additionally, both of the methodological weaknesses can be overwhelmed by utilizing a probabilistic measurement approach for the evaluation of ecological behaviour.

Numerous ecological problems are anthropogenic in nature, implying that these issues are driven by human conduct. Our present age has changed the environment quicker also, more thoroughly than some other age in the past, demonstrating that conduct change is needed for a reasonable future. Pro environmental behaviour (PEB) is complex in its variety just as in its many casual influences. Behavioural and social sciences have dedicated incredible effort to comprehend what drives PEB, by developing theories that incorporate internal, institutional and social factors. Pro environmental behaviour, a subject that has gotten the interest of economists all the more as of late has been explored by researchers in the field of environmental psychology.

While psychologists are more worried about internal factors, economists center more on external factors. An interdisciplinary methodology consolidating knowledge from both disciplines is lacking, however, such a methodology is bound to give solid experiences into the different determinants of PEB and their transaction in affecting social change. Pro environmental behaviour (PEB) can be characterized from the actor's standpoint and covers all behaviours attempted by a solitary individual to lessen one's negative ecological impact with a clear intention to change the environment.

Check Your Progress

1. What does landscape refer to?
2. List the three foundations of attitude.
3. What do you understand by the social learning of attitudes?
4. What are the two essential classifications of attitude measurement?

4.4 ANSWER TO CHECK YOUR PROGRESS QUESTIONS

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1. The word landscape refers to 'any realm of the visible, natural geographical world'
2. Attitudes have three foundations: affect or emotion, behaviour, and cognitions.
3. Social learning of attitudes refers to the learning of attitudes that occurs in social contexts. More precisely, it refers to adaptive behaviour change (learning) stemming from observing other people (or other animals), rather than learning from one's own direct experience.
4. Attitude measurement can be separated into two essential classifications. These are:
   - Direct Measurement (Likert scale and semantic differential)
   - Indirect Measurement (projective techniques and the implicit association test)

4.5 SUMMARY

- Effective landscape management is underpinned by landscape assessment. Assuming that it is thoroughly applied, landscape evaluation ought to illuminate both the approach and decision making process relating to how landscapes are managed, and accordingly lessen resulting costs in the policy making process or proposed project.
- The word landscape accordingly grasps all its numerous variations which occur through: climatic, edaphic, geological, ecological, cultural or agricultural impacts, to eventually mould unique regional landscapes of distinctiveness.
- In the dictionary, the word aesthetic means something 'pertaining to the appreciation of beauty or good taste' or/and: 'relating to the enjoyment or study of beauty.' Therefore, in light of the above, one can characterize landscape aesthetics as: 'appreciation and enjoyment of beauty in any landscape type'.
- We can define environmental psychology as 'an interdisciplinary field that centres on the interplay among people and their environmental factors.'
- Environmental psychology discusses an individual's own interaction with his landscape climate, whichever specific one he turns out to be in at any time as expected; and whichever unique individual turns out to perceive that landscape.
- Landscape aesthetic and environmental psychology are two sides of the same coin. One is relating to the inward universe of the human psyche, and the other to the external universe of actual reality.

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- The human emotive responses stimulated by the environment are fundamental positive and negative dualities on a linear spectrum: beautiful (attraction) vs ugly (repulsion), pleasure vs displeasure, comfort vs discomfort, likes vs dislikes, safety (security) vs danger (fear), happy vs sad, interesting vs boring, comprehension vs confusion etc. Certain variables will be related with specific senses.
- An attitude is a general and lasting positive or negative opinion or feeling about some individual, item, or issue.
- Attitude development happens through either direct insight or the influence of others or the media.
- Any immediate experience with an object through seeing, hearing, smelling, tasting, or touching will prompt a quick evaluative response.
- Some attitudes come from our larger belief system. We may come to hold certain attitude since they approve of our fundamental values. Numerous attitude beliefs come from religious or moral convictions.
- Operant or instrumental conditioning is the point at which an attitude forms or structures since it has been strengthened through remuneration or a reward or a pleasant experience or discouraged through punishment or an undesirable encounter.
- Classical or Pavlovian conditioning happens when a new stimulus comes to evoke a passionate response due to its relationship with a stimulus that already evokes that response or reaction.
- Evaluative conditioning happens when we structure attitudes toward an object or individual in light of the fact that our experience to them harmonized with a positive or negative feeling
- Social learning of attitudes refers to the learning of attitudes that occurs in social contexts. More precisely, it refers to adaptive behaviour change (learning) stemming from observing other people (or other animals), rather than learning from one's own direct experience.
- Maybe the most direct method of getting some answers concerning somebody's attitudes is to ask them. Be that as it may, attitudes are identified with self-image and social acknowledgment. To safeguard a positive self-image, individuals' reactions might be influenced by social appeal.
- An attitude scale is intended to give a valid, or precise, proportion of a person's social attitude.
- The San Francisco Department of Public Health created the Pedestrian Environmental Quality Index (PEQI), as an instrument to evaluate pedestrian wellbeing and requirements, as well as collect consideration and interest for pedestrian planning.

- Every day we encounter numerous attempts to persuade us to change our attitudes; parents, teachers, peers, religious leaders, salespersons, politicians, media and several other agents engage in acts of persuasion.
- Dissonance is the struggle a person experiences when inconsistencies occur between attitudes that we hold, or between our attitudes and actions.
- Since psychologists refer to individual behaviour instead of behaviour of entire societies they inquire questions such as what decides a person's ecological behaviour, i.e., activities which contribute towards ecological safeguarding or preservation or how might behaviour be changed in a more ecological direction.
- Pro environmental behaviour (PEB) is complex in its variety just as in its many casual influences. Behavioural and social sciences have dedicated incredible effort to comprehend what drives PEB, by developing theories that incorporate internal, institutional and social factors.

4.6 KEY WORDS

- **Aesthetics:** It is a branch of philosophy that deals with the nature of beauty and taste, as well as the philosophy of art.
- **Attitude:** It is a way of feeling or acting toward a person, thing or situation.
- **Cognitive Dissonance:** the state of having inconsistent thoughts, beliefs, or attitudes, especially as relating to behavioural decisions and attitude change.

4.7 SELF ASSESSMENT QUESTIONS AND EXERCISES

Short-Answer Questions

1. What are the two parts of landscape evaluation?
2. Discuss the nature of human aesthetic perception.
3. Write a short note on PEQI.

Long-Answer Questions

1. Describe the formation of attitudes towards the environment.
2. Explain the various measurements of attitude.
3. Discuss how attitudes to environment can change by examining the various approaches to attitudinal change.

4.8 FURTHER READINGS

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BLOCK - II
APPROACHES TO ENVIRONMENT

UNIT 5 THEORIES OF ENVIRONMENT

Structure

5.0 INTRODUCTION

The field of environmental psychology is a growing area of research which focuses on the personal and social factors responsible for crucial human responses to the stimuli in physical environment. There are many different ways of thinking about human behaviour. Psychologists use a range of perspectives while performing study on how people think, feel and behave. Some experts focus on one particular school of thought, such as the biological perspective, whereas others take a more diverse approach that includes various points of view. Ecological theories state that an individual and his environment co-exist, more like an interdependent relationship. People's behaviours exist because of the environment they are put in. Behavioural constraint theory says that when we feel our behavioural freedom is compromised by elements in the environment, we build a certain degree of reactant to escape the stressor. Adaptation level theory suggests that an individual would adapt to a certain level of stimulation from the environment. This level of stimulation is important for him to function optimally as too much or too little of that stimulation would result in unfavourable consequences. In this unit, we will study in detail about the behavioural relationships and the theories in environmental psychology.

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5.1 OBJECTIVES

After going through this unit, you will be able to:

- Describe the concept of behaviour relationships
- Explain the meaning, nature and function of theory in environmental psychology
- Discuss the fledging theories of environment behaviour

5.2 BEHAVIOUR RELATIONSHIPS: INTRODUCTION

Man and environment relationship is just about as old as the advancement of humankind. Since the advancement of man, the physical components of the planet earth, like landscape, soil, water, climate, flora and fauna shaped man's current circumstances. During that time man was commonly a 'physical man' due to his restricted needs, necessities, and absolute reliance on nature.

With the development in social and economic activities, progression in innovations, man extended his own current environment through plan, design and skill to have arrangements for improved and better food, safe house, access, luxuries and solace. Man's capacity to survive in variety of ecosystem and his exceptional capacity to adjust to extraordinary external conditions make man-environment relationship an interesting area of study.

The environment wherein man endures and to which he adjusts and which he impacts or incorporate physical, social, and biological aspects. Man and environment has never been static and a large number elements are answerable for the shifts in man environment relationship.

Enviornmental studies is the interdisciplinary scholarly field which methodically examines human interaction with the environment in light of a legitimate concern for taking care of complex issues. It is a wide field of study that incorporates the natural environment, man-made environment, and the relationships between them. The field encompasses study in fundamental ecology and environmental science, just as relevant subjects like ethics, policy, politics, law, economics, philosophy, environmental sociology and environmental justice, planning, pollution control and natural resource management.

An approach is a method of getting closer. The investigation of connections among man and environment has consistently been, somehow, a central theme in environmental study. Be that as it may, the features of man-environment relationship change through time with the improvement of human society and the dimension of environment. The man-environment connections, hence, can be perceived and evaluated in a variety of ways and approaches.

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Foundation of Environmental Psychology

For a few centuries, the environment has given home to people and various life forms, however the unquenchable requirements of people have driven them to devise techniques for survival and adaptation. A few of these methodologies, particularly innovation and technology, have had direct or indirect negative outcomes on the immediate environment, bringing about the degradation of the environment. A significant number of the present ecological issues are progressively the results of individual activities, individual customer choices, and the exercises of small and big organizations. In any case, the reality is that the healthiness of the world's economy and people is inseparably bound to the prosperity of the environment. This suggests that now, significantly more than beforehand, there is a more noteworthy need to understand patterns, connections and root causes of the worsening environment. An exceptionally solid device for nipping the 21st century environmental issues, which are alarming in nature, is environmental education. One genuine device for accomplishing this feat is a legitimate understanding and the application of behavioural models and theories.

5.2.1 Nature and Function of Theory in Environmental Psychology

Theory is a well-established principle that has been created to clarify some aspects of the natural world. Theories emerge from observations and testing that have been completed over and again and they fuse facts, predictions, laws, and tried presumptions that are generally acknowledged. The theoretical framework along these lines gives a platform to communicating and expressing a hypothesis or theory of a research study. It presents and portrays the hypothesis that clarifies why the research problems under study exist.

There is a connection between ideas and hypotheses, to such an extent that, the constituents of a theory are ideas or concepts and principles. A concept is a symbolic portrayal of something real. It is the building block of theory. The primary difference between the theoretical and conceptual framework is that a conceptual framework is the idea of the analyst on how the problem of the research should be investigated. This is set up on the theoretical framework, which depends on a lot more on the broader scale of resolution. The theoretical framework thrives that have been tried and tested consistently over time and expresses the discoveries of various investigations on how phenomena occur. This structure gives an overall portrayal of relationships between things in a given phenomenon. On its part, the conceptual framework portrays the relationship between specific variables distinguished in the study. It moreover traces the input, process and outcome of an entire investigation. A model is a blueprint for action, portraying what occurs in reality in a universal way. Models are utilized to depict the application of theories for a specific case. Basically, theories are grounded standards created to explain dimensions of the natural world, they are comprised of concepts and ideas and applied by utilizing models.

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A theory presents an orderly method of understanding, behaviour events and circumstances. It is a bunch of interrelated definitions, ideas, and suggestions that predict or clarify events or situations by indicating connections among the variables. The idea of generality, or expansive application, is significant. Consequently, theories are by their tendency abstract and not content- or topic-specific. Although various theoretical models can communicate similar general thoughts, every theory utilizes a unique vocabulary to explain the particular features viewed as significant. Furthermore, there is a variety in theories in the degree to which they have been developed conceptually and tested empirically. A significant feature of the theory is its ability to be tried and tested. Various hypotheses and ideas exist for understanding Human Behaviors in Environmental Preservation.

Theories are created to explain predict and enhance the understanding of the phenomena. Theories challenge and expand the range of information within the boundaries of critical limiting assumptions. Theories vary in their development based on the ideas and strategies utilized and experimental test attempted. The testability of a hypothesis is one of its fundamental elements. An integrative use of various behavioural and environmental theories could end up being important in solving contemporary ecological issues.

It was suggested at the beginning of this chapter that the context – the environment – in which individuals live their lives is a basic factor in understanding human perceptions, attitudes and behaviour. Psychologists have to a great extent overlooked this setting expecting more clarification for behaviour or conduct and it is generally individual focused, as opposed to individual in-environment focused. Since environmental psychologists are in a situation to comprehend individual in-environment questions, the historical backdrop of environmental psychology has been firmly impacted by the need to address questions posed by the practical concerns of architects, planners and other professions answerable for the planning, design and management of the environment (Uzzell, 2000a). These inquiries include: how the environment stimulates behaviour and what occurs with excessive stimulation; how the environment constrains and causes stress, how we would structure maps of the environment in our minds and use them to explore through the environment; what variables are significant in individuals' assessment of the natural and man-made environment and how fulfilled they would say they are with various conditions and ecological conditions; what is the impact of the environment or behaviour setting on individuals; what are the actual properties of the environment that encourage some behaviours and debilitate others; whether we have a sense of place; what impact this has on our character.

Check Your Progress

1. What makes man-environment relationship an interesting area of study?
2. Define theory.
3. What is the primary difference between the theoretical and conceptual framework?

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5.3 ENVIRONMENT-BEHAVIOUR THEORIES: FLEDGLING THEORIES IN A FLEDGLING FIELD

In this segment we will discuss a portion of the methodologies that have been taken to addressing the inquiries which we mentioned in the previous section.

Arousal theory, environmental load, and adaptation level give great delineations of theories which are basically behaviourist in their assumptions and deterministic in their environment behaviour orientation.

5.3.1 Arousal Theory

From a neuro-physiological point of view, arousal is an uplifting of brain action, by the arousal centre of the brain known as reticular formation. One impact of exposure to environmental stimulation is increased arousal. It could be estimated physiologically by elevated autonomic activity, for example, increment pulse, circulatory strain, breath rate, adrenaline rush and so on. It may be measured behaviourally by increased motor activity, or simply as self-reported arousal.

It is one of the measurements along which any environment can be assessed. The arousal model makes particular expectations about the impacts on behaviour of lowered or heightened arousal. It is very valuable in clarifying some behavioural effects of such environmental factors such as temperature, crowding and noise.

Pleasant and Unpleasant Stimuli

There is a pleasant and unpleasant stimuli which elevate the arousal. For instance an exciting ride at a carnival could be as stimulating as noxious noise or a packed lift.

Impact on Behaviour

The increase of arousal level leads people to look for information about their internal states. We attempt to interpret the nature of arousal and the purposes behind it. Is it lovely or horrendous? Is it because of individuals around us, or due to some physical aspects of the environment? We can say that we decipher excitement as per the feelings showed by others around us. Furthermore, the causes which we interpret for the arousal have critical outcomes on our behaviour. For instance, on the off chance that we decipher excitement the reason for our own outrage, we may turn out to be more forceful towards others. But crediting it to outrage is not the only purpose behind the increased aggression.

As indicated by a few theories of aggression, increased arousal will encourage aggression, if aggression is a reaction created in a specific circumstance. For instance when noise builds arousal, it might also increase aggression.

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From an environmental behaviour viewpoint, as environment stimulation from crowding, noise, heat or some other source builds arousal, performance will either increase or decrease.

Yerkes-Dodson Law

Yerkes-Dodson law states that performance is maximum at intermediate levels of arousal and deteriorates as arousal either falls below or transcends this ideal point. For complex tasks, the optimum level of arousal happens marginally lower than simple tasks.

From an environmental behaviour perspective, as environmental stimulation from crowding, noise, heat or any other source increases arousal, performance will either increase or decrease, depending on whether the affected person's response is below or above the optimum arousal level for a particular task.

Evidently, low arousal does not bring about maximum performance and very high arousal keeps us from focusing on our task.

Arousal theory specifies that the environment gives a specific measure of physiological stimulation which, contingent upon the person's interpretation and attribution of the causes, has specific behavioural impacts. Every specific conduct is best performed at a definite degree of arousal. The connection between levels of arousal and ideal performance or behaviour is curvilinear (Yerkes-Dodson law). Though people look for stimulation when arousal is too low, too significant degrees of arousal created by either wonderful or unsavory stimulus or experiences have negative affect on performance and behaviour. Anomic behaviour in metropolitan conditions is ascribed to high stimulation levels because of environmental conditions like extreme noise or crowding (Cohen and Spacapan, 1984). Then again, under-stimulation may happen in specific conditions like the arctic causing unease and depression (Suedfeld and Steel, 2000).

Disadvantages of the Theory

One measure may demonstrate high level of arousal, though other may show lower level of arousal. Which measure to pick in predicting behaviour is a difficult issue. Notwithstanding, the arousal approach is a helpful one and will keep on consolidating into those environmental behaviour relationships to which it is appropriate.

5.3.2 The Environmental Load or Over-Stimulation Approach

The hypothesis is that people have a restricted capacity to deal with environmental stimuli. The limit is dictated by the measure of information inputs that can be handled by the central nervous system. When the environmental load surpasses the person's ability for processing, the central nervous system responds by overlooking a portion of the sources of information.

As per this model individuals have a restricted ability to handle approaching stimuli, and over-burden happens when the measure of approaching stimuli

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surpasses the person's ability to deal with them. People manage an over-burden situation by focusing their consideration on the main parts of an assignment or zeroing in on a fixed objective, disregarding fringe stimulation in order to avoid distraction. Focusing attention on a specific task in an overloaded circumstance is very demanding and produces fatigue or exhaustion (Kaplan and Kaplan, 1989). Generally, aftereffects of being exposed to an overload situation are, as per the over-burden model, less resilience to frustration, less resilience and diminished ability to respond in a versatile manner. Milgram (1970) credits the decay of social life in urban areas to the wide collection of demands on citizens making a diminished limit focus on others. The over-burden approach clarifies why certain natural conditions lead to undesirable behavioural consequences like aggression, absence of helping behaviour and self-centeredness in metropolitan conditions.

People have a limited ability to deal with information. When the sources of information surpass that limit, individuals will in general disregard a few information sources and dedicate more attention to others (Cohen, 1978). These hypotheses represent reactions to environmental stimulation in terms of the organism's momentary capacity to attend to and deal with salient features of its milieu.

By and large, stimuli important to the task at hand are designated as much attention as needed and less significant stimuli are disregarded. For instance, while driving during heavy traffic a lot of consideration is paid to the vehicles, trucks, transports, and street signs around us and less consideration is paid to the reporter on the vehicle radio, the children in the secondary lounge, and the mists in the sky. On the off chance that the less significant improvements will in general meddle with the main job, at that point overlooking them will upgrade execution. Assuming, nonetheless, the less significant improvements are imperative to the job needing to be done, at that point execution will not be ideal; for instance, disregarding the street signs since you are taking care of trucks, vehicles, and so on, may lead you thirty miles out of your way in returning home.

Once in a while the organisms' ability to manage the environment is exhausted or even drained. At the point when this happens, only the main information is taken care of, with any remaining data filtered through.

When attentional limits have been exhausted even little requests for consideration can be depleting. Hence, behavioural aftereffects including errors in judgment diminished capacity to bear frustration, overlooking others needing assistance, and such, can be represented by these speculations. For instance, a tired rush hour driver ultimately may arrive at his destination even after not seeing the traffic signals, despite the fact that this is a vital stimulation.

Furthermore, diminished capacity to bear frustration may prompt "Laying on the horn" or "path bouncing" and drivers in the separate path might be overlooked, if not viewed with disdain.

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5.3.3 Under Stimulation Approach

Stimulation load theories are able to account for behavioural effects in stimulus deprived environment (e.g., certain practices happening on board submarines and in prisons). In other words, this methodology proposes that under stimulation can be just as aversive as overstimulation. The so-called cabin-fever due to repetitive and same living conditions can also be viewed as the consequence of under stimulation. Wohlwill (1966) has contended that conditions ought to be portrayed regarding measurements applied to the dimensions of intensity, novelty, complexity, temporal variation, surprisingness, and incongruity, all of which contribute to stimulus load. Subsequent behaviours can be related to the stimulus properties of environments in orderly and comparable manners.

Educational administration of the hyperactive children is principally corresponding to decrease of environmental stimulation. Although social agreement is high with respect to the utilization of this administration method, empirical support is lacking. An alternative theory is introduced which depends on the homeostatic suspicion that the hyperactive children are in reality under-stimulated and their ability of performing hyperactive practices increases the overstimulation to move toward a more ideal level. Experimental help for this homeostatic model is introduced, and classroom treatment methods obtained from the hypothesis and dependent on this research are talked about. Suggested treatment is intended to increase stimulation and accordingly lessen hyperactive children's needs to create their own stimulation through activity.

Too much or too little stimulation can be bad for children. It is difficult to tolerate boredom, and numerous individuals think that it is horrendous. A large part of the population perceive that an overstimulated individual is probably going to experience difficulty in managing behavior. An under stimulated individual will turn to desperate measures to get their excitement level back into a more temperate range.

As your child gets older, it will be valuable to assist him with understanding where he lies on the introvert-extrovert scale and what that implies regarding avoiding the pressure that goes with excessively little or a lot of stimulation. When your child arrives at the age of seven, he can take one of the online child friendly personality tests, for example, the Murphy Meisgeier Type Indicator for Children (a children's version of the well-known Myers-Briggs test), which will give him some feeling of how much stimulation he needs.

Teach your child to perceive when he needs to accomplish something dynamic, intriguing, or energizing, and when his internal pressure sensors are revealing to him it is an ideal opportunity to take things down a step. Some relaxation techniques are very useful methods that can empower an overstimulated kid to restore his equilibrium.

Then again, ensure that the child has a scope of reasonable exercises accessible so he can build stimulation levels when important. Preferably, these should be things that do not generally need your contribution or management.

5.3.4 Adaptation Level Theory

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Helson developed the adaptation level theory of psychology. This theory states that a person's ability of judgment of a stimuli depends on his prior involvement or experiences of how they perceived similar stimuli in the past. It is a theory used to interpret psychological findings, and it is also used today.

Helson affirmed that adaptation levels vary from individual to individual and in various situations. The adaptation level theory can be applied to attitudes, sounds, light, and many other concepts, despite the fact that it started with Helson's investigations including vision. Helson saw that stimuli sometimes appeared without colour when they were in monochromatic lighting, and the manner in which the stimuli were seen relied upon the background. This discovery drove him to his acknowledgment of how adaptation levels work in vision.

Adaptation level theory (AL theory) is definitely a logical extension of arousal theory and the overload approach. It says that there is an intermediate level of stimulation which is individually optimal. Stimulation can be categorized into three types – sensory stimulation, social stimulation, and movement. These categories can be described along three dimensions of stimulation: intensity, diversity, and patterning (i.e., the structure and degree of uncertainty of the stimulation). In ideal conditions, a stimulus must be of average intensity, reasonably diverse and should be organized with a reasonable level of unpredictability. The degree of stimulation at which an individual feels good depends upon his/her previous experience, or all the more decisively the natural conditions under which the person has grown up. This reference level is nevertheless the subject to adaptation when the individual changes their life environment. If rural people can be agitated by metropolitan conditions, they may also adjust to the new circumstances after a specific time period of resistance. Adaptation level theory proposes a functioning and dynamic connection of the person with his/her current environment.

The Adaptation Level Theory by Helson (1948) states that the main point is adaptation, i.e., adjustment, to some actual power or size. At the point when we leave a dull room and enter open daylight, we feel blinded by the light. At that point, gradually, our tangible and neural frameworks adjust to the new power, which at that point turns into the default—the new degree in the words of quantifiers. When we reenter the dim room, the once friendly brightening in there will be inadequate as a result of the new adaptation level from daylight. Staying in that space for some time will again prompt a move back to the original adaptation level.

Adaption level theory, otherwise called AL Theory is a psychological idea which explains that the principle of a person's judgment on a stimulus depends

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upon their past experiences or memories of the experiences they have had with similar stimulus before.

As such, the Adaptation Level theory advances a theoretical idea that expresses that the decisions of an individual in regards to a specific class of stimulus is represented by his/her previous encounters as well as memories of the decisions in similar environments.

Henry's theory explains the connection between the past encounters and the present day judgment of an individual, also alluded to as a person's adaptation level, numerically, by contemplating a wide variety of criteria, for example, the reference points of past decisions, mean of similar stimuli in order of their recency and remarkable quality, among others. It is communicated as a logarithm which restores that a person's previous encounters and experiences identified with similar stimulus assume a significant part in deciding his/her adaptation level when a similar situation happens.

In the light of the above discoveries, the adaptation level theory can be considered as a theory of relativity in terms of psychology, and depends on the theory that a person's emotional judgment is subjected to the predominant standard (or adaptation level) of that specific person. The theory is explained further with the help of following examples:

Example - 1

Despite the fact that AL Theory is communicated as a mathematical formula, it can likewise be advantageously adjusted to the applications that have nothing to do with arithmetic. For instance, an individual may think about a recently launched car model as 'quite large,' in light of the fact that the size of the car contradicts his/her impression of the size of a new car model, which may be generally small depending upon his past experiences. This judgment, as per Henry, is a result of the combination of past encounters/reference purposes of the individual joined with the overall standard of a new car model.

Here, it should also be noticed that as the size of the new car model continues to get bigger, a person's impression of the size of the new car model will also start to move towards a greater size, which is currently as per the individual, is the common standard of new model. Previously mentioned situation also fills in as an extraordinary tribute to the Henry's hypothesis which states that the adaptation level of an individual is administered by the mean of comparative upgrades in the demand for their recency.

Example – 2

To more readily explain the terms 'prevailing norm' and 'adaptation level', let us think about another example. We as a whole use different sorts of pens in our everyday life. Despite the fact that many of them are of similar weight (around 5.8 grams); some might be somewhat lighter than the others. Nonetheless, what is the benchmark that chooses whether a pen is heavy or light?

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When you give a pen to an individual and ask him/her if it is light or heavy, the judgment would include that specific person's new past encounters with a pen, alongside the heaviness of a pen that is considered as should be expected under winning conditions. The individual may only have the option to pass his/her judgment in the wake of considering the above variables, which when consolidated, wholly address the overall standard of the heaviness of a pen, just as the person's adaptation level.

Adaptation level theory portrays the interaction by which an individual gets harsh toward the impacts of steady stimulus.

5.3.5 Optimal Stimulation

The optimal stimulation level is the magnitude of stimulation a person seek in life. In theories which assume that human actions are affected by motivational tendencies, the concept that for achieving an optimum stimulation level, social actions stimulated by pure desire plays an important role. The medium levels of stimulation, which is also known as the optimum stimulation level, are the most common one to be selected. Due to individual difference, the optimal stimulation level (OSL) vary from person to person.

People who have high amount of optimum stimulation level attract by stimulation whereas others avoid stimulation.

5.3.6 Behaviour Constraint Approach

This model presents the temporal dimension of exposure to ecological conditions, and alludes to singular norms of exposure (Moser, 2002). The impact of stressors is very much recorded, yet the discoveries are infrequently examined in terms of adaptation and before-after comparisons. However one can accept that where there are no constraining factors the individuals will return to their own set of norms which are expounded through their experiences of exposure. The principle of elasticity gives a decent representation of individual conduct with regards to ecological conditions. Utilizing the principle of elasticity from solid mechanics to portray the adaptive abilities of people exposed to environmental constrains, three fundamental behaviour specificities as an outcome of changing ecological possibilities can be recognized: (1) returning to an earlier state, that is a point of reference, in which constraints were not present; (2) the ability to adapt to a state of constraint as long as the constraint is permanent; (3) the existence of limits on one's flexibility. Getting back to a previous state that is a perspective, where limitations were absent. The last one is seen through decreased flexibility in the face of increased constraints, the existence of a breaking point, (when the constrains are too great), and by the progressive reduction of elasticity as a function of both continuous constraints and of ageing.

1. **Returning to an earlier baseline:** While attention is for the most part given to attitude change and modifying behaviour in specific circumstances,

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the steadiness after some time of these behaviours is rarely examined. However longitudinal exploration regularly shows that pro environmental behaviour resorts to the initial state before the constraints were experienced. This has been seen for example with regards to urging individuals to sort their homegrown waste (Moser and Matheau, in press) or in degrees of worry about global natural issues (Uzzell, 2000b). Exposure to constraints makes disequilibrium and the individual, tending to reincorporate initial behaviour, return to the previous state of equilibrium.

2. **Adaptation:** It is the ability to endure a constraining situation to the extent that it is consistent. Noticing behaviour in the metropolitan environment gives proof of the constraining conditions of the metropolitan setting. People living in urban areas walk faster on the road and exhibit more noteworthy withdrawal than those living in small towns: they look straight ahead, seldom make eye-contact with others, and respond less to the requests for help from others. In other words, confronted with an over-invigorating metropolitan environment, individuals use a filtering process by which they concentrate on those requests they assess as significant, ignoring peripheral stimulation. The consistent expression of this sort of adaptive behaviour proposes that it has become normative. The walking speed of occupants of small towns is slower that the walking speed of occupants living in urban areas (Bornstein, 1979). So we can say that such behaviour gives proof of the person's ability to react to specific environmentally constraining conditions.
3. **The extent and limits of flexibility:** The limits of flexibility and, all the more especially, the breakdown following constraints which are excessively incredible, are best seen in aggressive behaviour. The difference between instrumental and hostile aggression (Feshbach, 1964) reviews the distinction between adaptive behaviour focused on successfully confronting a threat and a reactive and impulsive behaviour. Three limits of adaptability can be identified: (a) decreased adaptability despite increased limitations. When openness to known imperatives is moderately high, there is a less chance of playing out a versatile reaction, and in this manner an increase in responsive practices take places. There is diminished flexibility even with requirement, more so if the imperative is added onto previously existing limitations influencing the person. This is most clear in aggressive behaviours (Moser, 1984). Individuals respond all the more unequivocally to a similar stimulus in urban areas than in small towns. Hostile aggression turns out to be more frequent. This results in a decrease in versatile limits and consequently of adaptability, if extra constraints are grafted onto those already present. (b) The presence of a breaking point when the constraints are too great: Intervention by cognitive processes is forestalled if stimulus creates too extreme a neuro-vegetative response (Zillmann, 1978, Moser, 1992). This is generally clear with unfriendly aggressive behaviour. This includes non-

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versatile receptive behaviour which is plainly of an alternate request. The outcome is the breakdown and a cutoff on adaptability. However, in opposition to what happens when there is elasticity, this breakdown luckily happens only occasionally, on an ad hoc basis. (c) The progressive loss of elasticity as a function of the persistence of exposure to constraints: This has been analyzed under laboratory conditions as post-exposure effects. Outside the laboratory, the consistent mobilization of adapting measures, for instance, for those living close to airports produce weariness and brings the limit down to confront new unpleasant circumstances (Altman, 1975). One experiences, specifically, greater vulnerability and irritability and a decrease in the ability to oppose unpleasant occasions. These impacts exhibit that there is a diminished tolerance threshold, thus a diminished adaptability following prolonged exposure to various environmental constraints.

5.3.7 Barker's Ecological Psychology

Barker's behaviour settings approach has both a hypothetical and methodological significance as it gives a system to analyzing the logic of behaviour in specific settings. Barker (1968, 1990) thought about the environment as where recommended examples of behaviours, called programs, happen. There is a correspondence between the nature of the physical milieu and a decided number and kind of collective behavior taking place in it. As per environmental psychology, realizing the setting will give information about the quantity of projects (i.e., practices) in it. Such projects are intermittent exercises, consistently performed by people holding specific roles. A church for example, incites practices like explaining, listening, praying, singing, and so on, however each sort of activity is performed by people endorsing particular roles. As per his/her job, the priest is a 'performer' and the congregation are 'non-performers'. This setting also has a layout and particular furniture which fits that purpose and fixes the program, i.e., what type of behaviour should happen in it. The so called 'behaviour setting'' (i.e., the physical place and the behaviours) figures out what sort of behaviour is suitable and along these lines can or ought to happen. Patterns of behaviours (e.g., worshipping) as well as settings (e.g., churches) are nevertheless independent: a religious office can be held in the open air, and the church can be utilized for a concert. It is their role-environment structure or synomorphology that creates the behaviour setting. Barker's examination supposes interdependency between aggregate patterns of behaviour, the program, and the actual space or milieu wherein these behaviours happen. Behaviour should be unique in the particular setting and subject to the setting in which they happen. Settings are delimited places, for example, inside dividers, wall, or emblematic hindrances. They can be distinguished and depicted. Obstructions between settings also delimit programs. Knowing about the setting (e.g., its purpose or intention) infers the common behaviour of individuals in that setting. Barker's conceptualisation allows a comprehension of environment behaviour relationships such that space might be organised with a specific goal in

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mind to meet its different purposes. Behaviour settings are dynamic structures that advance over the time (Wicker, 1979, 1987). Staffing (formerly manning) theory completes Barker's methodology, by proposing a bunch of ideas identified with the number of individuals the behaviour setting needs to be functional (Barker, 1960, Wicker and Kirkmeyer, 1976). Besides key concepts like performers who do the essential tasks, and the non-performers who observe, the minimum number of individuals expected to keep up the working of a behaviour setting is known as the maintenance minimum, and the maximum, its capacity. Candidates are individuals trying to become part of the behaviour setting. Overstaffing or understaffing is an outcome of too few or an excessive number of candidates for a behaviour setting. The outcomes of understaffing are that individuals need to work more earnestly and should endorse a greater scope of various jobs to keep up the working of the setting. They will also feel more dedicated to the gathering and embrace more significant jobs. On the other hand, overstaffing requires the fulfilment of adaptive measures to maintain the functioning.

Behaviour settings and staffing theory are useful instruments to take care of environmental design problems and to improve the working conditions. Barker's methodology has been effectively applied to the analyses of workplaces, schools and small towns. It assists in documenting the community life and enables the evaluation of the structure of organizations in terms of efficiency and responsibility.

Check Your Progress

4. What does Yerkes-Dodson law state?
5. What is adaptation level theory?

5.4 ANSWERS TO CHECK YOUR PROGRESS QUESTIONS

1. Man's capacity to survive in variety of ecosystem and his exceptional capacity to adjust to extraordinary external conditions make man-environment relationship an interesting area of study.
2. A theory is a well-established principle that has been created to clarify some aspects of the natural world.
3. The primary difference between the theoretical and conceptual framework is that a conceptual framework is the idea of the analyst on how the problem of the research should be investigated.
4. Yerkes-Dodson law states that performance is maximum at intermediate levels of arousal and deteriorates as arousal either falls below or transcends this ideal point.
5. Adaption level theory, otherwise called AL Theory is a psychological idea which explains that the principle of a person's judgment on a stimulus depends

upon their past experiences or memories of the experiences they have had with similar stimulus before.

5.5 SUMMARY

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- With the development in social and economic activities, progression in innovations, man extended his own current environment through plan, design and skill to have arrangements for improved and better food, safe house, access, luxuries and solace.
- The investigation of connections among man and environment has consistently been, somehow, a central theme in environmental study. Be that as it may, the features of man-environment relationship change through time with the improvement of human society and the dimension of environment.
- A significant number of the present ecological issues are progressively the results of individual activities, individual customer choices, and the exercises of small and big organizations.
- Theory is a well-established principle that has been created to clarify some aspects of the natural world. Theories emerge from observations and testing that have been completed over and again and they fuse facts, predictions, laws, and tried presumptions that are generally acknowledged.
- The primary difference between the theoretical and conceptual framework is that a conceptual framework is the idea of the analyst on how the problem of the research should be investigated.
- Theories are created to explain predict and enhance the understanding of the phenomena. Theories challenge and expand the range of information within the boundaries of critical limiting assumptions.
- Since environmental psychologists are in a situation to comprehend individual in-environment questions, the historical backdrop of environmental psychology has been firmly impacted by the need to address questions posed by the practical concerns of architects, planners and other professions answerable for the planning, design and management of the environment.
- Arousal theory, environmental load, and adaptation level give great delineations of theories which are basically behaviourist in their assumptions and deterministic in their environment behaviour orientation.
- From an environmental behaviour viewpoint, as environment stimulation from crowding, noise, heat or some other source builds arousal, performance will either increase or decrease.
- Yerkes-Dodson law indicates that performance is maximum at intermediate levels of arousal and deteriorates as arousal either falls below or transcends

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this ideal point. For complex tasks, the optimum level of arousal happens marginally lower than simple tasks.

- Arousal theory specifies that the environment gives a specific measure of physiological stimulation which, contingent upon the person's interpretation and attribution of the causes, has specific behavioural impacts.
- As per Over-stimulation Approach individuals have a restricted ability to handle approaching stimuli, and over-burden happens when the measure of approaching stimuli surpasses the person's ability to deal with them.
- Once in a while the organisms' ability to manage the environment is exhausted or even drained. At the point when this happens, only the main information is taken care of, with any remaining data filtered through.
- Stimulation load theories are able to account for behavioural effects in stimulus deprived environment (e.g., certain practices happening on board submarines and in prisons). In other words, this methodology proposes that under stimulation can be just as aversive as overstimulation.
- Too much or too little stimulation can be bad for children. It is difficult to tolerate boredom, and numerous individuals think that it is horrendous.
- Helson developed the adaptation level theory of psychology. This theory states that a person's ability of judgment of a stimuli depends on his prior involvement or experiences of how they perceived similar stimuli in the past.
- The degree of stimulation at which an individual feels good depends upon his/her previous experience, or all the more decisively the natural conditions under which the person has grown up.
- Adaption level theory, otherwise called AL Theory is a psychological idea which clarifies that the premise of a person's judgment on a stimulus depends upon their past experiences or memories of the experiences they have had with similar stimulus before.
- Henry's theory explains the connection between the past encounters and the present day judgment of an individual, also alluded to as a person's adaptation level, numerically, by contemplating a wide variety of criteria, for example, the reference points of past decisions, mean of similar stimuli in order of their recency and remarkable quality, among others.
- Behavioural constraint approach presents the temporal dimension of exposure to ecological conditions, and alludes to singular norms of exposure (Moser, 2002, approaching). The impact of stressors is very much recorded, yet the discoveries are infrequently examined in terms of adaptation and before-after comparisons.
- While attention is for the most part given to attitude change and modifying behaviour in specific circumstances, the steadiness after some time of these behaviours is rarely examined.

- Adaptation is the ability to endure a constraining situation to the extent that it is consistent. Noticing behaviour in the metropolitan environment gives proof of the constraining conditions of the metropolitan setting.
- Barker's behaviour settings approach has both a hypothetical and methodological significance as it gives a system to analyzing the logic of behaviour in specific settings.
- Behaviour settings and staffing theory are useful instruments to take care of environmental design problems and to improve the working conditions.

5.6 KEY WORDS

- **Approach:** It is a way of dealing with something.
- **Arousal:** It is the action or fact of arousing or being aroused.
- **Stimulus:** It refers to a thing that rouses activity or energy in someone or something
- **Adaptation:** It is a change or the process of change by which an organism or species becomes better suited to its environment.
- **Behaviour settings:** These are theorized entities that help explain the relationship between individuals and the environment - particularly the social environment.

5.7 SELF ASSESSMENT QUESTIONS AND EXERCISES

Short-Answer Questions

1. What is the nature of theory in environmental psychology?
2. How is adaptation level theory a logical extension of arousal theory and overload approach?
3. What are the three fundamental behaviour specificities as an outcome of changing ecological possibilities?
4. Mention the limits of adaptability.

Long-Answer Questions

1. Describe the arousal theory.
2. Distinguish between over stimulation approach and under stimulation approach.
3. Explain the adaptation level theory with the help of examples.
4. Discuss Barker's behaviour settings approach.

5.8 FURTHER READINGS

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UNIT 6 ENVIRONMENTAL STRESS

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Structure

6.0 INTRODUCTION

Environmental stress refers to the emotional, behavioral and cognitive reaction to stimuli in the environment that cause stress. Some of the environmental stressors are natural calamities, air pollution, crowding, war, noise, etc. These stressors impact the lives of people to a great extent not just in terms of the immediate effects but the repercussions that are seen to prevail over a long period of time. Environmental stressors can typically be categorized into cataclysmic events, upsetting life events, daily hassles, and ambient stressors. In this unit, you will learn about the characteristics and types of environmental stressors and the effects of natural disasters.

6.1 OBJECTIVES

After going through this unit, you will be able to:

- Discuss the characteristics, attributes and types of environmental stressors
- Analyse the characteristics and effects of natural disasters

6.2 ENVIRONMENTAL STRESS APPROACH

Autonomic and cognitive factors join to frame an individual evaluation of stressors in the environment and categorize them as threatening or non-threatening. Stressors that are seen as threatening may prompt stress responses including physiological, emotional, and behavioural components, which may, in turn, evoke strategies intended to adapt to and possibly adjust to the threat.

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The actual environment influences individuals in a number of ways: how they feel, their opinions and how they act. Stress arises when the demands of the natural environment exceed a person's capacity to deal with those demands. Environmental stress alludes to a negative subjective psychological reaction to an environmental stimulus. Note that an environmental stimulus that is upsetting for one individual in a specific environment may not be distressing for another or for the same individual in an alternate environment. All things considered, environmental stress is a communication between an individual and an external stimuli.

Environmental stress has been studied in a wide range of indoor, outdoor and virtual settings, including work and residential environments. It has been studied in labs as well as in the field and has been a significant area of study for a long time, which continues to be studied today.

How does evolution shape the manner in which creatures react to environmental change? Do high variable environments elevate or obstruct variation to local conditions? Despite considerable attention to these inquiries from developmental scholars (Auld et al., 2010; Gabriel, 2005Gabriel and Lynch, 1992; Parsons, 2005; Via et al., 1995), answering them for a particular case remains extremely challenging, to some extent on the grounds that the appropriate responses rely upon both the temporal and spatial attributes of the environmental variation and the characteristics of the organism encountering them (Angilletta and Sears, 2011). An extra complication when thinking about the evolution of responses to environmental stressors stems essentially from the trouble of plainly characterizing what is implied by the word 'stress'. Is there a contrast between an ordinary homeostatic reaction to an environmental change and a stress response, and assuming this is the case, how might we draw a splitting line between them?

Shockingly, it isn't generally a simple task to choose what is implied when we use the word 'stress'. Since the time Hans (Selye, 1950) first presented the idea of stress as the non-specific response of the body to any demand'', there have been numerous fitting scrutinies of the idea, and attempts to explain its significance (Fink, 2009; Goldstein and Kopin, 2007; Johnstone et al., 2012; Koolhaas et al., 2011; Le Moal, 2007; McEwen and Wingfield, 2010; Romero et al., 2009). Despite these attempts, the definition stays questionable and ambiguous and the word is used in various contexts. Quite a bit of this confusion may originate from the fact that the stress research has grown independently across various fields of science, with generous inlets between those interested in stress from a biomedical viewpoint and those intrigued by the impacts of stressors in natural population (Bijlsma and Loeschcke, 2005; Boonstra, 2013). Another significant theoretical gap happens between those basically inspired by the whole organism phenomena of the glucocorticoid-mediated stress response (Wingfield, 2013) and those keen on different parts of response to environmental change like the cellular stress response (Kültz, 2005). Any broad meaning of the idea of stress ought to have the perspectives of these viewpoints.

6.3 ENVIRONMENTAL STRESSORS: APRAISAL AND CHARACTERISTICS OF THE STRESS RESPONSE

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Environmental stressors are stimuli that cause stress and result in the reduction of productivity, reproductive success, and ecosystem development. Stressors influence all organisms and their populations, communities, and ecoscapes (landscape and seascapes). Stressors might be natural in origin, being related with such environmental impacts as:

- competition, predation, disease, and other interactions among organisms
- constraints related to climate or to inadequate or excessive nutrients, moisture, or space
- disturbances such as wild fire and windstorms

The impacts of natural stressors are not generally negative. A few people, populations, and communities may profit by the impacts of environmental stress, even while others endure a level of harm.

Progressively, in any case, stressors related with human activities have the most basic impact on species and environments. In such a large number of cases, anthropogenic stressors are making significant harm assets that are expected to support individuals and their economy, and furthermore to characteristic biodiversity and environments. Rapidly spreading fire, windstorms, and bug episodes can be broad aggravations that influence biological systems at a large scale.

Ecological stress may occur as an intense, short-lived event of destruction, otherwise called a disturbance. Then again, stressors may exert their influence throughout an all-encompassing timeframe – that is, in a chronic manner. The interaction of organisms with a stressor at a particular place and time is called exposure. Exposure can be instantaneous, or it might happen over a long period of time. If an exposure is intense enough, it will cause a type of biological or ecological change, called a response, to happen. It is imperative to see, in any case, that human population and communities are equipped for tolerating a range of intensity of stressors without enduring critical harm. At the end of the day, certain limits of biological or ecological tolerance should be surpassed before harm is caused.

Damage happens when one stressor or more than one stressor elicit reactions that can be deciphered as a degradation of environmental quality. Such responses may include illness or death caused by an exposure of wild creatures to pesticides, or as a decrease of the productivity of ecosystems, or the danger of vulnerable components of biodiversity. In this part, we look at an applied system for the investigation of harm brought about by stressors.

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6.3.1 Characteristics of Environmental Stressors

Environmental stressors are typically considered to be categorized as one of four particular classes: cataclysmic events, upsetting life events, daily hassles, and ambient stressors (Evans and Cohen 1987). Calamitous occasions involve abrupt catastrophes that affect a large number of people simultaneously. For example, floods, major storms, earthquakes, volcanic emissions, nuclear power plant accidents, synthetic plant mishaps, and the closure of chemical treatment plants have a place within this classification. Disastrous occasions are seldom predictable, neither regarding their start, nor concerning their course, however, they are typically expected to be fairly short.

Stressful life events are major life events occurring in the course of an individual's life that require major individual adaptive responses. Such occasions include significant changes for work, or private climate, e.g., starting a new position, moving to another neighborhood, significant development work in the present local location, or a significant detectable change in the working states of a close by stressor. The occasion as such is generally short, however, the conduct results might be long, or perpetual.

Daily hassles are quite common and include events such as disagreements with partners, crowding in study halls, and traffic congestion on the daily route to work. In spite of the fact that they are pretty much common and unsurprising, the individual has little intention to keep away from such problems, and the term falls somewhat short.

Ambient stressors is a term proposed by Campbell (1983), indicating more consistent and intractable background attributes of the physical environment. They regularly go unnoticed, like consistent murmur of the air-conditioning, the permanent dust in an industrial area, and the faint hiss of the central heating system. A great number of people accept that they can adjust to encompassing stressors, and they think about the expenses of adapting to such stressors to be higher than basically suffering from them.

Likewise, every type of environmental stressor can be characterized along several dimensions, of which we notice just three.

(a) The significant dimension is the level of controllability over the environmental stressor. Control might be either direct (e.g., turning off the neighbor's loud grass mower), indirect (e.g., shutting the windows to diminish the clamor), social (e.g., calling specialists to stop the commotion), or cognitive (e.g., realizing that the commotion will stop in about 60 minutes). It has frequently turned out that stress effects decrease with increased control, but sometimes control has secondary stress effects (e.g., shutting the windows will build the temperature inside the house).

(b) Related to cognitive control is the predictability of the stressor. High predictability of the event and time course of an aversive agent may induce individuals to adapt to it. For example, occupants nearby city rail frameworks for the most part realize precisely the timetable of the trains and only occasionally gripe about commotion and vibration, however they feel bothered when a train is absent. On the other hand, realizing in advance that another air terminal will open in the area causes more prominent pressure impacts than realizing that the old air terminal will shut in the area (Hatfield et al. 1998).

(c) Stressors might be pretty much perceptually salient or identifiable. Some environmental agents are of rather low intensity and may either be not recognized at all (e.g. perceptually salient or identifiable), others are possibly distinguished when intensity changes. On the off chance that an environmental agent is not perceptually salient, stress responses may happen on the grounds that individuals get educated about possible hazards, and the sort and level of stress reactions relies especially upon the content of information and the credibility of its source.

6.3.2 Types of Stressors

The assorted sorts of natural stressors are assembled into classes, despite the fact that they are not completely elite.

1. Physical stress is a disturbance in which there is an extraordinary exposure to kinetic energy, which harms habitats and ecosystems. Examples include such problematic occasions as a storm or hurricane, a seismic ocean wave (tidal wave), the impact of a volcanic emission, a blast, or stomping on by large equipment or explorers.
2. Wildfire is another unsettling influence, which includes the uncontrolled burning of the biomass of a biological system. A wildfire can be ignited by individuals, or normally by lightning. A serious fire consumes much of the biomass of an ecosystem, but even a less-severe wildfire may kill numerous life forms by scorching and poisoning by toxic gases.
3. Chemical pollution occurs when one or more than one substances occur in a concentration sufficiently high enough to elicit physiological reactions in living beings, possibly causing harm and ecological change. Compound stressors incorporate pesticides and gases, for example, ozone and sulfur dioxide, and poisonous components like arsenic and mercury. Contamination may likewise be brought about by extreme supplements, which can contort productivity and other natural capacities. Note that the simple presence of a conceivably poisonous substance doesn't really cause contamination.
4. Thermal contamination is brought about by the arrival of warmth (nuclear power) into the climate, which brings about natural pressure since species

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fluctuate in their resilience of temperature limits. Warm pressure may happen at common springs and submarine vents where geographically warmed water is discharged. It is likewise connected with releases of high temperature water from power plants.

5. Radiation pressure is brought about by unnecessary openness to ionizing energy. The radiation might be produced by atomic waste or blasts, or it very well may be demonstrative X-beams or sun oriented bright energy.
6. Climatic pressure is related with deficient or over the top systems of temperature, dampness, sun based radiation, wind, or mixes of these.
7. Biological stressors are related with communications happening among organic entities, like competition, herbivory, predation, parasitism, and illness. For instance, people of the equivalent or various species may vie for fundamental assets that are restricted in stock. Herbivory, predation, parasitism, and infection are trophic communications, in which one animal type abuses another. Abuse can be anthropogenic, as when people gather wild creatures or trees, or it tends to be common, maybe connected with defoliating creepy crawlies or infection causing microorganisms.

Biological pollution occurs when individuals discharge organic entities beyond their natural reach. This may include the presentation of outsider species that attack and adjust characteristic living spaces, or it could be the arrival of microorganisms into the climate through releases of crude sewage.

Ecological Responses

An environment that has been influenced by disturbance normally suffers mortality among its species, alongside harm to its primary properties (like species composition furthermore, biomass distribution) and functional attributes (like profitability and nutrient cycling). When the disturbance event is over, an interaction of recuperation through succession starts. If the succession continues for a long sufficient time, it will reestablish another biological system, maybe one like that current before the disturbing influence. Chronic stressors work throughout longer timeframes (as opposed to events), and they incorporate climatic elements and numerous sorts of chemical and thermal contaminations. Contingent upon the intensity of exposure, living beings may endure intense acute toxicity about tissue harm or even demise, or a more subtle persistent harm that results in decreased productivity.

Exposure to a higher intensity of ecological stressors can bring about evolutionary changes if individual living beings shift and vary in tolerance and those distinctions are based on heredity. Under such conditions, regular choice for open-minded people will in the end bring about expanded tolerance at the population level. At the local area level, generally weak species will be decreased or dispensed with from the environment especially if the intensity of stress increases. The specialties of those species may then be occupied by more tolerant individuals from the

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community, or by invading species that are capable of misusing a stressful yet weak competitive environment.

A prolonged strengthening or intensification of stress will cause long-term environmental change to happen. Consider, for instance, a case wherein a new metal smelter is developed in a forested scene. If the smelter transmits poisonous sulfur dioxide gas, the harmful toxic stress will harm the tree-sized plants of the woods and in the long run cause them to offer approach to bush measured and herbaceous vegetation. If the long stress severe, the landscape could completely lose its vegetation. This sort of harm has really happened around various Canadian smelters, like those close to Sudbury.

This sort of environmental harm includes changes in the composition and dominance of species in communities, in the spatial dissemination of biomass, and in capacities like efficiency, litter decomposition, and nutrient cycling. Since a smelter is a discrete point source of environmental stress, the ecological responses in the end stabilize as gradient of community change that transmit outward, a downwind or downstream direction from the source of pollution.

The intensity of a stressor may likewise diminish in existence. At the point when this occurs, the ecological reactions are, in numerous regards, the opposite of the harm that happens when the stress increases. These progressions address a cycle of recovery through succession. On account of the Sudbury smelters, outflows of toxins have diminished significantly in light of the establishment of pollution control technologies. This has resulted in significantly less harmful stress in the surrounding environment, which has permitted some ecological recovery to take place.

Ecologists have depicted the general attributes of ecosystem that have been exposed to serious stress for a while. All in all, as environmental stress strengthens fundamentally, (for example, by expanding contamination), the accompanying changes are noticed:

- mortality builds, particularly of the most weak species
- species' richness diminishes
- the stocks of nutrients and biomass become drained
- the pace of community respiration surpasses that of production, so the net creation gets negative.
- delicate species are replaced by more tolerant ones
- top hunters and large bodied species might be lost from the environment
- previously self-maintaining environments may require dynamic administration to sustain their desirable attributes, for instance, to keep up declining populaces of rare or economically significant species that have gotten undermined

Biological systems that are constantly presented to extreme stress, (for example, environment focused on tundra) ultimately stabilize. Normally, the stable

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environments are low in species richness, simple in structure and function, and dominated by generally small, long lived species. Also, they have low paces of efficiency, disintegration, and nutrient cycling.

If an increase in environmental stress has an anthropogenic causation, the subsequent ecological changes are regularly considered to represent damage and are seen as a degradation of environmental quality and ecological integrity.

Check Your Progress

1. What does environmental stress allude to?
2. What are the four classes of environmental stressors?
3. When does chemical pollution occur?
4. What is climatic pressure related to?

6.4 NATURAL DISASTERS AND THEIR CHAACTERISTICS

Natural disasters are catastrophic events that result from any of the Earth's natural phenomena. These can range from floods and tropical storms to tidal waves and earthquakes. The Earth, over its 4.54 billion-year history, has seen numerous catastrophic events. Some of these events have prompted a few mass eliminations and drastic repercussions for various enduring species.

A natural disaster can be characterized as:

> "A significant event brought by the natural processes of the Earth that makes widespread destruction to the environment and death toll."

A natural hazard is generally perceived before a natural disaster. For example, the Gujarat Earthquake, which happened on 26th January, 2001 is a natural disaster. The natural hazard is living under the active fault lines present under the territory of Gujarat.

Nonetheless, some regular risks can likewise be incited or influenced by anthropogenic components. For example, avalanches can be set off by deforestation, mining and agrarian exercises.

Natural disasters frequently cause destruction on a massive scale. Certain natural disasters, for example, wildfire cause destruction of creature territory and just as much harm to property and death toll.

A natural disaster is a major destructive event occurring because of natural processes of the Earth; which include floods, typhoons, cyclones, volcanic emissions, quakes, torrents, storms, and other geologic cycles. A natural disaster

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can cause death toll or harm property and regularly leave some financial repercussions afterward, the seriousness of which relies upon the influenced populace's resilience and on the infrastructure available.

In the present times, the distinction between normal, man-made and man-accelerated is very hard to draw with human decisions like architecture, fire, resource management or even environment change conceivably. An unfavorable event won't increase the disastrous effects of a catastrophe if it happens in a zone without vulnerable population. In a weak zone, notwithstanding, like Nepal during the 2015 seismic tremor, an adverse event can have disastrous outcomes and leave enduring harm, which can require a long time to fix.

Disturbance is a natural force that influences all biological systems. For instance, a wild fire may kill mature trees over a large territory, however that occasion of obliteration is trailed by recovery through progression. Fire is common in the boreal forest and in dry season inclined biological systems like grassland and savannah. By and large, around 2-million hectares of timberland consumed every year in Canada, is generally burned down by lightning. Rapidly spreading fire changes the environment conditions and furthermore causes extreme contamination by the outflow of particulates and gases like carbon dioxide and nitrogen oxides to the environment.

Other natural agents of disturbance incorporate tropical storms, cyclones, floods, and even glaciation (throughout geologic time). These likewise cause enormous natural harm, which is followed by successional recovery. After glaciation, which includes prolonged burial and abrasion of the land by a huge mass of ice, the post-melting recovery is initiated by moving living beings that colonize the crude scene.

A volcanic eruption or earthquake can produce at least one or more devastating oceanic waves, or tsunamis. In 1883, the destructive eruption of the volcanic island of Krakatau in Indonesia made a 30-m wave that killed around 36, 000 people. In 2004, more than 2,25,000 people were killed by a torrent in the Indian Ocean. In 2011, a subsea quake produced a torrent of up to 40.5 m that crushed beach front areas, headed out up to 10 km inland over low-lying landscape, caused in any event 18,000 deaths., annihilated countless buildings and structures, and made a mechanical emergency when flooding rendered inoperable the control frameworks of an enormous thermal energy station.

The impact and warmth of a volcanic emission can likewise harm environments, as happened in 1980 when Mount St. Helens in Washington erupted in a pretty much sideways impact. The blast blew down 21,000 ha of conifer woodland, executed another 10-thousand ha by heat injury, and in any case harmed an extra 30-thousand ha. There were additionally wrecking landslides, and a tremendous zone was covered with particulate ejecta (known as tephra) that settled from the air 50-cm or all the more profound.

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A volcanic emission can likewise discharge tremendous measures of sulfur dioxide, particulates, and different toxins high into the air. Around 2-5 million tons of SO_2 (communicated as the sulfur substance, or SO_2-S) are discharged by volcanoes in a commonplace year, and an individual emission may transmit more than 1-million tons. This common SO2 adds to the acidification of precipitation and to other ecological harm.

Natural population outbreaks of herbivores, predators, or microorganisms can likewise bring about extreme harm to natural environments. For example, the spruce budworm (Choristoneura fumiferana) intermittently defoliates colossal regions of conifer forest in eastern Canada (in excess of 55 million hectares in 1975). This causes broad mortality of fir and tidy trees and other environmental harms. A recent outbreak of the mountain pine-bug (Dendroctonus ponderosae) has similarly caused severe harm to pine backwoods in western Canada and the northwestern U.S., with around 36 million ha affected. A marine model is the green sea urchin (Strongylocentrotus droebachiensis), which at times irrupts in rough sub tidal natural surroundings off Nova Scotia.

These invertebrates can over-gaze mature "timberland" of the kelps Laminaria and Agarum, bringing about a "barren ground" with significantly less productivity and biomass. After the number of urchin collapses, the kelp woodland rapidly restores.

Micro disturbances are likewise a typical system of natural ecosystems. Instances of these more limited size disturbing influences include the death of huge individual trees inside an otherwise intact forest , maybe brought about by disease or an accident , (for example, a lightning strike). This makes a natural gap in the canopy, underneath which a micro succession happens as plants compete to take advantage of temporary resource opportunities such as extra light. The foliage of mature trees, in the long run, fills the gap. Also, the death of an individual coral head inside a generally flawless reef starts a micro succession inside that marine biological system.

Scientists attempt to comprehend the impacts of regular disaster influences and to apply that information to plan the broad framework that permits assets to be reaped or in any case utilized while controlling the subsequent environmental harm. For instance, understanding the characteristics of gap-phase disturbances in an old-growth forest can help in the plan of a specific gathering framework that imitates the natural disturbance regime. The utilization of that sort of framework will leave the physical and biological purity of the woodland considerably flawless, even while singular trees are intermittently reaped for business use. Those people would be replaced by natural regeneration. Taking into account the natural, gap-phase disturbance dynamics of old-growth forest, clear-cutting followed by the planting of tree seedlings might be considered a less "natural" management system.

However, clear-cutting may be a fitting practice to utilize when harvesting forest that is adapted to community replacing disturbances, like wild fire or insect outbreaks.

6.4.1 Effects of Natural Disasters

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The impacts of a disaster depend upon the attributes of the exposed elements and on the nature of the event itself. By and large, the components in danger are the population, the environment and physical structures in housing, industry, trade and public administrations.

The impacts can be classified as direct or indirect losses. Direct losses are identified with actual harm, reflected in the number of casualties, in harm to the foundation of public administrations, harm to buildings, the metropolitan zone, industry, exchange, and disintegration of the environment, that is, actual modification of the environment.

The indirect loss can ordinarily be classified into social impacts like the interference of transportation, public administration, and the media, and the negative picture that an area may secure regarding others; and monetary impacts like interruption of exchange and industry as an outcome of the decrease in production, disincentives for investment, and the cost of rehabilitation and restoration.

In various developing nations, like the nations of Latin America and the Caribbean, there have been calamities in which a large number of individuals have died and countless dollars have been lost in twenty or thirty seconds. Frequently the immediate and backhanded expenses can't be determined, yet add up to a colossal level of a nation's GDP. Because of the recurrence of various types of disasters in several nations of the region, average annual losses add up to a critical level of the gross national product. Clearly, this leads to impoverishment of the populace and stagnation, since it involves unanticipated uses that influence the equilibrium of payment and, all in all, the financial improvement of a country.

If existing levels of danger are to be diminished, preventive measures against the impacts of calamities ought to be viewed as a fundamental part of comprehensive development at the territorial and metropolitan level. Given that disasters of the size mentioned above can genuinely affect the development of affected communities, the expense of taking preventive measures should be estimated against that of recovery from calamities, and danger examinations should be remembered for the evaluation of the social and monetary parts of each locale or country.

Natural disasters – like storms, typhoons, quakes, landslides, floods, wild fires, volcanic emissions and climate occasions like outrageous dry seasons and rainstorm – are likely to become more frequent because of environmental change. These occasions carry with them a large group of issues, including humanitarian, general well-being, natural and infrastructural issues.

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Humanitarian Crises

Environmental change and accompanying natural disasters have created an enormous migrant populace, called climate refugees or environmental migrants. These individuals are seen to be forced out of their homes by an unexpected catastrophic event, similar to a wave, or a more slow moving cataclysmic event, similar to a relentless drought. Regardless, the area where they once lived is not, at this point, habitable for one or the other reason, or the way of life has dropped to the extent that the uncertain migration life looks more promising.

It is anticipated that before the century is over, there will be 2 billion environment refugees and migrants. Out of an extended populace of 11 billion by 2100, that is just about 1/5th people on earth. The vast majority of these individuals will have lived along the coastlines.

Public Health Issues

Health problems are quite possibly the most pressing issues after any natural disaster. It is frequently the situation that facilities for water and latrine cleanliness are damaged or inoperable implying that the protected removal of human waste rapidly turns into a general public health hazard. Further, without running water, hand washing and food cleanliness deteriorate.

During and after events like storms and floods, standing water can be a favorable place for pathogenic microscopic organisms and infection vectors like mosquitoes. In situations where transportation abilities and framework are harmed, overcomers of cataclysmic events can be cut off from life-saving medications for both intense and ongoing conditions, and be secluded from rescue and emergency medical care.

After a natural disaster, survivors can encounter mental health consequences, including post-traumatic stress disorder, or PTSD.

Environmental Problems

In March 2011, a torrent following the 9.0-size Tôhoku tremor in Japan caused what came to be known as the Fukushima Daiichi atomic calamity, where radioactive material was released in Japan and into the Pacific Ocean. This was the biggest atomic catastrophe since Chernobyl, and it caused a cascade of issues in the ecosystem and surrounding waters, spreading radioactive material through far-running sea flows.

Natural disasters from tsunamis and wildfire can cause wide-ranging and long-term consequences for ecosystems: spreading pollution and waste, or essentially demolishing habitats.

Infrastructural Damage

Quite possibly the most quick and financially wrecking worries with natural disasters is the harm to both public and private infrastructure. These occasions can cause a loss of billions of dollars and not all governments are prepared to subsidize the cycle of post-catastrophe cleanup and remaking.

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Further, numerous private mortgage holders don't have property protection, and certain catastrophic events fall outside of the extent of protection inclusion; this implies that in the wake of a disaster, individuals can end up losing the entirety of their resources with no chance for compensation.

Natural disasters can have long-term negative results beyond the initial death toll and destruction of infrastructure. Frequently, an area affected by a natural disaster will show scars of the event for quite a long time to come.

Check Your Progress

5. What is a natural disaster?
6. What quantity of SO_2 do volcanoes discharge?
7. What do the impacts of a disaster depend upon?

6.5 ANSWERS TO CHECK YOUR PROGRESS QUESTIONS

1. Environmental stress alludes to a negative subjective psychological reaction to an environmental stimulus.
2. Environmental stressors are typically considered to be categorized as one of four particular classes: cataclysmic events, upsetting life events, daily hassles, and ambient stressors.
3. Chemical pollution occurs when one or more than one substances occur in a concentration sufficiently high enough to elicit physiological reactions in living beings, possibly causing harm and ecological change.
4. Climatic pressure is related deficient or over the top systems of temperature, dampness, sun based radiation, wind, or mixes of these.
5. A natural disaster is a major destructive event occurring because of natural processes of the Earth; which include floods, typhoons, cyclones, volcanic emissions, quakes, torrents, storms, and other geologic cycles.
6. Around 2-5 million tons of SO_2 (communicated as the sulfur substance, or SO_2-S) are discharged by volcanoes in a commonplace year, and an individual emission may transmit more than 1-million tons.

7. The impacts of a disaster depend upon the attributes of the exposed elements and on the nature of the event itself.

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6.6 SUMMARY

- Stressors that are seen as threatening may prompt stress responses including physiological, emotional, and behavioural components, which may, in turn, evoke strategies intended to adapt to and possibly adjust to the threat.
- An extra complication when thinking about the evolution of responses to environmental stressors stems essentially from the trouble of plainly characterizing what is implied by the word 'stress'.
- Environmental stressors are typically considered to be categorized as one of four particular classes: cataclysmic events, upsetting life events, daily hassles, and ambient stressors.
- Stressful life events are major life events occurring in the course of an individual's life that require major individual adaptive responses.
- Related to cognitive control is the predictability of the stressor. High predictability of the event and time course of an aversive agent may induce individuals to adapt to it.
- Physical stress is a disturbance in which there is an extraordinary exposure to kinetic energy, which harms habitats and ecosystems. Examples include such problematic occasions as a storm or hurricane, a seismic ocean wave (tidal wave), the impact of a volcanic emission, a blast, or stomping on by large equipment or explorers.
- Radiation pressure is brought about by unnecessary openness to ionizing energy. The radiation might be produced by atomic waste or blasts, or it very well may be demonstrative X-beams or sun oriented bright energy.
- The intensity of a stressor may likewise diminish in existence. At the point when this occurs, the ecological reactions are, in numerous regards, the opposite of the harm that happens when the stress increases. These progressions address a cycle of recovery through succession.
- A natural disaster can cause death toll or harm property and regularly leave some financial repercussions afterward, the seriousness of which relies upon the influenced populace's resilience and on the infrastructure available.
- The impacts of a disaster depend upon the attributes of the exposed elements and on the nature of the event itself. By and large, the components in danger are the population, the environment and physical structures in housing, industry, trade and public administrations.

- If existing levels of danger are to be diminished, preventive measures against the impacts of calamities ought to be viewed as a fundamental part of comprehensive development at the territorial and metropolitan level.
- In situations where transportation abilities and framework are harmed, overcomers of cataclysmic events can be cut off from life-saving medications for both intense and ongoing conditions, and be secluded from rescue and emergency medical care.

6.7 KEY WORDS

- **Environmental Stress:** It alludes to a negative subjective psychological reaction to an environmental stimulus.
- **Homeostatic Reaction:** It is the tendency of a system, especially the physiological system of higher animals, to maintain internal stability, owing to the coordinated response of its parts to any situation or stimulus tending to disturb its normal condition or function.
- **Ecoscape:** It is the organizational shape or layout of an ecosystem.
- **Herbivory:** It is a form of consumption in which an organism principally eats autotrophs such as plants, algae and photosynthesizing bacteria.
- **Geologic Time**: It the extensive interval of time occupied by the geologic history of Earth. Formal geologic time begins at the start of the Archean Eon (4.0 billion to 2.5 billion years ago) and continues to the present day.

6.8 SELF ASSESSMENT QUESTIONS AND EXERCISES

Short-Answer Questions

1. Define environmental stressors.
2. List the environmental impacts with which environmental stressors are related.
3. What are the different types of control over the environmental stressor?
4. Write a short note on biological stressors.
5. How can natural population outbreaks of herbivores, predators, or microorganisms bring about extreme harm to natural environments?
6. Write a short note on direct and indirect losses caused by natural disasters.

Long-Answer Questions

1. Discuss the attributes of environmental stressors.
2. Explain the three dimensions of every type of environmental stressor.

3. Analyze some recent natural disasters that have taken place in different parts of the world.
4. Examine the public health issues caused by natural disasters.

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6.9 FURTHER READINGS

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UNIT 7 ENVIRONMENTAL NOISE POLLUTION

Structure

7.0 INTRODUCTION

The advancement of technology have shifted focus away from the increasing number of technological catastrophes. As technology becomes increasingly complicated, technological catastrophes are bound to increase. Since the Industrial Revolution, humans have produced a large number of technological systems. At times these systems do not operate properly and malfunction, and sometimes these malfunctions lead to technological disasters. Technological disasters are defined as one that brings on a major crisis, threatens the feasibility of a technological system, causes many losses of lives and property, and may create danger to the social environment in which it occurs. In simple words, a technological failure takes place due to an unexpected breakdown of one or more parts of a technological system. Moreover, in this unit, we will study about the meaning, measuring methods and sources of noise. Noise can bring about some estimated changes in behaviour by covering speech and acoustic variation and by its action as a stressor. On the basis of the results from laboratory and naturalistic settings, there are three factors which provide a platform for an exhaustive theory of the social effects of noise, viz., social interaction is disrupted by the masking of sounds, the weighting of interpersonal judgments is changed and noisy settings are perceived as aversive, which governs

the utility of social engagement. In this unit, we will study in detail about the technological catastrophe and noise.

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7.1 OBJECTIVE

After going through this unit, you will be able to:

- Describe the meaning and characteristics of technological catastrophe
- Explain the meaning and the ways of measuring noise
- Discuss the psychological effects of noise and also its effects on performance
- Explain the relationship between noise and social behaviour

7.2 TECHNOLOGICAL CATASTROPHE

Disaster attributed, to a limited extent or altogether, to human intent, mistake, negligence, or involving a failure of a man-made system, bringing about critical injuries or deaths is called technological catastrophe or natural catastrophe.

A technological catastrophe is a calamitous occasion that is brought about by either human error in controlling technology or a malfunction of a technological system. Innovation based disasters are just about as genuine as natural disasters. In some cases, warning signs of the disaster may continuously show up over a couple of years, yet different effects may quickly upset society and business.

Disasters brought about by technology include the breakdown of systems, hardware and engineering standards that damage individuals and the climate. The actual term incorporates a wide range of present day issues and outcomes of technological mismanagement and designing errors. Technological disasters include structural collapses, like bridges, mines and structures, as well as modern mishaps, like chemical and atomic bomb explosions. The impacts of contamination, similar to smog and acid rain, are long term man-made disasters. Dealing with short term catastrophes might be straightforward, but addressing chronic issues might take some time and may even put public and the government on opposite sides in solving them. It could be difficult to pinpoint who is eventually liable for the cause of a complex disaster and paying for the expenses of recuperation.

The disaster may go unnoticed or may take place because of a single significant event. For instance, if a train derails and spills chemical near a human habitat, the population is evacuated and the event is taken into cognizance. But if low level of chemical contamination happens for a long period of time then there might be no individual or an institution to be blamed. Acute disasters are for a short time and well-defined events that may have long term repercussions. This might be a one-time oil spilling from ship tankers or a breach in a mining region. A

technological disaster like a flood may break an underground fuel storage tank. Nonetheless, disasters are bound to happen persistently due to repeated practices that are disregarded and not reported on time. Chronic problems are generally uncovered after acute events. For instance, toxins that are illegally dumped will seep into the groundwater. Manufacturing companies which do not control their storm water runoff may flood the nearby environment with toxins.

Mishaps or catastrophes can be the aftereffect of natural or man-made disasters. Technological disasters, civil unrest, terror acts and pre-planned clashes are viewed as man-made disasters. Contrary to that, technological disasters include transport mishaps, mishaps in manufacturing units, blasts, chemical substance leak, etc. The most significant disasters are associated with fires. With the increase in the density of population, fire risks likewise also grow, including the danger of being trapped or killed in a fire. Danger to human existence and wellbeing, potential harm to property and climate brought about by fire are viewed as fire hazard.

7.2.1 Characteristics of Technological Disasters

Now as we know, a technological disaster is an event happened due to the malfunction of a technological structure or potentially some human error in controlling or taking care of the technology. Technological disasters can be viewed as man-made disasters which means there is an "identifiable cause" characteristic. Because of this characteristic, impact on communities can frequently be more detrimental (Goldsteen and Schorr 1982). The impacts of a disaster on people might be long lasting and they can suffer for quite a long time. Notwithstanding, side effects may show up progressively and may not be seen right away.

Though all types of calamities are challenging, the technological disasters are generally more difficult due to the following attributes:

- The threat cannot be envisioned. A technological disaster is abrupt, sudden, and variable.
- People are responsible. Casualties or victims of technological disasters will in general feel outrage toward individuals who were answerable and responsible for the accidents that may have been prevented.
- Community breakdowns and conflicts may take place. Technological disasters can give rise to disputes within communities.
- Longer Recovery—Community members will in general focus on litigation and blame, and less on cleanup and recovery (Picou, Marshall, and Gall 2004).
- Media Exposure—Media covering a technological disaster can be steady adding to already high levels of stress and anxiety (Morris, Grattat, Mayer and Blackburn 2013).

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Technological disasters in general influence specific occupational groups. On account of the Deepwater Horizon/BP oil spilling, the fishing and the travel industry were severely impacted as damaged renewable natural resources (Grattan et al. 2017). Likewise, the social and economic impact of this catastrophe was widespread, affecting networks in five beach front states. Numerous groups of people experienced these impacts, regardless of the fact that they did not have oil on their coast.

Check Your Progress

1. Define technological catastrophe.
2. Give some examples of technological disasters.

7.3 DEFINING, MEASURING AND PERCEIVING NOISE

Noise is undesirable sound which is thought to be unpleasant, loud and disruptive to hearing. From a physics viewpoint, noise is not different from sound, as both are vibrations through a medium, like air or water. The distinction emerges when the brain receives and perceives a sound.

Acoustic noise is any sound in the acoustic domain, either deliberate (e.g., music or discourse) or unintended. Interestingly, noise in electronics may not be perceptible to the human ear and may require instruments for detection.

In audio engineering, commotion can allude to the unwanted residual electronic noise signal that produces acoustic noise heard as a hiss. In experimental sciences, noise can allude to any random fluctuation of data that impedes perception of a signal.

Noise is an undesirable sound. It can be created by numerous sources - man's vocal cord, a running motor, a vibrating loudspeaker, an operating machine tool, etc.

There are two significant characteristics of sound or noise – frequency and loudness.

Sound is the rapidly varying pressure wave going through a medium. When sound travels through air, the atmospheric pressure varies periodically. The quantity of pressure variance per second is known as the frequency, and is estimated in Hertz (Hz) which is characterized as cycles per second. The higher the frequency, the more high pitched a sound is heard. The sound generated by drums have lower frequencies than those created by a whistle.

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Environmental Noise

Environmental noise is the accumulation of all noise present in a particular environment. The principle sources of environmental noise are motor vehicles, airplanes, trains and industrial sources. These noise sources expose a large population to noise pollution that creates inconvenience, and also gives rise to critical health consequences, for example, elevated incidence of hearing loss and cardiovascular disease. Urban noise is generally not of a magnitude that causes hearing loss but rather it intrudes on sleep, upsets communication and meddles with other human activities. There is a wide array of relief techniques and controls accessible to lessen sound levels including source intensity reduction, land-use arranging strategies, noise barriers and sound baffles, time of day use regimens, vehicle operational controls and architectural acoustics design measures.

Measuring and Perceiving Noise

Sound is estimated dependent on the amplitude and frequency of a sound wave. Amplitude measures how powerful the wave is. The energy in a sound wave is estimated in decibels (dB), the measure of loudness, or intensity of a sound; this estimation depicts the amplitude of a sound wave. Decibels are communicated in a logarithmic scale. Then again, pitch depicts the frequency of a sound and is estimated in hertz (Hz).

The primary instrument to measure sounds in air is the Sound Level Meter. There are various instruments that are utilized to measure noise – Noise Dosimeters are regularly utilized in occupational environments, noise monitors are utilized to measure noise in environments and noise pollution, and as of late smartphone-based sound level meter applications (apps) are being utilized to crowdsource and map recreational and community noise.

'A-weighting' is applied to a sound spectrum to address the sound that people are equipped for hearing at every frequency. Sound pressing factor is hence communicated regarding dBA. 0 dBA is the mildest level that an individual can hear. Ordinary talking voices are around 65 dBA. A live performance can be around 120 dBA.

Numerous elements impact how boisterous a sound appears, including how long it keeps going, the sound's frequencies (or pitches), and the environment where you hear the sound. Another significant and effectively estimated factor is sound intensity, or volume.

We measure sound intensity (also referred to as sound power or sound pressure) in units called decibels. Decibels (dB) are named out of appreciation for Alexander Graham Bell, the designer of both the phone and the audiometer. An audiometer is a gadget that estimates how well an individual can hear certain sounds.

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An advanced variant of it is used today to diagnose hearing loss. Decibels are not quite the same as other familiar scales of measurement. While numerous standard estimating gadgets, like rulers are linear and the decibel scale is logarithmic. This sort of scale better addresses how changes in sound intensity really feel to our ears. To get this, think about a structure that is 80 feet tall. On the off chance that we develop another 10 feet, the structure will be 12.5 per cent taller, which would appear to be simply marginally taller to us; this is a straight estimation. Utilizing the logarithmic decibel scale, if a sound is 80 decibels, and we add another 10 decibels, the sound will be multiple times more serious, and will appear to be about twice as boisterous and loud to our ears.

Sometimes we utilize various versions of decibels. 'A-weighted' decibels, or 'dBA' are frequently utilized when describing sound level suggestions for healthy listening. While the dB scale depends just on sound intensity, the dBA scale depends on intensity and on how the human ear reacts. Along these lines, dBA gives us a superior idea of when sound can harm your hearing.

The cochlea is a snail-moulded organ inside your inward ear that allows you to hear. The cochlea can react to a specific range of frequencies, or pitches of sound. The cochlea reacts best to frequencies in the range of human speech. It does not react to frequencies that are a lot sequential. At the point when sounds contain frequencies are excessively high or excessively low for us to hear—as in ultrasonic and infrasonic sounds—our cochlea does not respond to all.

In the frequencies that our ears react to best, estimations for dBA are as higher as they seem to be in dB. For example, the sharp E string on a violin has very much like dB and dBA levels. However, a lower frequency sound that is not processed as viably through the ear will have a lower output level. For example, the most reduced note on a tuba (16Hz) will have a much lower dBA reading than a dB reading.

Indeed, even little expansions in dBA level can immensely affect your hearing wellbeing. As dBA rises, your hearing is bound to be harmed, and more rapidly than you may anticipate. Sound is bound to harm your hearing in the event if it is:

- 85 dBA and you are exposed to it for 8 hours.
- 100 dBA and you are exposed to it for 14 minutes.
- 110 dBA and you are exposed to it for 2 minutes.

7.3.1 Noise Variables

Noise variables are difficult or impossible to control at the design and production level, but can be controlled at the analysis level, for example loads and material variation. A noise variable will have the nominal value as specified by the distribution, i.e., follow the distribution exactly.

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7.3.2 Sources of Noise

Given below are the significant causes/sources of noise pollution:

(i) **Industrial Sources:** Progress in technology (industrialization) has given rise to noise pollution. Textile mills, print machines, engineering establishments, metal works and so on contribute vigorously towards noise pollution. In industrial cities such as Kolkata, Ludhiana and Kanpur, generally the industrial zones are not separated from the residential zones of the city particularly on account of small scale industries. These carry out their work from workshops situated on the ground floors in the residential areas and cause inconvenience, distress and irritation to the occupants exposed to the noise that is unavoidably produced. The situation is vastly improved in present day planned cities like Chandigarh where the industrial area and the residential area are separated from each another by an adequately wide green belt.

(ii) **Transport Vehicles:** Automobile revolution in metropolitan places has ended up being a major cause of noise pollution. Rising traffic has given rise to traffic jams in congested zones where the continued hooting of horns by anxious drivers pierce the ears of others. Noise from airplanes has been a significant issue in large urban areas like Delhi and Mumbai. Air terminals are set up nearby densely populated areas and the airplanes fly over residential areas. Heavy trucks, freight car trains, airplanes, motorcycles, mopeds, jeeps, etc., contribute largely to the noise pollution.

(iii) **Household:** The household is an industry in itself and is a cause of numerous indoor noises like the slamming of doors, noise of playing kids, crying of babies, moving of furniture, loud conversations of the residents and so on. Besides, the music and entertainment system, blender processors, pressure cookers, desert coolers, air conditioners, exhaust fans, vacuum cleaners and washing machines in the house altogether cause noise pollution.

(iv) **Public Address System:** In India people need just an excuse for using loud speakers. The reasons can be a religious event, birth, demise, marriage, protests, business publicizing, etc. Public system, in this way, contributes in its own particular manner towards noise pollution.

(v) **Agricultural Machines:** Tractors, thrashers, harvesters, tube wells and so on have all made agribusiness profoundly mechanical and yet exceptionally noisy. Noise level 90 dB to 98 dB because of running of farm machines have been recorded in Punjab.

(vi) **Defense Equipment:** A great deal of noise pollution is added to the environment by big guns, tanks, launching of rockets, explosions, activities of military planes and shooting training.

(vii) **Miscellaneous Sources:** The auto repair shops, construction works, blasting, demolishing, stone crushing, etc., are different causes of noise pollution.

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7.3.3 Psychological Effects of Noise

A large number of studies have shown a link between noise pollution and increased anxiety, depression, high blood pressure, heart disease, and stroke. Given below are the psychological effects of noise:

- **Hindrance in language learning:** As per a child psychologist from the University of Wisconsin Madison, noise can go about as an obstruction in the learning abilities of a kid, particularly a language. Steady or constant background noise can prompt diminished capacity of understanding words that the youngster definitely knows, and furthermore of learning new ones.
- **Anxiety and depression:** The most well-known mental health disorders are also connected to noise. Various examinations have demonstrated that noise pollution is connected to uneasiness, wretchedness, hypertension, heart sicknesses and strokes. Consistent noise can make an individual restless. In 2011, researchers found that individuals who lived close to the air terminal in some European urban cities admitted to be taking 28% more anxiety medications with each 10-decibel increment in noise. Another examination found that individuals living in and around occupied roads had 25% more chances of slipping into depression than other people who lived on less bustling roads.
- **Stress Hormone (Cortisol):** Constant or continuous exposure to sound keeps cortisol, the stress hormone, active constantly. With time, this can be really harmful to the body – both physically and mentally. Steady exposure to noise can cause significant medical issues like respiratory failures and furthermore triggers anxiety.
- **Sleep issues:** Noise can disturb our sleep and rest. We may close our eyes but not our ears. Noise while sleeping can create issue with our wellbeing, thus impeding our rest schedule. Not getting enough sleep may create medical issues.
- **Everyday life troubles:** Noise can cause some personality changes – individuals become more bad tempered, crotchety, fierce and furious due to steady noise. They cannot focus and think and may end up committing senseless errors or failing to remember things. This creates havoc in regular day to day existence as well as increasing feelings of anxiety, prompting more health issues.

7.3.4 Effects of Noise on Performance

The impact of noise on human cognitive performance and brain activity has been frequently ignored. Noise has diverse negative impacts starting from interference with cognitive performance to harming physical and psychological wellbeing. The non-auditory impacts of noise exposure incorporate perceived disturbance, irritation, cognitive impairment, cardiovascular issues and sleep disturbance. Noise

exposure is an issue in numerous occupational and non-occupational environments. It is assessed that 22 million labourers in the United States are presented to dangerous noises. It is likewise announced that 100 million people are exposed to hazardous environmental noise because of traffic, personal hearing gadgets and different sources. The World Health Organization (WHO) assesses that in any event one million solid life years (disability-adjusted life years) are lost yearly because of environmental noise in high income western European countries (with a population of around 340 million). In any vital industry, optimizing human performance is a critical factor in mishap avoidance. Noise is one part of the workplace that influences working environment wellbeing. Employees in managerial jobs require significant degrees of intellectual expertise and they need to keep up successful execution while exposed to more elevated levels of noise than Threshold Limit Values (TLV). Studies show that noise causes psychological debilitation and oxidative stress in the brain. As indicated by Wang et al., with additional urbanization and industrialisation, noise pollution has become a danger factor for depression, cognitive impairment and neurodegenerative problems. It has been seen that exposure to noise impacts the central nervous system leading to extreme stress, anxiety, intellectual and memory problems. Past investigations have proposed that the Limbic system in the brain is engaged with emotional activities. The Amygdala and the Hippocampus are two of the principle parts inside the Limbic framework that gets sensory information directly or indirectly from the central nervous system. Auditory stimulation itself can directly or indirectly influence these zones.

The dynamic process of cognitive selection is designated as "attention", which plays a significant role in daily activities like physical movements, emotional responses and perceptual and cognitive functions. At the point when quantifiable data processing is limited, the attention system directs human behaviour dependent on geographic and temporal characteristics. Noise can influence performance either by impairing data handling or causing changes in strategic response. Specifically, noise builds the degree of general alertness or activation and attention. Noise can likewise diminish performance accuracy and working memory performance, but it does not appear to influence performance speed. The extent of cognitive and mental functions is diverse, enveloping response time, attention, memory, intelligence and concentration, to give some examples. Altered cognitive function prompts human error which leads to mishaps. This can eventually prompt reduced performance and productivity. A few examinations have shown that noise improves performance particularly in sleep deprived workers, mostly because of increased stimulation. Certain people might be sensitive to noise in any event, when it is lower than TLV. Sensitivity to noise which is alluded to as environmental intolerance impacts attention and recognition. There are clashing reports in regards with the impact of noise on cognitive execution in the significant writing. The survey conducted by Gawron with respect to the impacts of noise on cognitive performance showed that among 58 examinations, 29 revealed a negative impact, 7 detailed a beneficial outcome and 22 announced no impact of noise on

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psychological execution. Noise as a tangible improvement builds excitement which is accepted to cause a decrease in the span of attention. As such, noisy commotion causes changes in the presentation of attentional functions. Smith accepts that noise quality to be one of the persuasive boundaries with respect to the impact of commotion on intellectual execution . An investigation by Hockey showed that high level of noise at 100 dBA (contrasted with 70 dBA) expanded central visual stimuli processing, however decreased peripheral stimuli processing. Exposure to noise over 85 dBA force prompts numerous unfavourable auditory and non-auditory impacts. The non-auditory impacts of noise exposure depend upon exposure span, kind of work, sexual orientation, age and affectability to noise.

The following are the physiological signs that are involved:

(a) Signals related to the peripheral nervous system, including heartbeat and Electromyogram

(b) Signals related to the central nervous system including electroencephalography (EEG)

Lately, intriguing outcomes have been obtained from the main collection of signs, in any case, hardly any investigations have utilized EEG signals as an important device for cognitive performance assessment. Cognitive theory proposes that the mind is exceptionally associated with feelings. Fundamental feelings utilize explicit cortical and subcortical frameworks inside the mind and are unique in relation to the cerebrum's electrical and metabolic exercises. Subsequently, EEG is perhaps the best and normal techniques for mind imaging utilized for Brain action preparing identifying with human pressure including noise. EEG signals measure all vacillations in the electrical fields coming about because of nerve movement in millisecond goals. EEG signals are generally assessed in different recurrence groups to decide their relationship with stresses. These bands incorporate the Alpha (8-12.5 Hz), Theta (4-8 Hz), Delta (1-4 Hz) and Beta (12.5-30 Hz) bands. Humphreys and Reveille recommend that fluctuations in the Alpha and Beta bands, specifically, are a sign of cognitive function. Increase in the Alpha frequency band alongside decrease in the Beta frequency band causes increased cognitive function. A reduction in the power of the Alpha band alongside a rise in the power of the Theta and Beta bands is a cause of neurological problems. Marshal et al., have shown a converse relationship in the prefrontal cortex between the Alpha power rhythm in an EEG and suffering from stressful conditions, implying that the Alpha power rhythm decreases with stress. Choi showed a positive connection between the Beta power rhythm in an EEG and experiencing distressing conditions in the temporal lobe. Different investigations have shown a decrease in the relative power of the Alpha band when attention is reduced. Contrasted with other imaging procedures, Electroencephalography has certain preferences which incorporate being non-intrusive, minimal effort, agreeable, protected, versatile, and having high time goal. Along these lines, EEG can be an extraordinary device for distinguishing

stressors in the climate as well as for anticipating the negative impacts of noise exposure.

7.3.5 Noise and Social Behaviour

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Not only can noise be appeared to detrimentally affect cognitive processes, it has also been found to have a negative impact on social behaviour. For the most part, research has shown that increasing degrees of noise are related with lower levels of social interaction (Appleyard and Lintell, 1972), increased aggressiveness (Geen and O'Neil, 1969) and lower levels of altruistic behaviour (Mathews and Canon, 1975). Typically, these sorts of impacts appear to be more checked when there is poorly perceived control over the source of noise. Given society's current concern with the obvious increase in crimes and the way that noise levels, especially in metropolitan zones, seem to increase for years to come, this segment will focus on a portion of the exploration that has connected noise and aggressive behaviour.

Noise, Aggression and Violence

Social psychologists have at some point realized that noise can be a proximal determinant of aggressive behavior. That is, noise all alone does not really increase aggressiveness, it may improve the probability of an aggressive reaction in somebody who has just been maddened, irritated or in some way prepared to act aggressively. Exploratory proof for this comes from an examination by Geen and O'Neil (1975) in which it was discovered that members created more aggressive reactions when presented to noise in the event that they had as of now been exposed to a rough film (which had signaled or inclined them to carry on forcefully). Further examination by Donnerstein and Wilson (1976) featured the job of perceived control as a mediating factor in the impacts of noise and aggression.

Participants were at first divided into two groups. One group was infuriated by a confederate. The members were then allowed the chance to give electric shocks to someone else under one of three conditions. In the primary condition, members were exposed to uncontrollable noise. In the second, they were exposed to noise they could control. The third condition was a control (no noise).

The outcomes showed that overall, angry participants gave higher intense shocks than non-furious participants. However, both furious and non-furious participants gave the low intensity shocks when they were subjected to noise they could handle. The most elevated force of shock was given by members presented to wild noise. Studies like these recommend that, while noise does not in itself cause individuals to turn out to be more forceful, it very well may be a significant factor in hastening a forceful reaction in individuals that are as of now excited or aggravated.

One criticism of these examinations is the artificiality. For obvious ethical reasons field experiments of the impacts of noise on aggression are difficult to

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carry out, so it is hard to test the legitimacy of these discoveries in reality. In any case, there have been occurrences revealed in the UK and the US of violent attack – and even homicide where noise from neighbours has been referred to as an accelerating factor in the crime. In most of these cases apparently the assault (by the 'victim' of the noise on its 'perpetrator') is the decision of a lengthy interaction of grumbling and lack of action from the individual considered to be the cause or source of the noise (frequently music). Such cases seem, by all accounts, to be consistent with the exploration proof to the extent that the attack is the conclusion of the lengthy procedure of complaint and absence of action from the person who in first place created the noise. Nonetheless, the reality of the situation cannot prove that noise is the potential factor in accelerating these fierce occurrences if just for the explanation that most of individuals influenced by 'neighbour noise' do not resort to violence.

Environmental health data appear to demonstrate that the rate of increase in complaints about noise is more prominent than the rate of increase in actual noise, recommending that individuals are getting more intolerable of noise, or at any rate, are more likely to report it to the concerned authorities. It is a measure of societal concern over the quality of life issues brought about by noisy neighbors that, over recent years, the British government has focused on noise from neighbours, clubs and concert venues with progressively serious authorizations including Anti-Social Behavior Orders (ASBOs) and other lawful measures including the seizure of sound equipment for repeat offenders.

7.3.6 Commuting

Because noise-induced hearing impairment is the result not only of occupational noise exposure but also of total daily noise exposure, it is important to take the non-occupational exposure of individuals (during commuting to and from their jobs, at home, and during recreational activities) into account. Mass transit is one of the main contributors to non-occupational noise exposure. A new methodology to estimate a representative commuting noise exposure was put into practice for the Madrid subway because of all Spanish subway systems it covers the highest percentage of worker journeys (22.6%). The results of the application highlight that, for Madrid subway passengers, noise exposure level normalized to a nominal eight hours depends strongly on the type of train, the presence of squealing noise, and the public address audio system, ranging from 68.6 dBA to 72.8 dBA. These values play an important role in a more complete evaluation of a relationship between noise dose and worker health response.

7.3.7 Impedance

One of the important physical characteristics relating to the propagation of sound is the acoustic impedance of the medium in which the sound wave travels. Acoustic

impedance (Z) is given by the ratio of the wave's acoustic pressure (p) to its volume velocity (U):

$$Z = \frac{p}{U}. \qquad (15)$$

Acoustic impedance is a measure of the ease with which a sound wave propagates through a particular medium.

Check Your Progress

3. What is noise?
4. What are the two significant characteristics of sound or noise?
5. What do you mean by acoustic impedance?

7.4 ANSWERS TO CHECK YOUR PROGRESS QUESTIONS

1. A technological catastrophe is a calamitous occasion that is brought about by either human error in controlling technology or a malfunction of a technological system. Innovation based disasters are just about as genuine as natural disasters.
2. Technological disasters include structural collapses like bridges, mines and structures, modern mishaps like chemical and atomic bomb explosions, transport mishaps, mishaps in manufacturing units, chemical substance leak, etc.
3. Noise is undesirable sound which is thought to be unpleasant, loud and disruptive to hearing. From a physics viewpoint, noise is not different from sound, as both are vibrations through a medium, like air or water.
4. There are two significant characteristics of sound or noise – frequency and loudness.
5. Acoustic impedance is a measure of the ease with which a sound wave propagates through a particular medium.

7.5 SUMMARY

- A technological catastrophe is a calamitous occasion that is brought about by either human error in controlling technology or a malfunction of a technological system. Innovation based disasters are just about as genuine as natural disasters.

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- Disasters brought about by technology include the breakdown of systems, hardware and engineering standards that damage individuals and the climate. The actual term incorporates a wide range of present day issues and outcomes of technological mismanagement and designing errors.
- Technological disasters can be viewed as man-made disasters which means there is an "identifiable cause" characteristic. Because of this characteristic, impact on communities can frequently be more detrimental
- Noise is undesirable sound which is thought to be unpleasant, loud and disruptive to hearing. From a physics viewpoint, noise is not different from sound, as both are vibrations through a medium, like air or water. The distinction emerges when the brain receives and perceives a sound.
- There are two significant characteristics of sound or noise – frequency and loudness.
- Sound is estimated dependent on the amplitude and frequency of a sound wave. Amplitude measures how powerful the wave is. The energy in a sound wave is estimated in decibels (dB), the measure of loudness, or intensity of a sound; this estimation depicts the amplitude of a sound wave. Decibels are communicated in a logarithmic scale. Then again, pitch depicts the frequency of a sound and is estimated in hertz (Hz).
- We measure sound intensity (also referred to as sound power or sound pressure) in units called decibels.
- Progress in technology (industrialization) has given rise to noise pollution. Textile mills, print machines, engineering establishments, metal works and so on contribute vigorously towards noise pollution.
- The most well-known mental health disorders are also connected to noise. Various examinations have demonstrated that noise pollution is connected to uneasiness, wretchedness, hypertension, heart sicknesses and strokes.
- The impact of noise on human cognitive performance and brain activity has been frequently ignored. Noise has diverse negative impacts starting from interference with cognitive performance to harming physical and psychological wellbeing.
- The dynamic process of cognitive selection is designated as "attention", which plays a significant role in daily activities like physical movements, emotional responses and perceptual and cognitive functions.
- Sensitivity to noise which is alluded to as environmental intolerance impacts attention and recognition.
- Social psychologists have at some point realized that noise can be a proximal determinant of aggressive behavior. That is, noise all alone does not really increase aggressiveness, it may improve the probability of an aggressive

reaction in somebody who has just been maddened, irritated or in some way prepared to act aggressively.

7.6 KEY WORDS

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- **Technological catastrophe:** It is an event caused by a malfunction of a technological structure and/or some human error in controlling or handling the technology.
- **Environmental noise:** It is an accumulation of noise pollution that occurs outside. This noise can be caused by transport, industrial, and recreational activities.
- **Decibel:** It is a logarithmic unit used to measure sound level.
- **Hertz:** It is the derived unit of frequency in the International System of Units (SI) and is defined as one cycle per second.

7.7 SELF ASSESSMENT QUESTIONS AND EXERCISES

Short-Answer Questions

1. Mention the instruments to measure sounds.
2. How can noise be a proximal determinant of aggressive behaviour?
3. What is the relation between noise and social behaviour?
4. What are the elements that impact how boisterous a sound appears?

Long-Answer Questions

1. 'Chronic problems are generally uncovered after acute events.' Elucidate the statement.
2. Describe the characteristics of technological disasters.
3. Explain the sources of noise pollution.
4. Discuss the psychological effects of noise.
5. How does noise affect human cognitive performance and brain activity? Explain.

7.8 FURTHER READINGS

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UNIT 8 WEATHER, AIR POLLUTION AND BEHAVIOUR

Structure

8.0 INTRODUCTION

In the previous unit, you learnt about environmental noise pollution. In this unit, you will learn about the effect of the physical environment on human behaviour. The physical environment refers to the surroundings that impact the development and growth of an organism. The physical environment may incorporate the climate of a place. The climate may incorporate the rain, wind, temperature, and humidity of a spot. All these climate designs have consequences for human behaviour. We will examine these consequences in the unit.

8.1 OBJECTIVES

After going through this unit, you will be able to:

- Discuss the effect of heat and cold temperatures on behaviour and performance

- Explain how wind and altitude impacts behaviour
- Describe the impact of air pollution on behaviour

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8.2 PHYSICAL ENVIRONMENT

In a physical environment that encounters the four periods of the climate, change of human conduct is seen in each season. In a country that encounters the four seasons, the climate conditions change consistently. The spring season occurs from March to May. This is the season when the snow starts to soften. During this period, it rains a ton. The days will in general get hotter and more, and the evenings will in general be cool. The climate is not as cold as the colder time of year season, yet is not just about as blistering as in summer.

The late spring season begins from June to August. The temperatures during the day are generally over 20 degrees Celsius. The temperature can get sultrier to around 30 degrees Celsius or higher. During July, the climate keeps on getting more sweltering to around the period of August.

The other season is harvest time. It occurs from September to November. It is the briefest period of the year. The climate can be stormy or dry contingent upon the year. The excellent green shade of the climate may begin transforming into caramel. The winter season of year may begin in December. During this season, the temperature turns out to be low. The days and evenings become freezing. The daytime temperature in some cases is under zero degrees Celsius. The winter season is the longest period of the year. This temperature is made more unforgiving due to the chilly breeze that makes the climate much colder.

In a nation where climate differs altogether, human behaviour can include everything from sunbathing on the sea shore in summers to remaining inside during winters. Individuals have various attitudes toward different climate conditions. A decent day can be portrayed as clear sky with insignificant overcast cover and a considerable lot of daylight. Terrible climate can be depicted as a sky with substantial overcast cover and negligible daylight.

The climate influences the manner in which people act. In an actual climate that encounters the four seasons, individuals will in general act in accordance with the climate. The brutal climate conditions like warm summers and winters will in general contrarily affect the manner in which individuals carry on. Terrible climate may make individuals invest the vast majority of their energy inside. This will bring about an absence of energy, sorrow, hostility, and viciousness. Then again, great climate causes individuals to feel loose, glad, and fiery. Notwithstanding, the person needs to concoct different climate conditions. They should dress properly in various climate seasons. They ought to likewise change their negative disposition towards a portion of the seasons and think of exercises to keep them occupied with during various climate conditions.

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8.2.1 Heat and Behaviour: Social Behaviour

A few examinations have discovered a connection between high temperature and violent conduct. In the United States, crimes of different types increases on hot days, especially violent crimes (murder, attack, theft, and assault). In concurrence with this finding, violent crime is more normal in the hotter southern states – interestingly, non-violent crime is more uncommon further south. A comparative example has been found in France, Spain, and Italy, nations with huge north to south varieties. The recurrence of common clashes in the time frame 1950–2004 in tropical locales is identified with the El Niño and La Niña marvels, with clashes being twice as likely in El Niño years. The El Niño is the warm period of the ENSO, the El Niño Southern Oscillation, when a huge region of warm water is created in the eastern tropical Pacific coast off South America, prompting expanding temperatures in the region, just as dry season in certain territories. These occasions happen each three to seven years, and last around a year or more. The comparing cold stage is known as the La Niña, and common clashes in the area are more uncommon during these occasions. Individuals begin drinking more liquor on blistering summer evenings, and we know excessive liquor can fuel violence. Undesirable conditions increases distress and irritability.

Nevertheless, the connection between higher temperature and inclination to violence is anything but a basic straight line. It is rather curvilinear, broadly looking like a rearranged U. An investigation of the quantity of concerning attacks in Dallas, a southern city with a lot of hot days, showed that the quantity of attacks rises as the temperature ascends to around 30Ú˜C, however as it goes over that, the measure of brutality goes down once more. It's like over a specific temperature it is simply excessively hot to do anything. We likewise notice various examples in the evening and day: the quantity of fierce episodes is identified with the temperature by a basic straight line to some degree cooler long periods of night. How might we clarify these examples? The most popular record is Baron and Bell's negative influence escape (NAE) model, which expresses that the inconvenience brought about by decently high and low temperatures encourages hostility, however, outrageous temperatures stimulate coping thought processes, like a craving to get away, which conflict with and accordingly decrease animosity.

We don't notice an increment simply in brutal crimes; the occurrence of less radical aggression, for example, road rage, increases as well. In one investigation completed in the American city of Phoenix, Arizona, an analyst sat at a street intersection each Saturday from April to August, during which period the temperature went from 29°C to 42°C. The scientist sat in her vehicle at a similar intersection, a solitary path constrained by traffic signals, and when the lights turned green she socially stayed there. The scientists estimated the recurrence and length of sounds from the vehicles behind her, and blares turned out to be more incessant and endured longer the hotter the climate. The relationship was direct – the chart of sound quantity versus temperature frames a straight line. The analysts additionally

noticed that the drivers of vehicles with their windows down sounded the most – on the grounds that, they contended, those vehicles didn't have cooling.

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8.2.2 Perception of and Psychological Reaction to Ambient Temperatures

The earth's surface and air are warming unequivocally and progressively. As per the Intergovernmental Panel on Climate Change, assessed normal temperatures expanded by 0.78 °C (95% certainty stretch (CI): 0.72 to 0.85 °C) between the 1850–1900 and 2003–2012 periods. Although the global human-wellbeing weight of environmental change has not been all around evaluated, temperature-related morbidity and mortality, especially for heat patients, have been accounted for. Psychological instability is a global wellbeing worry representing 32.4% of years lived with incapacity (YLDs) and 13.0% of handicap changed life years (DALYs]. Mental problems likewise have significant effects upon suicide rate. The World Health Organization assessed the pervasiveness of lifetime mental turmoil (counting tension, disposition, externalizing, and substance use) to be inside the between quartile scopes of 18.1%–36.1%. In Hong Kong, the assessed predominance of basic mental problems among Chinese adults aged 16–75 years was 13.3%.

The quantity of studies taking a look at the relationship between mental problems and surrounding temperature have been expanding as of late. Studies from Shanghai and Toronto two Northern Hemispheric urban areas situated at high latitudes over the Tropic of Cancer, have announced higher relative dangers of mental problems at hotter temperatures, yet no relationship at low temperatures. A majority of other studies likewise announced a higher danger of mental problems during hotter temperatures, however some of these studies were conducted during heat waves and looked at the effect of seasonality. They used statistical methods not capable of revealing non-linear and lagged effects, or were not population-based. Suicide rate, which is pertinent to mental issues, has likewise been discovered increasing with hotter temperatures in various areas. With expanding global average temperatures, understanding the potential impact of high temperatures on mental issue hospitalizations will support the improvement of focused populace based wellbeing strategies that address the necessities of patients.

Temperature impacts are a significant theme in the psychological literature. It has been shown that outside temperatures emphatically impact and shape human brain psychology and behaviour. Animosity and strife are advanced through warmth (Anderson, 1989; 2001; DeWall, Anderson and Bushman, 2011) and high temperatures hinder mind-set (Keller, Fredrickson, Ybarra, Côté, Johnson, Mikels, Bet, 2005), rest (Okamoto-Mizuno, Mizuno, Michie, Maeda &lizuka, 1999) and wellbeing (Ormandy and Ezratty, 2012, Parsons, 2014). Results from past examinations demonstrate negative emotional and behavioural reactions to outrageous temperatures.

Heat production is directly proportional to exercise intensity, so exhausting activity, even in a cool climate, can cause a considerable increase in internal heat level. People are generally 20% effective, which implies that for each 100 Watts we produce, we additionally produce 400 Watts of heat. Obviously competitors who produce 400W would deliver an incredible 1600Watts of heat! The body has different approaches to eliminate this heat and perspiring is frequently the main one. Perspiring will permit a person to eliminate heat, yet it might likewise bring about dehydration, which in the long run makes it harder to direct internal heat level. At the point when the climate is blistering and humid it turns out to be harder to eliminate this heat through conduction and convection and we need to depend exclusively on perspiring. Enormous expansions in internal heat level during exercise are probably not going to happen in people who run at a more slow speed.

For some time it was imagined that when internal heat level ascents to about 39.5 °C (103 °F), significant fatigue (i.e., weakness in the mind as opposed to in the working muscles) occurs. This was viewed as a defensive component to forestall overheating. This was revealed in experiments where subjects practiced in the warmth till they were depleted and consistently appeared to stop when temperature came to about 39.5 °C (103 °F).

It is now understood that heat per se affects performance but that hypo hydration makes things worse. On the off chance that the body warms up and the body gets dried out to a critical degree, all physiological capacities are probably going to be undermined.

8.2.3 Heat and Performance

It is by and large acknowledged that aerobic exercise capacity limit in hot conditions is diminished while running may even be improved. The effect of environmental temperature and humidity on endurance performance can be huge. Let us see how heat reacts with various parts of the body.

- **Central nervous system:** The brain will heat up and there are various changes in the mind like fuel exhaustion, changes in neurotransmitters, accumulation of ammonia, cytokines, etc., that may alter brain function.
- **Muscle:** Heat likewise directly or indirectly impact muscle work, there is amassing of metabolites and an expansion pace of glycogen breakdown.
- **Respiration:** Expansions in ventilation and breathlessness are generally noticed.
- **Psychological factors:** Last but certainly not least, there is increased discomfort and effects on pain tolerance, mood, and motivation, all of which can influence performance.

So what causes diminished performance in heat?

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Although performance is diminished in warm weather, foreseeing how much performance will be influenced, and how much certain degrees of drying out will impact this, is unpredictable. Obviously there isn't one factor rather numerous components that come together to cause weariness. There is still a lot of that is not entirely perceived and Nybo et al (2) in a great audit of the writing inferred that future investigations need to attempt to segregate every one of the elements that impact performance in high temperature and study its significance. Clearly this is a tedious and no simple errand.

8.3 COLD WEATHER AND BEHAVIOUR

Let us see how cold weather effects social behaviour.

Social Behaviour

Can the chilly climate change individuals' conduct? Science says yes. Experts have found that cold temperatures can impact our considerations and choices without us knowing it. Research shows from affecting what colours ladies wear to how we judge lawbreakers, from the restrictions of human inventiveness to how we treat our companions, cold temperatures may greatly affect the human mind.

Here are five ways chilly climate may impact individuals.

(i) **The Red Dress Effect:** Cold climate may impact what colours ladies wear, as per research distributed in 2013 and 2014. The examination showed that during chilly climate ladies are bound to wear shades of red and pink on days when they're ovulating.

(ii) **Cold Blooded Murder:** Room temperature can impact how individuals judge criminals. Individuals in cold rooms in the examination were bound to consider offenders to be merciless wrongdoers whose violations were planned, as indicated by the investigation. Interestingly, individuals in hot rooms would in general consider lawbreakers to be hot-headed and impulsive, as indicated by the 2014 examination in the journal *PLOS One*. In the examination, 133 undergrads in Germany saw eight mug shots of individuals who had been captured. The students composed what wrongdoing they thought the individual had carried out and appraised how rash or planned they thought it was.

(iii) **Romantic Movies:** When it's cold outside, is there a preferable method to remain by nestling up with a sentimental film? It appears to be that when individuals feel truly chilly, they search for mental warmth, scientists said in a recent report distributed in the *Journal of Consumer Research*.

During a few analyses, experts controlled the temperatures of both the room that the members were sitting in to that of their beverage,

and afterward requested that members select a film. Individuals would in general pick sentiment films when they were cool, the analysts found. Curiously, the impact didn't hold for individuals who didn't connect sentiment films with mental warmth. The scientists additionally found that online film leaseholders picked more sentiment films when the climate was cold than when it was warm.

(iv) **Prisoner's Dilemma**: Temperature may influence how much trust individuals put in each other, as per an examination. In a trial called the "iterated prisoners dilemma," members were combined together and placed in a make-believe prison. The members were informed that specialists needed more proof to convict both of them, yet each was approached to testify against the other, as per the 2013 examination, published in the journal *Evolutionary Psychology*.

Members in the investigation who were approached to hold a chemical hand warmer during the examination were twice as liable to help out one another (which means, they would not testify against the other individual) contrasted to individuals who held an ice pack. It is conceivable that the vibe of actual warmth expanded the students' trust.

(v) **Hot and Cold Creativity:** Various sorts of imagination can arise when an individual feels hot or cold. In a progression of investigations, scientists found that individuals who were given a hot cup of tea or who were in a warm room were better at innovative drawing, categorizing objects and considering gift ideas for others. But when they were cool, the members were better at recognising metaphors, considering new pasta names and planning abstract gifting.

It is conceivable that warmth assists individuals with warm social imagination, which means they may feel mentally nearer to others and more liberal toward them. While due to the cold individuals may feel separated from others.

8.3.1 Cold Temperatures and Health

Frigid temperatures can place your wellbeing in danger from numerous points of view. A few dangers of chilly climate on wellbeing are as follows:

- **Frostbite:** This results from cold temperatures harms portions of your body, frequently your ears, nose, cheeks, jawline, fingers, and toes.
- **Hypothermia:** This condition occurs when your internal heat level dips under 95F(35°C). This results from your body losing more warmth than it can make, for example, when you are presented to cold or water.
- **Heart issues:** Chilly climate can expand the danger of a cardiovascular failure.

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Less obvious impacts

- **Dry skin and mucus membranes:** These are regular in the colder time of year. Winter air is generally very dry, and that can drain the dampness out of your body.
- **Balance:** At the point when it's cold outside, there will undoubtedly be ice — which implies more odds of falling and getting harmed. Older individuals are more in danger of injury, however, anybody can get injured on the off chance that they slip on frosty walkways or steps.
- **Being inactive:** At the point when chilly climate continues endlessly, you may wind up long hours watching TV. This sort of inactive conduct can cause medical problems.

Disease Risk

Cold decreases the resistant reaction – The cold climate brings about less blood supply to safeguard body heat in the core of torso and head. This decrease in blood stream implies there are less white platelets accessible to battle sickness. This impact appears to bring about an expanded vulnerability to winter diseases like colds, flu and so on.

8.3.2 Cold Extremes and Performance

A chilly climate is characterized by conditions that cause more prominent than ordinary body heat losses. In this setting "ordinary" alludes to what in particular individuals experience in regular day to day existence under agreeable, frequently indoor conditions, but this may vary due to social, economic or natural climatic condition. Conditions with an air temperature under 18 to 20°C would be viewed as cold.

Cold work involves an assortment of industrial and occupational activities and related activities under various climatic conditions. For example, in many nations the food business requires work under cool conditions—ordinarily 2 to 8°C for new food and beneath – 25°C for frozen food.

Cold exposure and the related social and physiological responses affect human performance at different degrees of intricacy. Let us discuss the following.

Manual Performance

Working by hand is truly defenceless to cold exposure. Because of their little mass and huge surface territory, hands and fingers lose a lot of warmth while keeping up high tissue temperatures (30 to 35°C). Such high temperatures can be kept up just with an unquestionable degree of inner warmth creation, taking into account the support from high blood stream to the furthest points.

Hand heat loss can be reduced by wearing gloves. In any case, great hand wear for chilly climate implies thickness and volume, and, thus, weakened ability

and manual capacity. Thus, manual execution in the cold can't be safeguarded by easy measures. At best, the reduction in performance may be limited as the result of a balanced compromise between the choice of functional hand wear, work behaviour and exposure scheme.

Neuro-Muscular Performance

There is an articulated impact of cold on muscular function and performance. Cooling of muscle tissue lessens blood stream and hinders neural cycles like transmission of nerve signals and synaptic function. Also, consistency of tissues increments, bringing about higher inward friction during motion.

Physical Work Capacity

As recently discussed, muscular performance deteriorates in the cold. With impaired muscle function there is an overall hindrance towards physical work capacity. A contributing factor to the decrease in aerobic work limit is the peripheral resistance of the systemic circulation. Pronounced vasoconstriction increases central circulation, eventually leading to cold diuresis and elevated blood pressure. Cooling of the core may also have a direct effect on the contractility of the heart muscle.

Work limit, as estimated by maximal oxygen consuming limit, diminishes by 5 to 6% per °C. Subsequently persistence may break down quickly as the functional result of the brought down maximal limit and with an expanded energy prerequisite of strong work.

Check Your Progress

1. What is the El Nino effect?
2. When does hypothermia occur?

8.4 WIND AND BEHAVIOUR

Let us begin by discussing wind perception.

8.4.1 Wind Perception

Wind perception studies date to the 1970s, following urbanization principles formed around mixed high and medium-rise buildings and the resulting wind forces induced because of this irregular landscape. Earlier examination on the topic had focused in on low and moderate wind speeds that are normal in metropolitan territories. For the most part called wind comfort research, these trial were led to survey the effect of abrupt gusts to metropolitan zones and the impacts of these windy conditions on people groups' everyday lives (Bottema 2000). Experiments were performed to survey critical wind thresholds—by and large speed and breeziness—

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that cause inconvenience, cause individuals to feel risky, cause insecurity, and make every day errands testing

Wind is the essential ingredients for two of the most damaging normal dangers on earth—typhoons and twisters. Storm preparation, evacuation, and hazard mitigation depends significantly on risk perception, and effective policy making and implementation requires understanding human impression of perils and related dangers. Earlier trial research on wind–human connection has focused on common 'comfort' in metropolitan territories by setting up wind speed limits that make every day undertakings testing, awkward, or cause individuals to feel perilous. Discoveries were to a great extent dependent on two-decision semantic reactions (faint- rough, quiet-hurricane, wonderful –irritating) or portrayals of actual reactions (loss of balance, shifts in footstep trajectories).Surprisingly, exact examination is missing on (a) people's accuracy in perceiving breeze speed while they are encountering it and (b) individuals' perception of individual danger in light of wind. Understanding individuals' perceptual precision of outrageous winds speeds is significant on the grounds that storms regularly cause gigantic force and correspondence interruptions that leave individuals without true climate alerts or reports. The effectiveness of weather warnings in conveying the actual risks associated with extreme wind events may be suboptimal even if information regarding wind speed severity is made available.

8.4.2 Behavioural Effects of Wind

Does an extreme breeze or an absence of wind cause erratic conduct in individuals or creatures? According to the American climatologist Mary Knapp, 'the appropriate response is that it depends - primarily on whether the breeze adds to comfort or brings down it. For instance, a 15-mile-an-hour wind on a moist summer day will give a pleasant cooling impact. A comparative breeze on a March morning will deliver musings of wind chills and a craving for a late-spring.' In addition, unrelenting winds may bring unwanted residue and dust that exasperate sensitivities, or it may clear a stale air mass and accordingly lessen contamination levels nearby. "Likewise with any aggravation the more it perseveres, the more probable it is to incite crabbiness, regardless of whether in creatures or people. Indeed, there are journal records of pioneers not used to the predominant breeze being made insane by the determined Plains winds."

At the point when air is totally still and cool, we can appreciate splendid twilight evenings and the break from hyper burning. Yet, when stillness are warm, or go on excessively long past the day break, they become abnormal and upsetting. They tend, we have learned, to come before the storm. So wind, when it comes, is generally welcome. However, not generally and not for everybody.

There is an early English maxim that says:

When the wind is in the east,

'tis good for neither man nor beast.

As a species, we appear to have a high awareness and a shockingly low resistance of wind. There are singular contrasts obviously, some of which are evidently sex-connected. Most women, reasonably, look to hide from the wind. However, there is something in particular about an oncoming hurricane that makes men extremely eager. Almost as though the sight of swiftly-driven cloud or the sound of air rushing through the trees were stimuli that triggered some deep-seated response. There is no uncertainty that days with a great deal of wind were once risky ones, obliterating covers, scattering cautioning aromas, and veiling the sound of a hunter. Furthermore, it likely could be that, even in our advanced microclimates, men specifically are as yet energized and upset by the old signs. The physiology appears to include the exemplary alert response of an extended creation of adrenaline. Digestion accelerates, veins of the heart and muscles enlarge, skin vessels contract, and the hairs shows an upsetting propensity to remain on end, creating prickles of worry.

A portion of the exploration proposes that dry breezes will in general make individuals who are touchy to it "tense," protract their response times, make it harder to focus and give them an overall sensation of "anxiety." The fundamental purpose behind the breezes that we have experienced are a consequence of barometrical pressing factor changes. Quick pressure changes tend to lead some to aches and pains in their joints and even to some headaches.

8.4.3 Barometric Pressure and Altitude

Atmospheric pressure factor, otherwise called barometric pressing factor (after the gauge), is the pressure factor inside the atmosphere of Earth. The standard atmosphere is a unit of pressing factor characterized as 101,325 Pa (1,013.25 hPa; 1,013.25 mbar), which is comparable to 760 mm Hg, 29.9212 inches Hg, or 14.696 psi. The atm unit is generally identical to the mean sea level atmospheric pressure on Earth, that is, the Earth's barometrical pressing factor adrift level is around 1 atm.

By and large, air pressure is firmly approximated by the hydrostatic pressure brought about by the heaviness of air over the assessment point. As air expands, there is less overlying air mass, so air pressure diminishes with expanding air. Pressure factor estimates force per unit area, with SI units of Pascals (1 pascal = 1 newton for every square meter, 1 N/m2). By and large, a segment of air with a cross-sectional region of 1 square centimetre (cm2), estimated from mean (normal) ocean level to the highest point of Earth's air, has a mass of about 1.03 kilogram and applies a force or "weight" of about 10.1 newtons, bringing about a pressing factor of 10.1 N/cm2 or 101 kN/m2 (101 kilopascals, kPa). A segment of air with a cross-sectional zone of 1 in2 would have a load of about 14.7 lbf, bringing about a pressing factor of 14.7 lbf/in2.

Tension on the Earth changes with the height of the surface; so air pressures on mountains is generally lower than air pressure at sea level. Pressure fluctuates

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easily from the Earth's surface to the highest point of the mesosphere. Albeit the pressing factor changes with the climate, NASA has averaged the conditions for all parts of the earth year round. As height increases, climatic pressing factor diminishes. One can ascertain the air pressure at a given altitude. Temperature and humidity likewise influence the atmospheric pressure, and it is important to realize these to register a precise figure.

At low elevations above ocean level, the atmospheric pressure diminishes by about 1.2 kPa (12 hPa) for each 100 meters. There are two reasons why atmospheric pressure diminishes as height expands: thickness and profundity of the climate. Most gas atoms in the climate are pulled near Earth's surface by gravity, so gas particles are denser close to the surface. With more gas particles in a given volume, there are more crashes of particles and in this way more noteworthy atmospheric pressure.

The depth (distance start to finish) of the air is most noteworthy at sea level and diminishes at higher elevations. With more depth of the environment, more air is pushing down from above. Consequently, gaseous tension is most prominent at sea level and falls with expanding elevation. On top of Mount Everest, which is the tallest mountain on Earth, air pressure is just around 33% of the pressing factor adrift level.

The pressing factor applied by the air in the climate is most noteworthy at Earth's surface and falls as altitude increases. The explanation is that thickness and profundity of the air are most prominent at sea level and decreases with increasing height. The atmospheric pressure of air in the climate permits us to do numerous things, from tasting through a straw to relaxing.

8.4.4 Physiological Effects of Reduced Barometric Pressure

The complexity of human physiological adaptation to high altitude gives rise to various likely reactions. Although each syndrome will be depicted independently, there is extensive overlap between them. Diseases like intense hypoxia, intense mountain infection etc. address a spectrum of abnormalities that share a similar pathophysiology.

Hypoxia

Hypoxia occurs in high altitudes due to the diminished barometric pressing factor and the resultant decrease in surrounding oxygen. With increased altitude, hypoxia occurs intensely, and the body does not have the opportunity to change. Mountain dwellers have commonly been shielded from the impacts of intense hypoxia due to the fact that they are acclimatized to the high altitudes. It results in headaches, short ness of breathe, coughing, confusion, disorientation, hallucinations, behavioural change, severe headaches, reduced level of consciousness, etc.

Acute Mountain Sickness

Higher altitudes have lower levels of oxygen and decreased air pressure. When one travels in a plane, drives or hikes up a mountain, the body may not have

enough time to adjust. This can result in acute mountain sickness (AMS). AMS typically occurs at about 8,000 feet, or 2,400 meters, above sea level. Dizziness, nausea, headaches, and shortness of breath are a few symptoms of this condition. Most instances of altitude sickness are mild and heal quickly. In rare cases, altitude sickness can become severe and cause complications with the lungs or brain.

Retinal Haemorrhages

Retinal haemorrhages are very normal, influencing up to 40% of people at 3,700 m and 56% at 5,350 m. Retinal haemorrhages are generally asymptomatic. They are no doubt brought about by expanded retinal blood stream and vascular dilatation because of blood vessel hypoxia. Retinal haemorrhages are more normal in people with migraines and can be hastened by exhausting activity. In contrast to other high-height conditions, retinal haemorrhages are not preventable by acetazolamide or furosemide treatment.

Chronic Mountain Sickness

Chronic mountain sickness (CMS) is a disease in which the proportion of blood volume that is occupied by red blood cells increases (polycythaemia) and there is an abnormally low level of oxygen in the blood (hypoxemia). It affects long term occupants of higher altitudes. More than 140 million people live above 2500 m worldwide, and on average, 5%–10% are at risk of developing CMS. The most frequent symptoms of CMS are headache, dizziness, tinnitus, breathlessness, palpitations, sleep disturbance, fatigue, loss of appetite, confusion, cyanosis, and dilation of veins.

Other Conditions

Patients with sickle cell sickness are bound to experience the ill effects of painful vaso-occlusive crisis at high altitude. Indeed, even moderate heights of 1,500 m have been known to accelerate emergencies, and elevations of 1,925 m are related with a 60% danger of emergencies. Patients with sickle cell infection dwelling at 3,050 m in Saudi Arabia have twice however many emergencies as patients living at sea level.

Basically no information exists depicting the danger to pregnant patients on climb to high altitudes. In spite of the fact that patients living at high altitudes have an increased danger of pregnancy-instigated hypertension, there is no evidence of increased foetal deaths. Serious hypoxia may cause irregularities in foetal pulse; be that as it may, this happens just at very high elevations or within the sight of high-height aspiratory oedema. The most serious danger to the pregnant patient may relate to remoteness of the region instead of to altitude induced complications.

8.4.5 Acclimatization to High Attitudes

While quickly climbing to high altitudes may bring about death, moderate climbing by mountain climbers can be effective when combined with compensatory physiological variation measures. Acclimatization to high elevations is geared towards

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keeping a sufficient stock of oxygen to fulfil metabolic needs regardless of the diminishing motivated PO_2. To accomplish this objective, changes happen on the whole organ frameworks associated with oxygen take-up into the body, dissemination of O_2 to the essential organs, and O_2 dumping to the tissues.

Discussion of oxygen take-up and distribution requires understanding the determinants of oxygen content in the blood. As air enters the alveolus, the roused PO_2 diminishes to another level (called the alveolar PO_2) due to two components: increased partial pressure of water vapour from humidification of inhaled air, and increased partial pressure of carbon dioxide (PCO_2) from CO_2 discharge. From the alveolus, oxygen diffuses across the alveolar capillary membrane into the blood because of an angle between alveolar PO_2 and blood PO_2. Most of oxygen found in blood is bound to haemoglobin (oxyhaemoglobin). Hence, oxygen content is directly identified with both the haemoglobin concentration in the blood and the level of O_2 binding cites on haemoglobin that are immersed with oxygen (oxyhaemoglobin immersion). Consequently, understanding the connection between blood vessel PO_2 and oxyhaemoglobin immersion is fundamental for understanding the determinants of oxygen content in the blood. Figure 8.1 represents the oxyhaemoglobin separation bend. With expanding height, motivated PO_2 diminishes and, hence, blood vessel PO_2 and oxyhaemoglobin saturation diminishes. In ordinary people, elevations more prominent than 3,000 m are related with diminished blood vessel PO_2 with oxyhaemoglobin saturation falling beneath 90%, on the lofty part of the oxyhaemoglobin separation bend. Further increase in altitudes will typically bring about huge desaturation in the absence of compensatory mechanisms.

The ventilatory transformations that happen in high-elevation conditions ensure the arterial partial pressure of oxygen against the impacts of diminishing ambient oxygen levels, and can be isolated into intense, subacute and ongoing changes. Intense climbing to high altitudes brings about a fall in the inspired PO_2 which thusly prompts a decline in the blood vessel PO_2 (hypoxia). To limit the impacts of decreased inspired PO_2 on blood vessel oxyhaemoglobin immersion, the hypoxia that happens at high elevation triggers an expansion in ventilation, intervened through the carotid body (hypoxic ventilatory reaction HVR). Hyperventilation expands carbon dioxide discharge and hence the blood vessel and afterward the alveolar partial pressure of carbon dioxide (PCO_2) falls. The fall in alveolar PCO_2 permits alveolar PO_2 to rise, and therefore, blood vessel PO_2 and blood vessel O_2 content increases. The expanded carbon dioxide discharge likewise causes a diminishing in blood hydrogen particle focus ([H+]) prompting the advancement of alkalosis. The following alkalosis hinders the hypoxic ventilatory reaction. Subsequently, on intense climbing to high altitudes there is a sudden expansion in ventilation that is adjusted by the improvement of an alkalosis in the blood.

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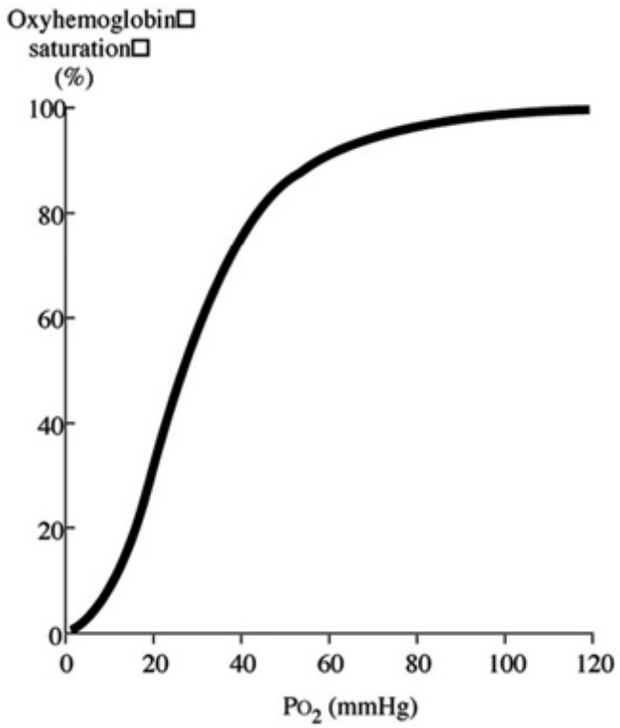

Fig 8.1 *Oxyhaemoglobin Separation Bend*

Full acclimatization entails days or even weeks. Slowly, the body compensates for the respiratory alkalosis by renal excretion of bicarbonate, allowing sufficient respiration to provide oxygen without risking alkalosis. It takes about four days at any given altitude and can be boosted by drugs such as acetazolamide. Eventually, the body undergoes physiological changes such as lower lactate production (because reduced glucose breakdown decreases the amount of lactate formed), decreased plasma volume, increased hematocrit (polycythemia), increased RBC mass, a higher concentration of capillaries in skeletal muscle tissue, increased myoglobin, increased mitochondria, increased aerobic enzyme concentration, increase in 2,3-BPG, hypoxic pulmonary vasoconstriction, and right ventricular hypertrophy. Pulmonary artery pressure increases in an effort to oxygenate more blood.

Full haematological adaptation to high altitude is achieved when the increase of red blood cells reaches a plateau and stops. The length of full haematological adaptation can be approximated by multiplying the altitude in kilometres by 11.4 days. The upper altitude limit of this linear relationship has not been fully established.

8.4.6 Behavioural Effects of Air Pressure Performance

Various examinations in medical meteorology show that unexpected every day varieties in the air pressure (AP) are a significant meteorotropic factor delivering adverse consequences for health and different types of human activity. Be that as it may, inadequate consideration is paid to the other bioeffective physical characteristics of air pressure.

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It has additionally been hypothesized that increasing events of cardiac arrhythmias on days with solid breeze are likely, at any rate mostly, to be because of some biological response to wind-generated rapid atmospheric pressure perturbations. For example, the impacts of winds blowing from the mountains on human mental movement, the response time as well as duration of active attention and indirect indications, and so on. Lee and Garraway found a huge impact of wind strength on the risk of sport injuries.

Noticed behaviours and individual anecdotes propose that the initial mood experienced at high altitudes is euphoria, trailed by sorrow. With time, people may likewise get contentious, irritable, anxious, and impassive (Van Liere and Stickney, 1963). Tragically, in spite of the fact that disturbances in emotional control have been seen at altitudes for quite a long time, there are not many quantitative investigations evaluating mood change and altitude.

Cognitive Performance

Similarly, as with temperament changes, the examination on mental capacity at high altitudes is fairly restricted. Most examinations have shown decrements in cognitive performance starting at an elevation of 3,000 m (9,843 ft) (Bahrke and Shukitt-Hale, 1993; Tune, 1964). Curiously, a couple of studies have even revealed that some of the changes in performance after exposure to higher elevations endure for as long as a year or more after return to lower heights, although much discussion encompasses this issue (Bahrke and Shukitt-Hale, 1993).

High altitude produces significant impairments in various cognitive performance. Changes in psychomotor execution, mental abilities, response time, vigilance, memory, and logical reasoning have all been estimated at heights over 3,000 m (9,843 ft) (Bahrke and Shukitt-Hale, 1993). Cognitive performance is generally more vulnerable against height than psychomotor performance, and it has been proposed that complex tasks are commonly influenced before simple tasks (Cudaback, 1984). Impaired performance at elevation can show itself in expanded errors, slowing of performance or a blend of these elements (Banderet and Burse, 1991).

Since human psychological capacity is delicate to changes in oxygen accessibility, openness to hypoxia should deliver a continuum of impacts as altitude level and duration increases. One investigation (Lieberman et al., 1991) assessed the behavioural effects of hypoxia as a component of time of exposure and altitude level with different standardized tests of cognitive performance. 23 guys were tried in an altitude chamber during a 4.5-h exposure to hypobaric hypoxia. The tests (Banderet and Lieberman, 1989) were directed utilizing paper and pencils as well as laptops and computers. All subjects were exposed to two levels of hypoxia, the equivalent of 4,206 m (13,800 ft) and 4,725 m (15,500 ft), as well as a near sea level control conditions (549 m [1,800 ft]). During exposure, tests

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were given from one to three times. Prior to mimicked altitude exposure, subjects rehearsed all tests widely to guarantee that performance was steady and close maximal. Cognitive performance was significantly impaired on 8 out of the 10 performance measures. Indeed, even on generally basic performance tasks, such as simple and choice reaction time—as well as trial of cognition, impairments happened in a graded manner. The quantity of hits on the Bakan vigilance task (Banderet and Lieberman, 1989) diminished with expanding hypoxia (or re-enacted height) as seen in Fig 8.2. Moreover, simple response time lengthened as an element of expanded hypoxia as did the mistakes on the four-choice response time test. The quantity of correct responses on addition, coding, number comparison, pattern recognition, and Tower of Hanoi ideal tests diminished with increasing stimulated altitudes and time at altitude. Thus, adverse changes in cognitive performance expanded with higher altitudes and longer durations.

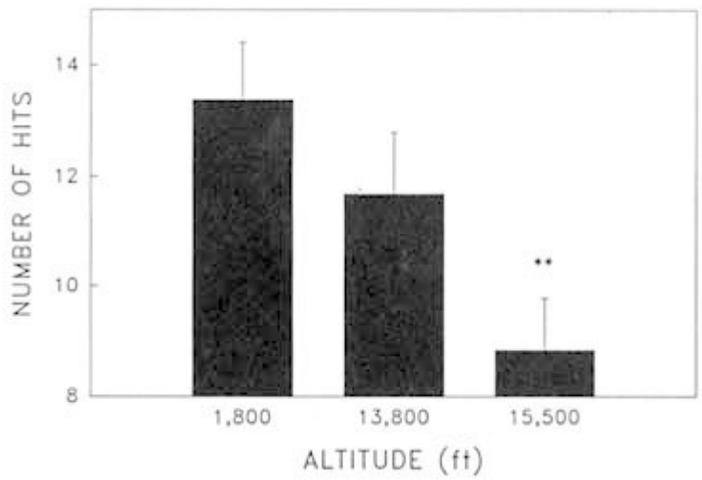

Fig 8.2 *Relationship between Hits and Altitude on the Bakan Vigilance Task*

8.5 AIR POLLUTION AND SOCIAL BEHAVIOUR

Air pollutions toll on human wellbeing is all around recorded. It is the main source of mortality in India, adding to the demise of more than 1.6 million individuals every year. It is liable for 1.1 million unexpected losses every year in China. In addition, in the U.S., around 111 million Americans — 35% of the populace — live in provinces with unfortunate air, which makes them more powerless to cellular breakdown in the lungs, respiratory failures, and strokes. Presently, another large scale review demonstrates that air pollution is not simply impeding to an individual's physiological wellbeing, but also to their mental wellbeing. The audit, directed by Professor Jackson Lu at MIT deliberately analyzes the mental, financial, and social

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impacts of air contamination. His discoveries show up in the April release of *Current Opinion in Psychology*.

According to Lu, 'a considerable lot of us will in general consider air pollution regarding its damage on the climate and human wellbeing, however it likewise contrarily impacts our mental wellbeing and conduct.' In a survey of 178 examination articles, Lu discovered proof that of the dangerous outcomes of air contamination. In all cases, air pollution — a combination of particulate matter, metals, and different gases and mixtures — causes decrease in happiness and increase in depression. Cognitively, it debilitates functioning and decision making. Financially, it harms work productivity. Furthermore, socially, it may lead to increase in criminal conduct.

Other exploration shows that air pollution adversely predicts individuals' life satisfaction and wellbeing. This impact has been seen in nations around the planet, including Australia, Canada, China, the U.S., and Europe. Air pollution is additionally connected with raised anxiety and expanded mental issues, like sorrow, schizophrenia, and chemical imbalance. Air pollution might be likewise a danger factor for substance abuse, self-hurting practices, and self-destruction.

Furthermore, air pollution hurts psychological working across all life stages, from pre-birth improvement, to youth, to youthful adulthood, and even into maturity. One investigation, which took a look at student in China taking different normalized math and verbal tests, discovered that contemporaneous exposure to air contaminations adversely predicted performance. Exposure during these tests additionally negatively predicted post-secondary educational attainment and earnings over time.

Air contamination may likewise prompt mental issues, for example, dementia and attention deficit hyperactivity issue. Exploration has shown that individuals living in spots with exorbitant measures of PM2.5 — an infinitesimal contamination ordinarily brought about by pollutants from power plants, vehicle fumes, and rapidly spreading fires — have an increased danger for dementia by 92%.

Examination additionally shows that air contamination is related with increased deceptive conduct. In an examination that investigated a nine-year board of 9,360 U.S. urban communities, air contamination emphatically anticipated both serious wrongdoings (murder, assault, theft, and attack) and vandalism related misdemeanours (thievery and engine vehicle burglary).

8.5.1 Integrating Weather and Pollution Effects: A Final Note

Climate and environment issues cost billions of dollars in losses around the world each year. These losses would be lesser it were conceivable to represent the effects on both air and water quality and the resulting sway on human wellbeing.

In a collaborative effort, researchers from NCDC, the Cooperative Institute for Meteorological Satellite Studies–Wisconsin, and the Cooperative Institute for Climate and Satellites–North Carolina summed up the present status of logical

information in regards to noticed and extended changes in climate and environment boundaries alongside their effect on air and water quality in an article named "Changes in Weather and Climate Extremes: State of Knowledge Relevant to Air and Water Quality in the U.S." distributed in the *Journal of the Air and Waste Management Association*. As indicated by the researchers, heat waves, dry seasons, fierce blazes, cold waves, snowfall, and flooding would all be able to influence air and water quality. During heat waves, the air gets stale and traps transmitted contaminations, regularly bringing about increases in surface ozone. Warmth waves and dry spell additionally dry out vegetation and give more fuel to out of control fires whose smoke is a genuine clinical risk. One kind of cold wave additionally permits air pollution to accumulate. What's more, extreme snow storms that take out electricity can indirectly lead to more air quality issues as individuals use wood and coal consuming stoves, chimneys, and gas or diesel generators to remain warm.

Floods coming about because of increases in heavy precipitation or from snowmelt can cause connected sewer flood frameworks, which are intended to release overabundance wastewater when under outrageous pressure, to flood all the more frequently into close by lakes, streams, or different waterways, causing water quality difficulties in cities.

Check Your Progress

3. What is atmospheric pressure factor?
4. What are the impairments produced by altitudes over 3,000 m?

8.6 ANSWERS TO CHECK YOUR PROGRESS QUESTIONS

1. The El Niño is the warm period of the ENSO, the El Niño Southern Oscillation, when a huge region of warm water is created in the eastern tropical Pacific coast off South America, prompting expanding temperatures in the region, just as dry season in certain territories.
2. Hypothermia condition occurs when your internal heat level dips under 95F (35°C).
3. Atmospheric pressure factor, otherwise called barometric pressing factor (after the gauge), is the pressure factor inside the atmosphere of Earth.
4. High altitude produces significant impairments in various cognitive performance. Changes in psychomotor execution, mental abilities, response time, vigilance, memory, and logical reasoning have all been estimated at heights over 3,000 m (9,843 ft).

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8.7 SUMMARY

- In a physical environment that encounters the four periods of the climate, change of human conduct is seen in each season.
- In a nation where climate differs altogether, human behaviour can include everything from sunbathing on the sea shore in summers to remaining inside during winters.
- Individuals have various attitudes toward different climate conditions. A decent day can be portrayed as clear sky with insignificant overcast cover and a considerable lot of daylight. Terrible climate can be depicted as a sky with substantial overcast cover and negligible daylight.
- A few examinations have discovered a connection between high temperature and violent conduct. In the United States, crimes of different types increases on hot days, especially violent crimes (murder, attack, theft, and assault).
- It is by and large acknowledged that aerobic exercise capacity limit in hot conditions is diminished while running may even be improved. The effect of environmental temperature and humidity on endurance performance can be huge.
- Experts have found that cold temperatures can impact our considerations and choices without us knowing it.
- Muscular performance deteriorates in the cold. With impaired muscle function there is an overall hindrance towards physical work capacity.
- Wind perception studies date to the 1970s, following urbanization principles formed around mixed high and medium-rise buildings and the resulting wind forces induced because of this irregular landscape.
- As a species, we appear to have a high awareness and a shockingly low resistance of wind.
- The complexity of human physiological adaptation to high altitude gives rise to various likely reactions. Although each syndrome will be depicted independently, there is extensive overlap between them.
- Hypoxia occurs in high altitudes due to the diminished barometric pressing factor and the resultant decrease in surrounding oxygen.
- Higher altitudes have lower levels of oxygen and decreased air pressure. When one travels in a plane, drives or hikes up a mountain, the body may not have enough time to adjust. This can result in acute mountain sickness.
- While quickly rising to high altitudes may bring about death, moderate climbing by mountain climbers can be effective when combined with compensatory physiological variation measures.
- High altitude produces significant impairments in various cognitive performance. Changes in psychomotor execution, mental abilities, response

time, vigilance, memory, and logical reasoning have all been estimated at heights over 3,000 m.

- Air pollutions toll on human wellbeing is all around recorded. It is the main source of mortality in India, adding to the demise of more than 1.6 million individuals every year.
- Air contamination may likewise prompt mental issues, for example, dementia and attention deficit hyperactivity issue.

8.8 KEY WORDS

- **Hypoxia:** It refers to deficiency in the amount of oxygen reaching the tissues.
- **Hypothermia:** It is a medical emergency that occurs when your body loses heat faster than it can produce heat, causing a dangerously low body temperature.
- **Alkalosis:** It is a condition in which the body fluids have excess base (alkali). This is the opposite of excess acid (acidosis).

8.9 SELF ASSESSMENT QUESTIONS AND EXERCISES

Short-Answer Questions

1. Write a short note on psychological reactions to ambient temperatures.
2. How does heat react with various parts of the body?
3. What is the red dress effect?
4. Write a short-note on how to acclimatize to high altitudes.
5. How does air pressure effect cognitive performance?

Long-Answer Questions

1. Describe how does heat impacts social behaviour.
2. Examine how cold temperatures effect performance.
3. Discuss the behavioural effects of wind.
4. Explain the physiological effects of reduced barometric pressure.
5. Discuss the impact of air pollution on behaviour.

8.10 FURTHER READINGS

Bell, P A, J D Fisher, Loomis R J. 1978. *Environmental Psychology*. Philadelphia: W.E. Saunders Co.

Fisher J D, P A Bell, Baum A. 1984. *Environmental Psychology, 2nd Edition*. New York: Holt Rinehart & Winston.

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BLOCK - III
ENVIRONMENTAL INFLUENCES

UNIT 9 PERSONAL SPACE AND TERRITORIALITY

Structure

9.0 INTRODUCTION

Personal space is the area surrounding an individual which they regard as psychologically theirs. People value their personal space and feel uncomfortable, angry, or anxious if their personal space is invaded upon. Allowing a person to enter into personal space and entering someone else's personal space are signs of perception of those people's relationship. An intimate zone is reserved for close friends, lovers, children and close family members. Another zone is used for conversations with friends, to chat with colleagues, and in group discussions. A further zone is reserved for strangers, newly formed groups, and new acquaintances. A fourth zone is used for speeches, lectures, and theater; mainly, public distance is that range reserved for larger audiences. Human territory research has generally been focused in a variety of settings including urban neighborhoods, libraries, mall parking lots, and areas around phones in public places. It refers to an intertwined

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system of emotions, beliefs, and behaviors that are place specific, socially and culturally influenced, and are linked to person-place transactions dealing with issues of setting management, maintenance, and expressiveness. A better understanding of human territoriality and its application in outdoor recreation settings has the potential to contribute to a more comprehensive understanding of recreation experience and conflict. In this unit, we will study in detail about the personal space and territoriality.

9.1 OBJECTIVES

After going through this unit, you will be able to:

- Describe the meaning and importance of personal space
- Discuss the methods for studying personal space
- Explain the interpersonal positioning effects
- State the consequences of personal space invasion

9.2 PERSONAL SPACE

Environmental psychologists work at three degrees of investigation: (a) crucial psychological measures like impression of the climate, spatial comprehension, and personality as they channel and construct human experience and conduct, (b) the administration of social space: personal space, territoriality, swarming, and security, and the actual setting parts of complex regular practices, for example, working, learning, living in a home and local area, and (c) human associations with nature and the role of psychology in environmental change.

According to Gifford, personal space is the dynamic distance and orientation component of interpersonal relations. This subject has been studied longer than any other matter of environmental psychology.

By mid-century, environmental psychology had become a well-established subject including works on topics, for example, personal space, sensory isolation and building plans. Numerous personal and situational impacts cooperate with interests for specific interpersonal distances. For instance, men have bigger personal spaces. Fascination and collaboration for the most part lead to more modest interpersonal distance, while more negative settings, for example, shame and inconsistent status lead to bigger distances. When the actual setting is not spacious enough, greater interpersonal distances are chosen. Social differences in interpersonal distance exist (e.g., Hall, 1966), though different factors frequently change social inclinations.

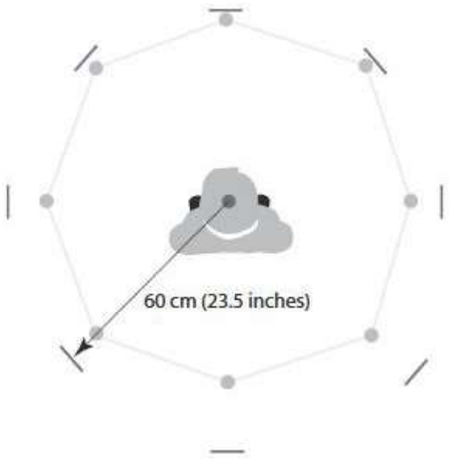

Fig 9.1 *The Average Dimensions of Personal Space for North American University Students Approached from Different Directions*

9.2.1 Functions of Personal Space

In 1966, anthropologist Edward Hall identified four different zones of personal space Americans like to keep around them:

1. Intimate distance: This extends roughly to 18 inches (46 cm) from the individual and is reserved for family, pets and very close friends. Displays of affection and comforting are commonly conducted within this space. The only strangers an individual typically accepts within his or her intimate space are healthcare professionals.
2. Personal distance: This extends 1.5 to 4 feet (0.46-1.2 m) and is reserved for friends and acquaintances. A handshake will typically place strangers at least 2 to 4 feet (0.6 1-1.2 m) apart, preserving the personal space.
3. Social distance: This extends from about 4 to 12 feet (1.2-3.7 m) and is used for formal, business and other impersonal interactions such as meeting a client.
4. Public space: This extends more than 12 feet (3.7 m) and is not guarded. Secret Service agents will commonly attempt to ensure 12 feet (3.7 m) of open space around dignitaries and high ranking officials.

Personal space has changed historically together with the boundaries of public and private in European culture since the Roman Empire. Personal space is also affected by a person's position in society with more affluent individuals demanding a larger personal space.

Take India for example. Let us take travelling in a bus. Here you will find

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that people are pushed and jostled and they stand packed in a bus each touching the other's body. On the other hand in European countries, especially in the USA the Americans will tend to pull in their elbows and knees and try not to touch or even look at one another while riding on the bus. Thus cultural differences and the use of colour in the physical environment can have a great impact upon people's interaction with others.

9.2.2 Methods for Studying Personal Space

The experience of personal space was studied by different target interpersonal distance and subjects' impression of interpersonal distance. Irrespective of gender, a few personality qualities, and target size of personal space, actual personal space is bigger than target personal space. However in non-personal space circumstances, subjects did not overestimate distance. In personal space circumstances, people evidently accept they are farther from others than they really are.

What is Proxemics?

Proxemics is the investigation of human utilization of space and the impacts that population thickness has on conduct, correspondence, and social association. As per Hall, the investigation of proxemics is important in assessing not just the manner in which individuals interact with others in daily life, but also "the association of space in [their] houses and structures, and at last the format of [their] towns".

9.2.3 Situational Determinants of Personal Space: Research Evidence

There is a close connection between the idea of personal space and territoriality. We construct houses, erect wall or some other markers and protect this asserted territory against attack. It is seen at numerous places that there are predefined parking spots in a street. Individuals keep their vehicles in that specific space. The strength of resentment differs from individual to individual. Territoriality is firmly identified with personal space. As per Altman and Chemers (1980) territory can be partitioned into three kinds, viz., primary, secondary and public territory.

9.2.4 Individual Difference Determinants of Personal Space: Research Evidence

The findings of psychologist Sommer (1959) presented that the attitude of schizophrenic patients vary from one extreme end to another, that is, from very small interpersonal distance to a very large one. It was also found that where there was an attraction between individuals and there existed a cordial bond, there was a reduced requirement of personal space. Likewise, when there was unfriendly interaction between individuals, they moved apart and there was a strong requirement of personal space.

Personal space interacts with the direction of our attitude, irrespective of it being negative or positive. Fisher and Byrne (1975) showed that individuals' attraction towards a person is an element of their utilization of interpersonal distance while interacting with them. It was also found that it depended upon the gender aspect.

9.3 INTERPERSONAL POSITIONING EFFECTS

Interaction is a significant part of our daily lives, viz., at work, at play or rest, and we should know about the expected positive and negative aspects of the utilization of interpersonal distance. The utilization of interpersonal distance is a significant part of the regulation of interaction and it influences the relationships considerably which ultimately affects the effectiveness of the interaction. Personal space makes us comfortable while interacting with others. It further saves us from potential physical appropriation. Moreover the breach of personal space which impacts one's mental wellness takes place in context of crowding.

9.4 SPATIAL ZONES THAT FACILITATE GOAL FULFILLMENT

Certain spatial zones are said to increase goal fulfillment, for example students opting for library for reading purpose. In positive psychology, a flow state, also referred to being in the zone, is the psychological state wherein an individual doing some work is completely immersed in a feeling of intense focus and involved fully in the task while enjoying the process of doing work. Generally, flow is portrayed by complete involvement in an activity. Named by Mihály Csíkszentmihályi in 1975, the idea has been broadly alluded to as a flow state in various fields.

9.5 CONSEQUENCES OF TOO MUCH OF TOO LITTLE PERSONAL SPACE

Personal space is referred to as a body buffer region that individuals keep between themselves and other people. In reality it alludes to the invisible bubble which we carry around us and it characterizes how close we will move toward others and how close we will permit others to move toward us. It is significant when we communicate with others. All of us have a specific measure of personal space and it changes according to different circumstances. We are a lot of mindful about the personal space. Our behavior with others depends upon our personal space.

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When one is at home, one can choose a specific amount of space around oneself inside which others will not be allowed to enter. Not just home but also at workplace or in school, or in a cinema lobby or a show, one changes the personal space considering where the individual is. In this manner, we can say that personal space shifts with time and place. Personal space or the bubble is something which keeps an inconspicuous command over a person's behaviour with others. Personal space spans a huge continuum which is dictated by various variables, social or cultural standards and immediate environment. The primary concern in this setting is that personal space impacts a person's behaviour and experience and the other way around.

Researches recommend that the personal space bubble is not circular in shape, however curved, in that it is larger in front and behind the person than that of the sides. Situational impacts on personal space have tended to focus on the social instead of the actual setting. It is usually found that when there is a strong attraction between people for example strong friendship, they are more likely to reduce their personal space.

9.6 CONSEQUENCES OF PERSONAL SPACE INVASION

When personal space is invaded people are expected to exhibit certain defensive behaviours. There are three different types of defenses. When someone uses a coat, sign, or fence to defend a territory, it is called a prevention defense. One anticipates infringement and acts to stop it before it occurs.

Reaction defenses, on the other hand, are responses to an infringement after it happens. Examples range from slamming a door in someone's face or physically striking the infringer to court actions for copyright violations.

The third type is the social boundary defense. Used at the edge of interactional territories, the social boundary defense consists of a ritual engaged in by hosts and visitors. For example, you need a password to enter many Websites. Another example is the customs office at the national border. Social boundary defenses serve to separate wanted visitors from unwanted ones.

9.7 TERRITORIAL BEHAVIOUR: KEEP OFF MY TURF

People use the real space among them according to complex rules and strong tendencies. But these standards and tendencies are not known for the most part.

Personal space, territoriality, and crowding are the essential segments of social space.

Territoriality in individuals is seen as a pattern of behaviour and experience related to the control, usually by non-violent strategies, for instance, occupation, law, custom, and personalization, of real space, objects and thoughts. Seven kinds of territory (fundamental, discretionary, public, objects, considerations, interactional, and body) have been distinguished (Altman, 1975); assurance methods (shirking, reaction, and social cutoff points) are used in view of infringements (assault, encroachment, and corrupting). Men are usually more territorial than women. Strategic planning of dwelling exteriors and street plans (impeccable space) improves inhabitants' territoriality and diminishes crime (e.g., Newman, 1972).

Methods like personalization, status and marking are used more to control space and ideas than using physical aggression. Theories of territoriality emphasize its organizing function and evolution than its link with aggression (Edney, 1976). Architects should bring into use the knowledge of territoriality to allow customers create as much control as they can exercise responsibly under the limits of organizational context; a territory occupant at that point gets profit from a greater sense of self-determination, identity, and even security.

9.7.1 Functions of Territoriality

Territoriality serves four functions: it provides security, privacy, autonomy, and self-identity, all of which are important for well-being. Many factors, such as age, sex, culture, and health status, affect the way people relate spatially to one another. The concept of territoriality is spread everywhere. The time you realize their presence, you find that the indications of human territoriality are everywhere: books spread out on a cafeteria table to reserve a spot, nameplates, wall, etc. There are billions of territories on the planet; some are small, others are large, some are inside others, (for example, an individual's room inside a home), and some are shared.

Primary territories are spaces possessed by people or primary groups, who control them relatively on a permanent basis and consider them integral in their daily lives, e.g., your room or a family's residence. Such territories have a high psychological importance in their owners' minds.

Secondary territories are less significant to their residents in comparison to the primary ones, however they do have a moderate importance to their inhabitants. An individual's table and chair at workplace, most loved eatery, locker in the gym, and playing area at home are some of the examples. Control of these territories is less vital for the resident and is bound to change.

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Public territories are the zones open to anybody on favourable terms with the local community. Beaches, sidewalks, and lodges are public territories. Sometimes, due to inadmissible behaviour, public territories are shut for some people. Retail stores, for instance, are public territories open to everybody. Nonetheless, somebody who causes inconvenience might be prohibited from a specific store.

One's physical self can be considered as a body territory. The limit is at one's skin. Bodies may be entered with authorization (as in a medical procedure) or without consent (as in a knife attack). A few people check and personalize their own bodies with cosmetics, adornments, tattoos, piercings, and dress, however they absolutely safeguard and attempt to control access to their bodies by others.

Two different sorts of territories also exist, though they are not given universal recognition. Objects meet a part of the standards for territories—we mark, personalize, protect, and control our assets. Ideas are also sometimes considered as territories. We safeguard them through patents and copyrights. There are rules against counterfeiting. Programmers, writers and lyricists attempt to protect their software, scripts and songs respectively.

How to mark your territory?

Now and then individuals erect genuine limits to have a special interest in their personal space.

As per correspondence educator Mark L. Knapp and social analyst Judith A. Lobby, this is a mainstream reaction to infringements (or anticipated infringements) of our territory. Leaving an "involved" sign on a plane seat, hanging a coat over the rear of a seat in a café, masterminding a towel and sunscreen on a lodging poolside parlor, or spreading books across a library work area designate "this spot is mine, and I will be getting back to guarantee it—so keep off!" truth be told, a great many people get pretty annoyed in the event that somebody stoops to move their markers. "Hello, I was here first!"

Individuals regularly mark where their territory starts or closes. A fence may isolate one yard from that of a neighbour, similarly as painted lines outline parking spots, and the room entrance plainly portrays that territory from the rest area of the home. You may likewise officially check your territory with your name or a symbol, for example, a club's symbol or your initials. "This room has a place to..." is a famous sign for the individuals who need to clarify that intruding will not go on without serious consequences.

9.7.2 Research on Territoriality in Humans

Research on territoriality in humans has been carried out and studied for the greater part a century and in 21st century we use it everywhere, directly from parking garages to even local prisons. Previous studies in human territoriality have focused

largely on behavior in urban settings. It is only recently that researchers are examining this construct in the context of forest settings. This study was designed to assess the territorial responses of visitors to Bald Eagle State Forest in central Pennsylvania and explore the structure and predictive validity of a proposed territoriality scale. Results indicated the sample was relatively homogenous in terms of demographics but included consumptive as well as non-consumptive forest visitors. Further analysis demonstrated only limited support for an exploratory territoriality scale and suggested the need for further research into the meaning and structure of human territoriality in forest recreation settings.

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Check Your Progress

1. Define personal space.
2. List the various types of territory.
3. What do you mean by a flow state?
4. Name the seven kinds of territory.
5. What are the essential segments of social space?
6. Which functions does territoriality serve?

9.8 ANSWERS TO CHECK YOUR PROGRESS QUESTIONS

1. According to Gifford, personal space is the dynamic distance and orientation component of interpersonal relations.
2. As per Altman and Chemers, territory can be partitioned into three kinds, viz., primary, secondary and public territory.
3. In positive psychology, a flow state, also referred to being in the zone, is the psychological state wherein an individual doing some work is completely immersed in a feeling of intense focus and involved fully in the task while enjoying the process of doing work.
4. Seven kinds of territory are fundamental, discretionary, public, objects, considerations, interactional, and body.
5. Personal space, territoriality, and crowding are the essential segments of social space.
6. Territoriality serves four functions: it provides security, privacy, autonomy, and self-identity, all of which are important for well-being.

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9.9 SUMMARY

- Environmental psychologists work at three degrees of investigation: (a) crucial psychological measures like impression of the climate, spatial comprehension, and personality as they channel and construct human experience and conduct, (b) the administration of social space, and (c) human associations with nature and the role of psychology in environmental change.
- By mid-century, environmental psychology had become a well-established subject including works on topics, for example, personal space, sensory isolation and building plans. Numerous personal and situational impacts cooperate with interests for specific interpersonal distances.
- Irrespective of gender, a few personality qualities, and target size of personal space, actual personal space is bigger than target personal space.
- There is a close connection between the idea of personal space and territoriality.
- The findings of psychologist Sommer (1959) presented that the attitude of schizophrenic patients vary from one extreme end to another, that is, from very small interpersonal distance to a very large one.
- In positive psychology, a flow state, also referred to being in the zone, is the psychological state wherein an individual doing some work is completely immersed in a feeling of intense focus and involved fully in the task while enjoying the process of doing work.
- All of us have a specific measure of personal space and it changes according to different circumstances. We are a lot of mindful about the personal space. Our behavior with others depends upon our personal space.
- When personal space is invaded people are expected to exhibit certain defensive behaviours. There are three different types of defenses. When someone uses a coat, sign, or fence to defend a territory, it is called a prevention defense. Reaction defenses, on the other hand, are responses to an infringement after it happens. The third type is the social boundary defense. Used at the edge of interactional territories, the social boundary defense consists of a ritual engaged in by hosts and visitors.
- People use the real space among them according to complex rules and strong tendencies. But these standards and tendencies are not known for the most part. Personal space, territoriality, and crowding are the essential segments of social space.
- Methods like personalization, status and marking are used more to control space and ideas than using physical aggression. Theories of territoriality

emphasize its organizing function and evolution than its link with aggression (Edney, 1976).

- Territoriality serves four functions: it provides security, privacy, autonomy, and self-identity, all of which are important for well-being. Many factors, such as age, sex, culture, and health status, affect the way people relate spatially to one another.

9.10 KEY WORDS

- **Personal space:** It is the powerful distance and direction segment of interpersonal relations.
- **Territoriality:** It is a set of behaviours and cognitions an organism or a group exhibits which mainly based on perceived ownership of physical space or geographical area.

9.11 SELF ASSESSMENT QUESTIONS AND EXERCISES

Short-Answer Questions

1. What are the three degrees of investigation that environmental psychologists work at?
2. What is the connection between the idea of personal space and territoriality?
3. What were the findings of psychologist Sommer regarding the determinants of personal space?
4. How does personal space impact a person's behaviour and experience?
5. What are the three types of defenses?

Long-Answer Questions

1. Describe the functions of personal space.
2. 'When there is a strong attraction between people, they are more likely to reduce their personal space.' Explain.
3. Males are more territorial than females. Comment on the statement.
4. Elucidate how personal space is important for children.

9.12 FURTHER READINGS

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UNIT 10 CROWDING

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Structure

10.0 INTRODUCTION

Crowding is a concept that is very closely associated to population density. Population density is the number of individuals per unit area or volume. The social and psychological effects of crowding is long-term and critical. Continued stress resulting from crowding can have a detrimental effect on the health of individuals. In recent times, there has been a shift from rural to urban areas, which has posed

a new set of challenges. This unit will discuss the concept of crowding, population density, cognitive mapping and urbanization.

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10.1 OBJECTIVES

After going through this unit, you will be able to:

- Discuss crowding and its effects
- Explain the effects of population density on animals and humans
- Understand cognitive mapping and its effects on environmental conditions, race, gender and experience
- Examine the environmental solutions to urban problems

10.2 INTRODUCTION TO CROWDING

Crowding is a subjective experience that is only mildly related to the objective index and population density (Stokols, 1972). It exists in three modes (Montano and Adamopoulos, 1984): situational, (for example, the feeling of being constrained or having expectations dashed), emotional (typically negative, however positive emotions can happen as well), and behavioural, (for example, activity completion or assertiveness). Crowding is influenced by personal factors (e.g., personality, attitudes, sex), social factors (e.g., the number, type, and activities of others, and similarity in attitude), and physical factors (e.g., architectural features and spatial arrangements). High indoor population density has a detrimental impact on mental and actual wellbeing, task execution, child development, and interaction in social settings (e.g., Evans and Saegert, 2000).

The 1970s witnessed an increased focus on crowding as a subject experience. There have been innumerable attempts to define and explain the crowding phenomenon. Psychologists have tried to differentiate between crowding as a psychological construct wherein the amount of space available is less than required, and purely physical indices of physical space such as density. This distinction explains why certain high density events are preferred over the other.

Crowding can lead to a lot of stress, more particularly over a period of time. When people experience crowding, their social interactions get altered. They either withdraw from others or create more psychological space and eventually become more irritable and aggressive. The most natural way to deal with crowding is through social withdrawal.

People in certain societies appear to adapt to high density better, however sensory overload a lack of personal control can lead to negative outcome. Short - term high density may have positive results when social and physical state are better. High outdoor density, as in large urban communities, surely can provide

varied social and cultural experience. To reduce the negative effects of high density through environmental design, more space is not always needed. Rather, careful environmental design (such as partitioning and behavioural Zoning) can ease crowding within a limited space.

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10.3 EFFECTS OF POPULATION DENSITY ON ANIMALS

The growth rate usually changes with time as the population increases or decreases. Certain studies were used to determine whether the growth rate of animal populations is a function of the population density. In most mathematical models of populations whose changes resemble those of actual populations, the growth rate is a decreasing function of density, meaning that as the population increases the growth rate decreases and vice versa. Records of actual populations can be used to test the relation between growth rate and density by calculating correlation coefficients for these two characteristics.

The primary conclusion is that in most animal species a population's growth rate is a decreasing function of density. This explains the relative stability of animal populations, which never continue to increase at rates their fertility would allow, and rarely decrease to extinction. Tentative conclusions are presented regarding the processes regulating population numbers. Populations of herbivorous insects at low and moderate levels are regulated by disease, parasites, and predators causing mortality that is an increasing function of density. Favorable conditions may allow an increase in insect numbers so rapid that the population temporarily escapes regulation by its enemies. Non-territorial species of vertebrates are normally controlled by predation and, when that fails, by competition; in both cases juvenile individuals are most affected. In territorial vertebrates competition for suitable territories determines the size of the breeding population. Populations of vertebrate species (expecting man) are in general regulated by the production of adult individuals being a decreasing function of population density.

10.3.1 Psychological Consequences of High Density for Animals

A population consists of all the organisms of a given species that live in a particular area. The statistical study of populations and how they change over time is called demography. Two important measures of a population are population size, the number of individuals, and population density, the number of individuals per unit area or volume. Ecologists estimate the size and density of populations using quadrats and the mark-recapture method. The organisms in a population may be distributed in a uniform, random, or clumped pattern. Uniform means that the population is evenly spaced, random indicates random spacing, and clumped means that the population is distributed in clusters.

10.3.2 Conceptual Perspectives: Attempts to Understand High Density Effects in Animals

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Population density is often used as a simple relative measure of how an organism responds to local conditions. If conditions are not good for the species, the density will be low (organisms will have died or moved out of the sampled area), whereas if conditions are good the density will be high (organisms will have reproduced and/or immigrated into the area). In this way, changes in density can provide insight into the natural history of the preferences and tolerances of individuals of the species. Of course, if the species is regulated by density-dependent processes (e.g., mortality or emigration) then the relationship of density with the attractiveness of the environment can be obscured. Even though the environment changes in a positive way, there may be no increase in density.

Sometimes, density can be used as an explicit proxy for population size, which of course is what many ecologists want to know about. This is particularly true in applied ecology (e.g., conservation and fisheries science). Unfortunately, the link between population density and population size is not always direct.

Check Your Progress

1. What are the negative effects of high indoor population density?
2. What are the two important measures of a population?

10.4 EFFECTS OF HIGH DENSITY ON HUMANS

Overcrowding and its associative effects result from:

1. The high 'social density' in homes, schools, clinics, camps;
2. The high 'spatial density' of the camp, in particular, congested buildings and roads, and lack of public spaces, including playgrounds and meeting places;
3. The burden placed on the already insufficient infrastructure and utilities, including roads, water supply, and electricity, and public services, including health and education.

The social and psychological effects of overcrowding are immediate, long-term, cumulative, multiple, mutually reinforcing, direct as well as indirect, and critical. Overcrowding is likely to worsen.

Overcrowding affects all segments of the population in common and particular ways. Social and psychological effects of overcrowding are experienced among individuals and within relationships at the following levels:

Within households, due to:

(a) Lack of personal privacy

(b) Exposure to others' behaviours and personal activities between families and households, since multi-family households are common and space

within households is constricted within the camp as a whole, due to physical congestion

(c) Crowded and overburdened social services, and

(d) Limited public spaces and buildings for meeting socially

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10.4.1 Methodologies Used to Study High Density in Humans Feeling the Effects of Density

To study the demographics of a population, we will have to start with a few baseline measures. One is simply the number of individuals in the population, or population size—N. Another is the population density, i.e., the number of individuals per area or volume of habitat.

Size and density are both important in describing the current status of the population and, potentially, for making predictions about how it could change in the future:

(a) Larger populations may be more stable than smaller populations because they are likely to have greater genetic variability and thus they have more potential to adapt to changes in the environment through natural selection.

(b) A member of a low-density population—where organisms are sparsely spread out—might have more trouble finding a mate to reproduce with than an individual in a high-density population.

It is impossible to calculate the exact size of a population. Scientists often estimate a population's size by taking one or more samples from the population and using these samples to make inferences about the population as a whole. A variety of methods can be used to sample populations to determine their size and density. Here, we will look at two of the most important: the quadrat and mark-recapture methods.

(a) **Quadrat method:** For immobile organisms such as plants—or for very small and slow-moving organisms—plots called quadrats may be used to determine population size and density. Each quadrat marks off an area of the same size—typically, a square area—within the habitat.

(b) **Mark-recapture method:** For organisms that move around, such as mammals, birds, or fish, a technique called the mark-recapture method is often used to determine population size. This method involves capturing a sample of animals and marking them in some way—for instance, using tags, bands, paint, or other body markings, as shown below. Then, the marked animals are released back into the environment and allowed to mix with the rest of the population.

Of the several methods of describing the spatial distribution of population, the simplest way is percentage distribution of population over the geographical areas. Another methodology usually adopted is to list the geographical

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areas of a given class into rank order which enables comparison of ranking from census to census. This provides changes in population trends over time. There are also other methods which are generally used to study population distribution like calculation of median point, the mean point or the centre of population, the point of minimum aggregate travel, and the point of maximum population potential.

10.4.2 Consequences for Affect, Arousal, and Illness- Effects of Density on Social Behaviour

Population density has adverse effects on social behaviour and relationships. This effect of population density on social behaviour, therefore, deserves more attention and should be thoroughly investigated. Social stress is ubiquitous in the lives of social animals. While significant research has aimed to understand the specific forms of stress imparted by particular social interactions, less attention has been paid to understanding the behavioural effects and neural underpinnings of stress produced by the presence and magnitude of social interactions. However, in humans and rodents alike, chronically low and chronically high rates of social interaction are associated with a suite of mental health issues, suggesting the need for further research.

10.4.3 Effects of High Density on Task Performance

The influence of high levels of density on human health and behaviour may be determined more by the individual's beliefs about his/her relationship to the environment than by the environment itself. An important implication of this analysis is that the behaviour and health of those experiencing high density conditions can be altered or improved not only by changing their environment, but also by changing their attitudes toward their environment. Thus both interventions that actually provide people with the opportunity to terminate, periodically escape, or modify unwanted stimulation and those that otherwise provide them with the belief that such changes are within their power should similarly ameliorate the negative impact of high density.

10.4.4 Putting the Pieces Together: Conceptualizations of Density Effects on Humans

There are various physical and human factors affecting the density of the population. While population distribution is concerned with how individuals are distributed or spread throughout a certain area, population density is the average number of individuals per unit of geographical area.

Some of the factors that affect the density of a population are discussed below.

Physical Factors

The physical factors affecting population density are as follows:

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1. **Relief and landforms:** Lowland plains, flat river valleys and deltas and volcanic areas with fertile soil tend to have high population densities. Mountainous areas with steep slopes and poor quality soil tend to have low population densities.
2. **Weather and climate:** Temperate areas which scarcely experience extremes of weather and climate tend to be more densely populated than areas which experience extreme weather conditions. Areas which are very dry, very cold or very wet tend to have sparse population whereas areas which have a moderate climate with evenly distributed rainfall or monsoon type climates have denser populations.
3. **Soil type and quality:** Areas which have rich, fertile soils tend to have higher population densities than areas which have poor quality soils. Good quality soils may be found in low lying areas, in volcanic areas and in areas which have a high natural humus content. Poor quality soils may be found in areas with steep slopes, areas with very high rainfall throughout the year which tends to leach nutrients from the soil, and areas experiencing soil degradation through human management, i.e. over-grazing/deforestation.
4. **Water supply:** Water supply is essential for human survival and development and because of this areas which have sufficient water (but not too much) tend to have denser populations than areas which are dry or suffer from regular drought or areas which have excessive rainfall or which may be prone to flooding.
5. **Vegetation:** Some types of vegetation make the development of settlement more likely, e.g. grasslands. Areas with particularly dense rainforest, coniferous forests or those with little vegetation tend to have sparse populations.
6. **Raw materials/natural resources:** Areas with a wealth of natural resources such as oil, coal or minerals may have higher population densities than areas which do not have access to raw materials or natural resources. However, it is important to remember that natural resources may be found in otherwise harsh environments and that they may be traded and exported/used in areas other than where they are extracted.
7. **Natural threats:** These may affect population density as people may try to avoid areas where pests, threatening animals and diseases are particular risks.

Human Factors

The human factors affecting population density are as follows:

1. **Agriculture:** Areas with well-developed farming methods are often densely populated.

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2. **Secondary industry:** Those areas in which manufacturing has developed tend to be densely populated. It is worth noting that even in old industrial areas in which manufacturing has declined or even stopped, population densities may remain high.
3. **Accessibility:** Areas with well-developed transport infrastructure and links through road, rail, shipping, canals and air are likely to be more densely populated than areas which are poorly connected.
4. **Political decisions:** Government policy can have a significant impact upon population density. This can occur if governments decide to provide boost to previously underdeveloped areas (e.g. Brasilia and the development of the Trans-Amazonian Highway in Brazil; the movement of Han Chinese to Tibet; the development of Abuja as a new capital city in Nigeria). If governments decide not to invest in an area, it may also result in a large number of people leaving which can lead to reduced population density.
5. **Conflict:** Wars and conflicts can lead to significant movements of population and a simultaneous decrease in density in some areas while in other areas it may increase.

Check Your Progress

3. Mention the two important methods used to sample populations to determine their size and density.
4. How does conflict influence population density of a region?

10.5 ELIMINATING THE CAUSES AND EFFECTS OF CROWDING: LOOK TO THE FUTURE

Crowded living conditions increase the risk of the spread of infectious diseases, such as respiratory infections, meningococcal disease, rheumatic fever and tuberculosis. The better planning of the house and the surrounding living environment can reduce crowding, and access to functioning health hardware, such as hot water, showers and clothes washing facilities, can reduce the health impacts of crowding.

Crowding of a house may be a regular, temporary and desirable event. A party, ceremony or sports carnival may all be important cultural events involving large numbers of people. This should not be confused with long term, involuntary crowding together of one large family into a very small house or the crowding of several families into one house due to lack of available housing or poverty.

10.5.1 The City: Perceiving and Experiencing the City

In 1960, Kevin Lynch wrote *The Image of the City* in which he dealt with the concept of imageability and readability of the city: how people see and interpret

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the city, build their own image of it, and the mental maps of the city, through the things they see, remember, the messages and signage they perceive and, in general, through the elements and signs of the urban landscape. Lynch's analysis mostly dealt with the idea of walking through the city, and the elements of the city which were taken in consideration were mostly physical (signs, posts, parks, stores, etc.).

10.5.2 Effects of Urban Life on the City Dweller: Research Evidence

Cities are known to play multifaceted functions in all societies. They are the heart of technological development and economic growth of many nations, while at the same time they serve as a breeding ground for poverty, inequality, environmental hazards, and communicable diseases. When large numbers of people congregate in cities, many problems result, particularly for the poor. For example, many rural migrants who settle in an urban slum area bring their families and their domesticated animals—both pets and livestock—with them. This influx of humans and animals leads to vulnerability of all migrants. Furthermore, most urban poor live in slums that are unregulated, have congested conditions, are overcrowded, are positioned near open sewers, and restricted to geographically dangerous areas such as hillsides, riverbanks, and water basins subject to landslides, flooding, or industrial hazards. All of these factors lead to the spread of communicable and non-communicable diseases, pollution, poor nutrition, road traffic, and so on. The problems faced by the poor spill over to other city dwellers. As the trend of urbanization continues, this spillover effect has increased and taken on a global dimension as more and more of the world's populations are affected.

10.5.3 Stress

Stress is your body's reaction to a challenge or demand. In short bursts, stress can be positive, such as when it helps you avoid danger or meet a deadline. But when stress lasts for a long time, it may harm your health. Stress is a feeling of emotional or physical tension. It can come from any event or thought that makes you feel frustrated, angry, or nervous.

10.5.4 Coping

Coping skills help you tolerate, minimize, and deal with stressful situations in life. Managing your stress well can help you feel better physically and psychologically and it can enhance your ability to perform your best. There are two different types of coping strategies:

- Problem-based coping is helpful when you need to change your situation, perhaps by removing a stressful thing from your life. For example, if you're in an unhealthy relationship, your anxiety and sadness might be best resolved by ending the relationship (as opposed to soothing your emotions).
- Emotion-based coping is helpful when you need to take care of your feelings. This refers to a situation when you either don't want to change your situation

or when circumstances are out of your control. For example, if you are grieving the loss of a loved one, it'd be important to take care of your feelings in a healthy way (since you can't change the circumstance).

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10.5.5 Affiliative Behaviour and Performance

Several studies have been conducted to understand affiliative behaviour and its importance in social environment. An affiliative behaviour is often defined as friendly and peaceful acts exchanged among individuals. Affiliative behaviours occur across a wide variety of taxa, but are particularly common among birds and mammals, and are often found within the category of social interaction.

10.5.6 Crime

Effective environments relating to criminal behaviour can be explained on three levels:

- **Macro level:** It refers to general features of the larger scale of environment, or society.
- **Medium level:** It refers to environmental characteristics on a city level.
- **Micro level:** It refers to the situation and circumstances of a particular location in a particular environment.

10.5.7 Long-term Behavioural Effects on Health

A little stress every now and then is not something to be concerned about. Ongoing, chronic stress, however, can cause or exacerbate many serious health problems, including:

- Mental health problems, such as depression, anxiety, and personality disorders
- Cardiovascular disease, including heart disease, high blood pressure, abnormal heart rhythms, heart attacks, and stroke
- Obesity and other eating disorders
- Menstrual problems
- Skin and hair problems, such as acne, psoriasis, and eczema, and permanent hair loss
- Gastrointestinal problems, such as GERD, gastritis, ulcerative colitis, and irritable colon.

It is obvious that long term physical stress would affect a person even behaviourally.

Check Your Progress

5. Who wrote *The Image of the City?*
6. What are the advantages of developing coping skills?

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10.6 COGNITIVE MAPPING AND ITS RELATIONSHIP WITH ENVIRONMENTAL CONDITIONS, SOCIOECONOMIC STATUS, RACE, GENDER AND EXPERIENCE

A cognitive map is a visual representation of a person's (or a group's) mental model for a given process or concept. Let us first discuss the relationship between environmental conditions and imagery.

Relationship between Environmental Conditions and Imagery

Imagery is a widely used method of communication. It contains phenomenal power in its ability to connect to an audience and convey ideas. Contemporary environmental imagery has been widely utilized by environmental advocacy organizations and those involved in the modern environmental movement. These types of imagery are used as a call to action, for eco-tourism promotion, and in political campaigns. Historical images, particularly World War II propaganda and retro eco-tourism posters, have been reutilized to promote environmental messages. However, these images bring with them notions of late nineteenth century conservationist assumptions of class, race, and socioeconomic status that should be considered. Similar themes can be found throughout images promoting adventure tourism and extreme outdoor sports. In addition to these contested themes, modern environmental imagery also raises different ideas of nature and the environment. Because images communicate differently than words, it is important to view these images with a slightly more critical eye, understanding the preconceptions that lie behind them, the sense of identification they attempt to generate, the calls to individual action they evoke, and the contexts in which they are created and distributed.

Socioeconomic Status and Cognitive Mapping

Policymakers are in the quest of a powerful and easy-to-use tool for representing the perceived causal structure of a complex system that could help them choose and develop the right strategies. In this context, fuzzy cognitive maps (FCMs) can serve as a soft computing method for modelling human knowledge and developing quantitative dynamic models. FCM-based modelling includes the aggregation of knowledge from a variety of sources involving multiple stakeholders, thus offering a more reliable final model. The average aggregation method for weighted interconnections among concepts is widely used in FCM modelling. In this research, we applied the OWA (ordered weighted averaging) learning operators in aggregating FCM weights, assigned by various participants/stakeholders. Various scenarios examining the economic sustainability and livelihood diversification of poor women in rural areas were performed using the FCM-based simulation process implemented by the 'FCMWizard' tool. Overall, the proposed method

can support policymakers in eliciting accurate outcomes of proposed policies that deal with social resilience and sustainable socio-economic development strategies.

Race and Cognitive Mapping

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A 1975 exploratory study focused on the cognitive maps of class and racial inequalities by concentrating on 113 American and 101 English respondents. An Index of Perceived Inequality is constructed from nine items dealing with inequalities, both among classes and between races. It focused on the education, occupation, income, respect, and treatment by the police and courts. The index appeared reliable and valid, particularly for the United States. For the United States, factor analysis show that perceptions of class inequalities cannot be separated empirically from perceptions of racial inequalities on the basis of their interrelationships. Thus a single dimension can account for the common variation of the nine items. But in England perceptions of class and racial inequalities tend to separate into two distinct, though correlated, clusters. Additionally, for both countries there is support for grouping the items into those dealing with inequality of opportunity and those dealing with inequality of treatment and condition. Finally, compared with the English, Americans perceived more inequality. Americans were more likely to see a growing economic gap between the rich and the poor; they saw a larger number of social classes, and were more likely to say that money is the defining criterion of class.

Gender and Cognitive Mapping

A famous study focuses upon the personal geography of a group of school children aged between 6 and 11. Its objectives were to examine whether gender influences a child's awareness of place and ability to represent space. The analysis considered both the quantitative accretion of spatial knowledge and the qualitative structural changes associated with the internalization of environmental information. The different ways in which boys and girls come into contact with the environment seem to have important implications for the development of their cognitive abilities. From a young age, boys show a much more broad understanding of space, mentioning places much further away from their homes than girls. Their maps are more complex in form showing a good grasp of spatial relationships. Both in terms of cartographic competence and map accuracy, strong gender related differences are apparent, suggesting that boys by the age of 11 have already achieved a higher level of spatial competence. Such observations may well have educational repercussions, particularly for the way in which geography is introduced to adolescents. It is argued that what is needed, especially in the initial part of a school curriculum, is to make the subject rich in environmental experiences in order to compensate for the discriminatory influence of early gender expectations.

Relevant Experience and Cognitive Mapping

Cognitive mapping, mind mapping, and concept mapping are three powerful visual-mapping strategies for organizing, communicating, and retaining knowledge. They help us lay out complex ideas, processes, and recognize patterns and relationships.

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Cognitive maps, mind maps, and concept maps look and feel similar; this similarity causes confusion. They are three different ways of visualizing a mental model — whether it belongs to the designer, the researcher, or the user. Each has its strengths and benefits. Cognitive maps are the umbrella term for all visual representations of mental models.

A cognitive map is any visual representation of a person's (or a group's) mental model for a given process or concept. Cognitive maps have no visual rules that they need to obey: there is no restriction on how the concepts and the relationships between them are visually represented.

Check Your Progress

7. What is a cognitive map?
8. What are the three powerful visual-mapping strategies for organizing, communicating, and retaining knowledge?

10.7 ENVIRONMENTAL SOLUTIONS TO URBAN PROBLEMS

Urbanization is a pervasive phenomenon that is fairly recent. In present global atmosphere, all nations have been dealing with the challenges of environment, social, transportation, and economy. These issues are common in developing countries due to the difference of development in cities and villages (Latif Fauzi, 2007). Most of the countries focus on development of cities instead of rural areas. Consequently, the urban areas are equipped with infrastructure and public facilities. They also provide more employment opportunities in comparison to the rural areas. Therefore, inhabitants are more interested in migrating to cities to avail hi-tech facilities and enhance their lifestyles. Cities have a major role to play to enhance economic growth and prosperity. The sustainable development of cities largely depends upon their physical, social and institutional infrastructure. An urban area is spatial concentration of people who are working in non-agricultural activities. The essential characteristic is that urban means non-agricultural. Urban can also be explained as a fairly multifaceted concept. Criteria used to define urban can include population size, space, density, and economic organization. Typically, urban is simply defined by some base line size, like 20 000 people (Long 1998).

10.7.1 Defensible Space

Defensible space is defined as 'a residential environment whose physical characteristics – building layout and site plan – function to allow inhabitants themselves to become key agents in ensuring their security'.

Oscar Newman in 1976 argued that good design can help the resident feel a sense of ownership and responsibility for the area around them, which will encourage them to defend it and that the more space that is under the control and

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influence of the residents the less chances are there is for the criminal to operate in. These ideas were adopted by the UK police's initiative 'Secured by Design' in 1988, which has proved to be an excellent initiative; thousands of homes have benefitted from this theory. It has to be said though that the effectiveness of defensible space depends largely on the willingness and particularly the ability of the people in control of it to self-police it, but by and large it seems to have worked well in the UK.

10.7.2 Land Use

Land use involves the management and modification of natural environment or wilderness into built environment such as settlements and semi-natural habitats such as arable fields, pastures, and managed woods. It also has been defined as 'the total of arrangements, activities, and inputs that people undertake in a certain land type'.

10.7.3 Social Factors

Social factors, particularly those that are encountered early in life such as parental care, can have a profound effect on neurobiological trajectories and can have long-term consequences with respect to mental health. It has been largely accepted that normal brain development depends upon a complex interplay between genetic and environmental factors. The field of behavioural epigenetics has provided novel approaches. Experiences can therefore become 'biologically embedded', thereby influencing the development and maintenance of behavioural adaptations to environmental challenges.

10.7.4 Urban Renewal

Urban renewal is a program of land redevelopment often used to address urban decay in cities. Urban renewal is the clearing out of blighted areas in inner cities to clear out slums and create opportunities for higher class housing, businesses, and more. A primary purpose of urban renewal is to restore economic viability to a given area by attracting external private and public investment and by encouraging business start-ups and survival.

10.7.5 Escaping from the City

Escaping from the city can be understood by a simple example: China faces severe air pollution issues due to the rapid growth of the economy, causing concerns for physical and mental health as well as behavioural changes. Such adverse impacts can be mediated by individual behaviours such as traveling from polluted cities to cleaner ones. A study utilizes smartphone-based location data and instrumental variable regression to try and find out how air quality affects population mobility. Our results confirm that air quality does affect the population outflows of cities. An increase of 100 points in the air quality index will cause a 49.60% increase in population outflow, and a rise of 1 ¼g m"3 in PM 2.5 may cause a 0.47% rise in

population outflow. Air pollution incidents can drive people to leave their cities 3 days or a week later by railway or road. The effect is heterogeneous among workdays, weekends and holidays. Our results imply that air quality management can be critical for urban tourism and environmental competitiveness.

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Check Your Progress

9. What do you mean by land use?
10. What do you mean by urban renewal?

10.8 ANSWERS TO CHECK YOUR PROGRESS QUESTIONS

1. High indoor population density has a detrimental impact on mental and actual wellbeing, task execution, child development, and interaction in social settings.
2. Two important measures of a population are population size, the number of individuals, and population density, the number of individuals per unit area or volume.
3. Two of the important methods used to sample populations to determine their size and density are the quadrat and mark-recapture methods.
4. Wars and conflicts can lead to significant movements of population and a simultaneous decrease in density in some areas while in other areas it may increase.
5. In 1960, Kevin Lynch wrote *The Image of the City*.
6. Coping skills help you tolerate, minimize, and deal with stressful situations in life. Managing your stress well can help you feel better physically and psychologically and it can enhance your ability to perform your best.
7. A cognitive map is a visual representation of a person's (or a group's) mental model for a given process or concept.
8. Cognitive mapping, mind mapping, and concept mapping are three powerful visual-mapping strategies for organizing, communicating, and retaining knowledge.
9. Land use involves the management and modification of natural environment or wilderness into built environment such as settlements and semi-natural habitats such as arable fields, pastures, and managed woods.
10. Urban renewal is a program of land redevelopment often used to address urban decay in cities. Urban renewal is the clearing out of blighted areas in inner cities to clear out slums and create opportunities for higher class housing, businesses, and more.

10.9 SUMMARY

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- Crowding is a subjective experience that is only mildly related to the objective index and population density. The 1970s witnessed an increased focus on crowding as a subject experience. There have been innumerable attempts to define and explain the crowding phenomenon. Crowding can lead to a lot of stress, more particularly over a period of time. When people experience crowding, their social interactions get altered.
- A population consists of all the organisms of a given species that live in a particular area. The statistical study of populations and how they change over time is called demography. Two important measures of a population are population size, the number of individuals, and population density, the number of individuals per unit area or volume.
- Population density is often used as a simple relative measure of how an organism responds to local conditions. If conditions are not good for the species, the density will be low (organisms will have died or moved out of the sampled area), whereas if conditions are good the density will be high (organisms will have reproduced and/or immigrated into the area).
- The social and psychological effects of overcrowding are immediate, long-term, cumulative, multiple, mutually reinforcing, direct as well as indirect, and critical. Overcrowding affects all segments of the population in common and particular ways. Social and psychological effects of overcrowding are experienced among individuals and within relationships.
- It is impossible to calculate the exact size of a population. Scientists often estimate a population's size by taking one or more samples from the population and using these samples to make inferences about the population as a whole. A variety of methods can be used to sample populations to determine their size and density. Two of the most important methods are the quadrat and mark-recapture methods.
- The influence of high levels of density on human health and behaviour may be determined more by the individual's beliefs about his/her relationship to the environment than by the environment itself. An important implication of this analysis is that the behaviour and health of those experiencing high density conditions can be altered or improved not only by changing their environment, but also by changing their attitudes toward their environment.
- There are various physical and human factors affecting the density of the population. The physical factors can be weather, soil type, vegetation, availability of natural resources, etc. Human factors influencing population density can be presence of recent and modern agricultural methods, secondary industry, accessibility, etc.
- Crowded living conditions increase the risk of the spread of infectious diseases, such as respiratory infections, meningococcal disease, rheumatic

fever and tuberculosis. The better planning of the house and the surrounding living environment can reduce crowding, and access to functioning health hardware, such as hot water, showers and clothes washing facilities, can reduce the health impacts of crowding.

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- In 1960, Kevin Lynch wrote *The Image of the City* in which he dealt with the concept of imageability and readability of the city: how people see and interpret the city, build their own image of it, and the mental maps of the city.
- Cities are known to play multifaceted functions in all societies. They are the heart of technological development and economic growth of many nations, while at the same time they serve as a breeding ground for poverty, inequality, environmental hazards, and communicable diseases.
- A little stress every now and then is not something to be concerned about. Ongoing, chronic stress, however, can cause or exacerbate many serious health problems. It is obvious that long term physical stress would affect a person even behaviourally.
- A cognitive map is a visual representation of a person's (or a group's) mental model for a given process or concept.
- Imagery is a widely used method of communication. It contains phenomenal power in its ability to connect to an audience and convey ideas. Contemporary environmental imagery has been widely utilized by environmental advocacy organizations and those involved in the modern environmental movement. These types of imagery are used as a call to action, for eco-tourism promotion, and in political campaigns.
- Urbanization is a pervasive phenomenon that is fairly recent. In present global atmosphere, all nations have been dealing with the challenges of environment, social, transportation, and economy. These issues are common in developing countries due to the difference of development in cities and villages. Criteria used to define urban can include population size, space, density, and economic organization.
- Defensible space is defined as 'a residential environment whose physical characteristics – building layout and site plan – function to allow inhabitants themselves to become key agents in ensuring their security'.
- Land use involves the management and modification of natural environment or wilderness into built environment such as settlements and semi-natural habitats such as arable fields, pastures, and managed woods.
- Urban renewal is a program of land redevelopment often used to address urban decay in cities. Urban renewal is the clearing out of blighted areas in inner cities to clear out slums and create opportunities for higher class housing, businesses, and more.

NOTES

10.10 KEY WORDS

- **Population density:** It is a measurement of population per unit area, or exceptionally unit volume.
- **Cognitive map:** It is a visual representation of a person's (or a group's) mental model for a given process or concept.
- **Urbanisation:** It refers to the population shift from rural to urban areas, the decrease in the proportion of people living in rural areas, and the ways in which societies adapt to this change.
- **Urban renewal:** It is a program of land redevelopment often used to address urban decay in cities. Urban renewal is the clearing out of blighted areas in inner cities to clear out slums and create opportunities for higher class housing, businesses, and more.

10.11 SELF ASSESSMENT QUESTIONS AND EXERCISES

Short-Answer Questions

1. Write a short note population density.
2. What are the social and psychological effects of overcrowding?
3. What are the two types of coping strategies?
4. Briefly mention the relationship between race and cognitive mapping.
5. What do you mean by urban renewal?

Long-Answer Questions

1. Discuss the impact of population density on humans and animals.
2. Explain the physical and human factors that influence population density.
3. Examine the causes and effects of crowding in cities.
4. Discuss the problems posed by urbanization and the solutions available to solve the problems.

10.12 FURTHER READINGS

Bell, P A, J D Fisher, Loomis R J. 1978. *Environmental Psychology*. Philadelphia: W.E. Saunders Co.

Fisher J D, P A Bell, Baum A. 1984. *Environmental Psychology, 2nd Edition*. New York: Holt Rinehart & Winston.

Pajeons, J D. 1977. *Environment and Behaviour*. Massachusetts: Addison and Wesley Publishing.

UNIT 11 ARCHITECTURE

NOTES

Structure

11.0 INTRODUCTION

Light, plants, materials, development strategies, temperature, and so on, are all important for the prosperity and wellbeing of an individual. We need to remember that people have an all-encompassing judgement: our faculties impact our reasoning, emotions and activities and thus our whole body. In the event that our faculties are vigorously animated, this can have an empowering or quieting impact. As a result, spaces can impact our thinking, our decision to act, and so on. On the off chance that we feel awkward in spaces, this can result in excitement or distress, touchiness, laziness or even nervousness. From a positive perspective, spaces can add to reinforcing our ability to be self-aware.

11.1 OBJECTIVES

After going through this unit, you will be able to:

- Discuss the concepts of architectural determinism, environmental possibilism and environmental probabilism

- Examine the relationship between behaviour and various elements of architectural design
- Describe the various stages in the design process

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11.2 EXTENT OF ARCHITECTURAL INFLUENCE: A HISTORICAL OVERVIEW

The attempt by Ittelson and Proshansky's group in the United States to study the relationship between architectural design and the behaviour of patients in psychiatric hospitals was not an isolated one. At the same time, other psychologists and psychiatrists were involved in similar research projects both in the United States and in other countries. In particular, the work begun at the end of the 1950s in Canada by Humphrey Osmond - 'a psychiatrist with research interests', as Proshansky (Proshansky and O'Hanlon, 1977, p. 105) defined him - and the social psychologist, Robert Sommer, must be cited. One of the first publications of this group was entitled *Function as the Basis of Psychiatric Ward Design* (Osmond, 1957). This work presents Osmond's theory on the existence of 'sociofugal' spatial settings, aimed at discouraging social interaction, or, rather, 'sociopetal settings, able to encourage social interaction. Following Osmond's suggestions, Kyo Izumi (1957) attempted to incorporate these psychological indications into the design for a new psychiatric hospital. The subsequent work of Robert Sommer developed from these first studies. Also studying behaviour on geriatric wards, Sommer developed the concepts of 'human territoriality' and 'personal space'.

At the same time in Europe, the French psychiatrist Paul Silvadon began a research programme in collaboration with architects on the role of the design of the psychiatric hospital for the improvement/healing of patients. In 1969, the results of this study were published in a monograph supported by the World Health Organization (Baker et al., 1960).

In 1956, the Research Commission of the American Institute of Architects (ÁÉÁ) presented a proposal to the National Science Foundation (NSF) to hold a conference, which took place in 1959 at the University of Michigan; the main topic was the relationship between the physical, biological and social sciences with regard to the problems of creating optimal environments for human activities (Magenau, 1959). Prior to this, at the 1958 convention of the ÁÉ in Cleveland, a preliminary seminar was held on the topic; participants included architects, civil engineers, urban planners, psychologists and sociologists.

As a result of these meetings, in 1958, one of the first collaborative agreements took place between an architect (Miller) and a psychologist (Wheeler) for the construction of several student dormitories at the University of Indiana. These buildings were then subjected to a post- occupancy evaluation study.

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Collaboration between psychologists and architects became more systematic over the years through the organization of conferences and through publications.

Canter and Lee in 1974 attempted to pinpoint the basic information psychology can provide for designing the environment. This was identified in reference to three categories:

(a) **People's activity:** What types of activities are carried out, where and how are they carried out, how do they change;

(b) **Differentiated appraisals:** What are the hierarchies of priorities existing among these both from a practical point of view and in terms of values; the behaviour-environment relationship -not only to know people's reactions to architectural variables, but also to discover the reasons for these relationships in an interactive perspective.

In this context, the contribution of psychology to the process of architectural design is seen as differentiated in relation to the various design stages:

(a) Ideation: When several general findings can be employed originating from psychological research concerning architectural characteristics and behaviours.

(b) Specification: When specific influences can be singled out from the physical characteristics of the environment as well as equally specific psychological aspects, for example, relations between environmental luminosity and insomnia or between environmental noise and work output, etc.

(c) Appraisal: When an analysis is made of the existing, also considering the resulting, psychological effects, to identify inadequacies or possible directions for improvement of a current design or future ones.

11.2.1 Architectural Determinism

Design determinism (at times called environmental determinism) portrays the impact of architecture/environment on the observer's conduct, that is, the possibility that the environment may control or correct how individuals carry on in a space.

It is frequently seen as a flawed idea, as it can be too efficient to even consider portraying the perplexing connections among people and their physical, social, and mental world. It does, in any case, appear to support a considerable lot of design typologies, supposing a straight connection among structural and its social yields. Building determinism ought to be seen less as a flat out strategy for plan, but instead as a consciousness of the likely consequences for our conduct in space. Jan Golembiewski, a draftsman and scientist at QUT, states that "… in my own exploration, I locate that the better an individual is, the more a decent climate will influence them emphatically and the less a terrible one will influence them contrarily."

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11.2.2 Environmental Possibilism

Environmental possibilism implies that in the system model of human ecology where both the social system and the ecosystem are interacting with each other, the integrity of the system will remain the same because of changes that occur in the structural configuration according to their internal dynamics.

11.2.3 Environmental Probabilism

The term 'probabilism' was coined by O. H. K. Spate as a compromise between the schools of environmental determinism and possibilism. Environment probabilism refers to the idea that individuals can select how they interact with the physical environment, but not freely; nature makes some choices much more likely than others. According to Spate, individuals had freedom of choice but that choice was highly constrained, and that the environment made some human responses more probable than others.

11.3 BEHAVIOUR AND ELEMENTS OF ARCHITECTURAL DESIGN

With a large portion of our lives spent inside, the spaces that we occupy plays an important part in our mental conduct. Environmental psychology or space psychology is, truth be told, the communication among individuals and the spaces they occupy. Lighting, colours, design, scale, extents, acoustics, and materials address the feelings of the individual and create a range of sentiments and practices. From inciting warmth and security, characterizing prosperity, or establishing a good and effective workplace, space can affect how we act or on what we feel; hence, planned and imaginative measures ought to be considered by the social and mental necessities of the tenants.

Dr. Sergio Altomonte, draftsman and partner educator in the branch of engineering and constructed climate at Nottingham college indicated that "structures and metropolitan spaces ought to be planned above all else around their tenants. The significance of design as a trigger to physical, physiological and mental prosperity is these days turning into a subject of critical relevance." **"**Structural signs can give fortification to the ideal practices that we might want to see authorized in explicit spot types," says environmental analyst and inside creator Migette Kaup. The key factors that engineers need to focus on include:

- security,
- social connectedness,
- simplicity of development, and
- more solid measures incorporate light, colours, craftsmanship, ventilation, and so on

11.3.1 Lighting

There have been various researches conducted by psychologists to examine the influence of light on human behaviour. Certain researches conducted in North America have shown that both positive and negative emotions may be intensified by brighter lighting, while lower lighting may dampen those moods. While examinations conducted at the University of Liege have measured the impact on the brain of alternating blue and green lights and shown that blue light stimulate and strengthen connections between brain areas involved in the process of emotions and language.

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Researchers have also explored how light affects social interaction and communication, health, satisfaction and comfort in order to improve the well-being of patients, reduce stress and anxiety related to hospital environment.

11.3.2 Windows

Collins (1975) conducted an examination of windows in various settings such as schools, manufacturing plants, workplaces, and medical clinics, and found that windows gave:

- a view to the outside
- information on the climate and season of day
- alleviation from sensations of claustrophobia, dreariness or fatigue

11.3.3 Colour

Colour is a fundamental component of our reality, in the natural habitat as well as in the man-made environment. Colour consistently assumes a part in the human transformative cycle. The environment and its colours are seen, and the mind cycles and judges what it sees on a level headed and emotional premise. Mental impact, correspondence, data, and consequences for the mind are parts of our perceptual judgment measures. Thus, the objectives of a colour plan in an engineering space are not consigned to design alone. Colour is tangible and as such has impacts that are emblematic, affiliated, synesthetic, and enthusiastic. This undeniable rationale has been demonstrated by logical examination. Since the body and brain are one substance, neuropsychological perspectives, psychosomatic impacts, visual ergonomics, and colour's mental impacts are the parts of colour ergonomics.

The impression of a colour and the message it passes on is of most extreme significance in making the mental mind-set or feeling that bolsters the capacity of a space. Colour has numerous impacts in our regular day to day existences. We have figured out how to react to specific colours unquestionably. For instance, red signifies alert/stop/blood, however, there are likewise responses that are subliminal. Organic responses to colour are exclusively physical in nature. Rather than the conspicuous optical response to colour, it is a response to the energy of the light waves. Tests show that regardless of whether an individual is blindfolded, their

heartbeat will observably increase when presented the colour red and diminish when presented the colour blue.

11.3.4 Aesthetics

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The psychology of aesthetics includes the "investigation of our associations with works of art; our responses to artistic creations, writing, verse, music, films, and exhibitions; our encounters of excellence and offensiveness, our inclinations and hates; and our regular impression of things in our reality—of normal and assembled conditions, plan objects, purchaser items, and obviously, individuals" (Smith and Tinio, 2014, p. 3). On the off chance that this definition appears to be widely inclusive, it is surely on the grounds that tasteful encounters are so pervasive in our lives. Simply consider what our run of the mill days resemble: we take a peek at pictures while perusing a magazine, tune in to music while heading to work, stare at the TV around evening time, and read a novel while on the train. Tasteful encounters additionally include a wide scope of reactions, from delight, inclination, loving, and interest to disturb, outrage, and shock (Silvia, 2009).

11.3.5 Furnishings

The effect of furnishings on human behaviour has been long known. The ancient practice of Feng Shui for example tells us that the form nad texture of furniture produce emotional responses. Rich textures ooze a sense of comfort while metal elements like wall clocks are linked to strength. Wooden elements promote personal growth and health.

11.3.6 Privacy

The psychology of studying personal space or privacy, or "peripersonal space" as it is known, tells us that human beings have a buffer zone around the body, which if invaded causes disquiet in the mind. The human brain computes a buffer zone around the body, which is very flexible. It changes in size, depending on context, computed in a manner that's largely unconscious. It is part of the scaffold of how human beings interact socially, on which all human social interactions are built. It has a huge impact on the way human beings react to each other, understand each other, and feel about each other.

11.3.7 Design Process

Design isn't about innovativeness. However much craftsmanship that it has, designing can likewise be additionally founded on logical qualities. Studies show that a large part of the structures that impel the most elevated effect on feelings interconnect design and psychology. There are reasons why a specific sight, smell or contact inspire reactions from us. Analysts direct trials to check how explicit triggers impact the comprehensive prosperity of clients. At the point when we are presented mental triggers, our biological make-up influences our insights. We veer away from incitements with uneasiness and stress reactions, or we move towards those that evoke sound responses.

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We are designed to naturally react dependent on our psychological planning, unconscious tendencies and instinctive predispositions. As these intricacies add up, they structure a part of the human conduct if not changed intentionally. Understanding these incitements and their repercussions is the foundation of client focused design. How people see examples can be straightforwardly ascribed to the Gestalt standards. Gestalt standards are based on approaches like similarity, continuation, conclusion, nearness and figure/ground.

11.3.8 Congruence

The various definitions of congruence describe a situation where a state of harmony and agreement is perceived or achieved. In architecture and design, congruence can be encountered and perceived as a transcendental trait, which has the capability of being constantly adapted and transformed, according to any specific situation or design problem that must be faced and tackled. According to Walter Benjamin, "the destructive character" of an object is reliable as it is always constant. Thus, if one is only searching for harmony, one must also be aware that it is the incongruence and disharmony which define the degree of harmony – even though they can never be fully perceived.

An interesting example of congruence between the finalized architectural product and its representational drawing is Mies van der Rohe's Resor House [Jackson Hole, Wyoming, U.S.A., 1937-38]. If one observes Mies's famous interior perspective collage-drawing, one may detect a vibrant flatness, which is not very characteristic of a perspective drawing's nature: it looks as if he intentionally tried to minimize spatial depth and focus on the notions of framing and demarcation. This is seen in Figure 11.1.

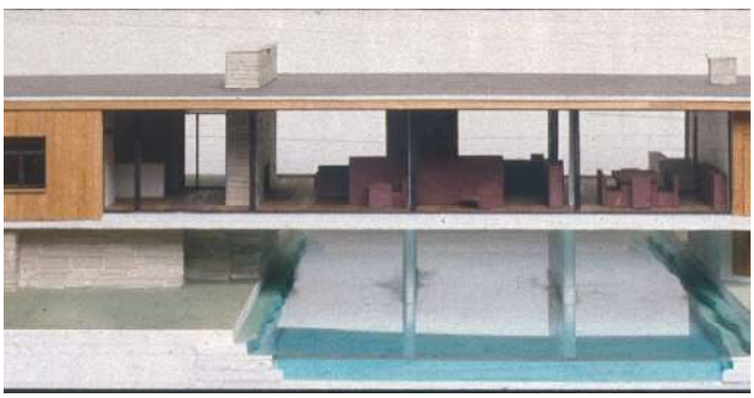

Fig 11.1 *Representational Drawing of Mies van der Rohe's Resor House*

11.3.9 Design Alternatives

Design alternatives in architecture seeks to strike a balance between ecological sustenance and the design, materials and techniques of construction. Such designing can be extremely challenging as the designed structure has to be both sustainable and eco-friendly without compromising on beauty and comfort.

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Check Your Progress

1. What is design determinism?
2. What does the psychology of aesthetics include?

11.4 STAGES IN THE DESIGN PROCESS

There are typically five stages of architectural design involved in a design-build of any project:

I. **Pre-design**: The main target is to get-along with a customer and decide in general the task, vision and objectives. There are some vital territories to talk about in relation to the task – scope, highlights, reason, and functionality. In this stage, the following activities are conducted:

- Customer counselling
- Examination and documentation of existing conditions
- Photos
- Estimations
- Ordering existing drawings assuming any
- Get ready undeniable level base drawings
- Articulation of plausible form/development cost
- Programming space and use
- Code survey
- This stage closes with the proprietor's choice to push ahead with a venture.

II. **Schematic Design:** In this phase, a series of rough sketches/drawings that illustrate the basic concepts of the design are done. In addition, initial research of local compliance and regulations are completed at this time.

III. **Design Development (DD):** Design development collects the results from the schematic design phase and takes them one step further. It entails finalizing the design and specifying items such as materials, window and door locations and general structural details.

At the end of this phase, the following things are delivered:

- Floor plans with a proposed basis of design openings and plumbing fixtures
- Overall dimensions
- Structural grid dimensions
- Interior wall dimensions
- Exterior elevations with a proposed basis of design openings and finishes

- Additional building sections
- Wall sections at all typical conditions
- Typical details
- Additional details to establish a basis for design products

IV. **Construction Drawings (CD):** By this stage, the final design has been arrived at. Here, the preparation of construction drawings/blueprints, notes, and technical specifications necessary for bidding, construction, and permit application begins. Construction contractors employ these detailed drawings and specifications to prepare for the construction. In this phase, the following things are delivered:

- Floor plans fully annotated
- All dimensions
- Room, wall, door, and window identification
- Section and detail indicators
- General notes and detailed notes
- Exterior elevations fully annotated
- All building sections required for construction
- Wall sections at all conditions
- Details fully annotated
- Structural plans, details, and notes
- Plumbing plans, schedules, details, and notes
- HVAC plans, schedules, details, and notes
- Electrical power and lighting plans, schedules, details, and notes

And we move to the final phase

V. **Construction:** In this stage, the construction of the project takes place.

11.4.1 Awareness of Design Alternatives Selection of Behavioural Criteria

Early item presentation and cost decreases in the assembling interaction are fundamental for an effective modern item. It has been accounted for that 75 % of the expense of an item is because of the design stage and 80% to the reasonable design measure. In addition, a misinterpreted applied design can never be made up for by a later better definite design. Accordingly, cash and time ought to be put carefully in the early design stages and, specifically in the calculated design stage. Customized strategies and CAD-based instruments are frequently used by architects to reduce mistakes and time wasting in these sensitive stages. The idea design measure is made of steps, portrayed by exacting coordination and cooperation. In this manner, the client's necessities must be assessed first, followed by the objective specifications and the item's specific prerequisites. Idea

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determination is a complex undertaking for designing designers as it tends to be considered as the most basic dynamic advance in the item improvement measure. During this stage, wrong arrangements should be limited, which implies that few features of the issue must be considered simultaneously. Efficient design strategies and appropriate dynamic procedures hence both add to a fruitful final item.

Check Your Progress

3. How many stages of architectural design are involved in a design-build of any project?
4. What activities are undertaken in the schematic design phase?

11.5 ANSWERS TO CHECK YOUR PROGRESS QUESTIONS

1. Design determinism (at times called environmental determinism) portrays the impact of architecture/environment on the observer's conduct, that is, the possibility that the environment may control or correct how individuals carry on in a space.
2. The psychology of aesthetics includes the "investigation of our associations with works of art; our responses to artistic creations, writing, verse, music, films, and exhibitions; our encounters of excellence and offensiveness, our inclinations and hates; and our regular impression of things in our reality—of normal and assembled conditions, plan objects, purchaser items, and obviously, individuals".
3. There are typically five stages of architectural design involved in a design-build of any project.
4. In the schematic design phase, a series of rough sketches/drawings that illustrate the basic concepts of the design are done.

11.6 SUMMARY

- The attempt by Ittelson and Proshansky's group in the United States to study the relationship between architectural design and the behaviour of patients in psychiatric hospitals was not an isolated one. At the same time, other psychologists and psychiatrists were involved in similar research projects both in the United States and in other countries.
- At the same time in Europe, the French psychiatrist Paul Silvadon began a research programme in collaboration with architects on the role of the design of the psychiatric hospital for the improvement/healing of patients.
- As a result of these meetings, in 1958, one of the first collaborative agreements took place between an architect (Miller) and a psychologist

(Wheeler) for the construction of several student dormitories at the University of Indiana.

- Design determinism (at times called environmental determinism) portrays the impact of architecture/environment on the observer's conduct, that is, the possibility that the environment may control or correct how individuals carry on in a space.
- Environmental possibilism implies that in the system model of human ecology where both the social system and the ecosystem are interacting with each other, the integrity of the system will remain the same because of changes that occur in the structural configuration according to their internal dynamics.
- Environment probabilism refers to the idea that individuals can select how they interact with the physical environment, but not freely; nature makes some choices much more likely than others.
- With a large portion of our lives spent inside, the spaces that we occupy plays an important part in our mental conduct.
- Environmental psychology or space psychology is, truth be told, the communication among individuals and the spaces they occupy.
- Lighting, colours, design, scale, extents, acoustics, and materials address the feelings of the individual and create a range of sentiments and practices.
- Certain researches conducted in North America have shown that both positive and negative emotions may be intensified by brighter lighting, while lower lighting may dampen those moods.
- Colour has numerous impacts in our regular day to day existences. We have figured out how to react to specific colours unquestionably. For instance, red signifies alert/stop/blood, however, there are likewise responses that are subliminal.
- The psychology of aesthetics includes the "investigation of our associations with works of art; our responses to artistic creations, writing, verse, music, films, and exhibitions; our encounters of excellence and offensiveness, our inclinations and hates; and our regular impression of things in our reality—of normal and assembled conditions, plan objects, purchaser items, and obviously, individuals".
- In architecture and design, congruence can be encountered and perceived as a transcendental trait, which has the capability of being constantly adapted and transformed, according to any specific situation or design problem that must be faced and tackled.
- There are typically five stages of architectural design involved in a design-build of any project: pre-design, schematic design, design development, construction drawings and construction.

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11.7 KEY WORDS

- **Architectural Determinism:** It refers to the effect of architecture/ environment on the viewer's behaviour, that is, the idea that the environment may control or amend how people behave in a space.
- **Environmental Possibilism:** It is the inverse of determinist and stresses the freedom of man to choose the pattern of human activity on earth.
- **Environmental Probabilism:** Here, the environment presents the entity not only with what is possible, but with what choices would be more or less likely under those particular circumstances.

11.8 SELF ASSESSMENT QUESTIONS AND EXERCISES

Short-Answer Questions

1. Differentiate environmental possibilism and probabilism.
2. Define architectural determinism.
3. How can lighting, colour, and aesthetics affect behaviour?

Long-Answer Questions

1. Explain the evolution of research on architectural design and behaviour.
2. Discuss architectural determinism.
3. Describe the various stages in the design process.

11.9 FURTHER READINGS

Bell, P A, J D Fisher, Loomis R J. 1978. *Environmental Psychology*. Philadelphia: W.E. Saunders Co.

Fisher J D, P A Bell, Baum A. 1984. *Environmental Psychology, 2nd Edition*. New York: Holt Rinehart & Winston.

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BLOCK - IV
RESEARCH AND DEVELOPMENT

UNIT 12 BEHAVIORALLY BASED RESEARCH

Structure

12.0 INTRODUCTION

In the previous unit, you learnt about the relationship between architecture and research. In this unit, we will discuss behaviour based research. As has been discussed, the environment can facilitate or discourage interactions among people. It can also influence peoples' behaviour and motivation to act. Moreover, the environment can influence a person's mood. Here we will discuss how certain environments are designed and how designs are implemented taking into account design theory.

12.1 OBJECTIVES

After going through this unit, you will be able to:

- Discuss the design of various learning environments
- Examine the design of health care facilities for the aged
- Describe pedestrian environments

12.2 IMPLEMENTING THE DESIGN PROCESS: MODELS FOR THE FUTURE

NOTES

As per Proshansky (1987), the future of environmental psychology may be in jeopardy. Its ability to endure and continue to develop as a social institution and, therefore, in its scientific achievements is in doubt. Having said that, there are various scopes of research which suggest promising a future in environmental psychology:

- Perception and evaluation of buildings and natural landscapes
- Cognitive mapping, spatial cognition, and wayfinding
- Ecological consequences of human actions
- Evaluation of building and natural landscapes
- Design of, and experiences related to, the physical aspects of workplaces, schools, residences, public buildings, and public spaces
- Psychological and behavioural aspects of people and nature
- Theories of place, place attachment, and place identity
- Psychological aspects of resource management and crises
- Environmental risks and hazards: perception, behaviour, and management
- Stress-related to physical settings
- Social use of space: crowding, privacy, territoriality, personal space

In the current times, as people become more environmentally conscious, climate and environmental psychologists are playing a larger role in the workforce. Many work for non-profits or the government, often serving as research psychologists or clinicians with environmental expertise.

In particular, climate and environmental psychologists direct the following suggestions:

1. Lead research on messages that inspire individuals to change their conduct.
2. Spread the word about environmental alternatives.
3. Reveal why individuals may not receive positive behaviours.
4. Urge individuals to reconsider their situations in the common world.
5. Assist people with carrying on with more sustainable lives.

12.2.1 Design in Selected Environments

Environmental psychology works with numerous other set up plan disciplines, including space arranging, ergonomics, lighting, acoustics, marking, and interior

designing. And keeping in mind that its additions are enormous, its strategies and ends are incredibly exact. For instance, research has demonstrated that finding a sink inside the obvious stretch of an emergency clinic hallway can increase the amount of hand washing, and that introducing operable windows in a school homeroom can lessen drowsiness. It explores the impacts of a specific shade of paint on a lounge room divider and furthermore of the ideal proportion of plants and cleared space in a city park.

Environmental psychology is much the same as evidence based planning. Evidence based planning attracts with respect to information from all fields, separating any kind of data that has been logically demonstrated and can be repeated. Manageable plan is to a great extent evidence based, as its practices and guidelines depend on logical examination. In any case, environmental psychology takes a similar approach and spotlights it all the more comprehensively on individuals, taking a look at research-based data about unpredictable cooperation between environmental factors and individuals' sentiments and activities.

12.2.2 Residential Setting, Preferences, Use of Space in the Home Satisfaction with the Home Environment

An example can be found in the studies conducted in the 1950s by Leon Festinger et al. (1950) in an urban residential environment. In this case, the hypothesis predicts significant connections between different models of social interaction practised by residents and the position of their homes in the environmental space of the area studied. One of the results the authors particularly point out is the role assumed by the proximity factor and by the sharing of routes in which the residential space is organized. These conditions emerge in particular as facilitating the structuring of meaningful relations between inhabitants.

Types of Residential Settings

Residential settings are of many types. In fact there are seven types of residential settings which are given below:

1. Single member household
2. 21st century household
3. Extended or joint household
4. Shared household
5. In home caretaker household
6. Provider managed household
7. Collective living household

12.3 PROPINQUITY: THE EFFECT OF OCCUPYING NEARBY TERRITORIES

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The propensity of people to frame close associations with individuals they experience over and over. That is, the more frequently one comes into contact with someone else, the more probable it is that one will shape a companionship or sentimental relationship with that individual. For instance, nearby neighbours frequently are companions, as are schoolmates and collaborators, separately. The propinquity effect perhaps is identified with the mere-exposure effect. First speculated in 1950 by U.S. therapists Leon Festinger and Stanley Schachter and Austrian-born U.S. social scientist Kurt Wolfgang Back (1920–1999), following an investigation of students living in Westgate Apartments at the Massachusetts Institute of Technology.

The Propinquity Effect in Psychology

This alludes to the propensity to frame fellowships and different types of relational associations with individuals we go over frequently in our everyday lives. Individuals who live close to one another or work in similar spots are bound to frame a bond with one another when contrasted with other people who are not presented to one another as frequently. This is on the grounds that steady openness can prompt expansion in trust. The propinquity impact was proposed by American therapists Leon Festinger, Stanley Schachter and Kurt Back in their 1950 paper, 'The Spatial Ecology of Group Formation'.

12.3.1 Learning Environments

The zones of psychology that relate most straightforwardly to classroom design and learning environments are natural, educational, human variables (designing), and social psychology. Past exploration on the impacts of such environmental factors as light, temperature, and commotion on learning has yielded some anticipated outcomes that are looked into conventional classroom design. Learning gives off an impression of being influenced antagonistically by lacking light, higher temperatures, and uproarious commotions—factors that are kept limited in most school classrooms.

Long stretches of exploration on the effect of ecological factors on human contemplations, emotions, and practices show that different factors frequently moderate the impacts of natural factors. In an outline of the exploration of educational environments, Weinstein presumed that ecological factors can affect students and by implication the impacts of various actual settings frequently rely upon the idea of the task and the student.

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12.3.2 Classroom Environments

According to research, irrespective of cultural beliefs, children learn faster in an environment that provides them sufficient opportunities to play, feel happy, and secure. An important part of the ambience of a classroom is providing children space for easy and safe movement. Motion permits children to move freely in the allocated spaces, create their own boundaries, and explore their abilities by handling different objects.

Teachers should create environments that match the age and level of the children they teach. The environment that is created to match children's development provide motherly care, space for sleeping, give an opportunity for children to play and interrelate with materials. These pointers of caring and effectiveness in teaching young children may help teachers in planning for better outlook of the classroom. According to Olds, when children feel comfortable, and safe in their physical environments, they explore materials that help them generate new ideas that deepen their comprehension of their surroundings.

Creating happiness in children means developing eagerness to explore and develop imaginative skills by employing materials that are exposed to them. Appropriate and sufficient materials make a classroom for young children to be joyous and inspire them to be creative. Classroom arrangement that emphasize on space for groups to work and play, appropriate materials placed in their respective learning areas, and good room lighting system, are considered environmentally appropriate classrooms. The organization of the classroom should comprise consideration for the seats and tables that are on the age level of the children.

Classrooms are designed according to the number of students that are to use them and the functions that are to be carried out. As Olds states, 'A facility that works well for children and staff must be designed from the inside out, and also from outside in, with structural evaluations. The architect is concerned with the type of building and its outlook, mechanical and electrical systems, corridors, exits, and overall public use space.'

Some architectural designs may provide specifications for carpets, furniture, and lighting. Designing a classroom that has an environment that is favorable to young children's learning should be a collaborative effort.

12.3.3 Libraries

Since the start of the modern library time, bookkeepers and other library organizers have been worried about growing better library offices. During that time numerous structural answers for issues of capacity, area, and administration have been proposed, used, changed, and disposed of. During the previous years an interdisciplinary way to deal with the investigation of people and their fabricated

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climate has been created. This tries to research the inconspicuous and complex connections that exist among individuals and build those conditions where we spend the lion's share of our lives. Data with respect to these connections is starting to rise up out of various parts of the social and actual sciences. Further, this data is starting to be applied to the way toward building planning. Environmental design is the part of architecture and building planning that thinks about the design of constructed conditions to accommodate the social, physical, mental, and conduct needs of individuals. Discoveries and philosophies from environmental design can be applied to library planning to add to the proceeding cycle of giving better library conditions.

Behaviour in a library is also quite unique to observe and studies have shown with their results that an environment like a library has sufficient influence on one's behaviour and learning abilities. All the more explicitly, when situational standards are established (e.g., when entering the library, one ought to be quiet), an environment is able to do consequently enact mental portrayals of regularizing conduct and the actual conduct. In specific investigations, members were presented pictures of conditions, and impacts on openness of portrayals of regularizing conduct and on genuine conduct were evaluated. Results demonstrated that portrayals of conduct and real conduct itself are initiated naturally when (a) objectives to visit the environment are dynamic and (b) solid relationship among environment and standardizing conduct are set up.

12.3.4 Museum Environments

Over the previous thirty years, the idea of 'training' in galleries has been logically extended by museum experts and scholars to make a hypothetical and methodological system for examining learning exercises in the museum environment (Allard and Boucher, 1998; Hein, 2002; Leinhardt et al., 2003). Dierking and Falk (1992, 2000) built up a "context oriented model of learning"—the individual, sociocultural, and actual settings, inside the progression of time. Csikszentmihalyi and Robinson (1990) focused on the meaning of the tasteful experience, applying their "stream" model to museums.

The configuration of an exhibition hall is elementary for a productive historical center understanding. A museum visit unfurls through development in space: the environment decides how guests investigate, draw in, consider, reflect, and understand displays. The whole instructive message relies upon the view of room. As indicated by Nasar (1994), a portion of the design attributes that are useful to the individual are the following:

- Visual quality
- Balance of appeal and intricacy
- Naturalness

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Pekarik et al. (1999) contemplated the assumptions that guests bring to a gallery and depicted the different components that involve the resulting experience. As a result of the ease and multidimensionality of the wonder, they built up the accompanying four-section system to incorporate the idea of 'museum understanding:'

- **Object encounters:** In which the individual spotlights on the item;
- **Cognitive encounters:** In which the individual adds data or information;
- **Introspective encounters:** In which the individual turns inwards, to individual emotions, recollections, and encounters, with a feeling of having a place or connectedness; and
- **Social encounters:** In which the individual collaborates with relatives, companions, and regularly historical center staff.

12.4 PEDESTRIAN ENVIRONMENTS: SHOPPING MALLS, PLAZAS AND CROSSWALKS, HOSPITAL SETTING AND RESIDENTIAL

Urban planners are keen on the environmental characteristics of areas that allow for ample opportunities for pedestrians to walk, in addition to sensorial and social settings. Exploration in walkability needs subjective investigations that address the micro-scale examinations of the environment. Research talks about the relationship of the physical, land-use, and social qualities of the environment at the micro level to individuals' conduct and insights toward walking. Utilizing the information from studies and meetings, this examination stresses the coordination of client discernments and abstract measures to comprehend the effect of environmental qualities on walking conduct on the main roads of a city. Adding to past examination, latest studies also show the essentialness of social characteristics in supporting walking. The discoveries grow our comprehension of the order and rules of walking needs and propose that, given a protected and happy setting, individuals search for helpfulness, feeling of having a place and pleasurability as extra and unmistakable requirements to improve their walking experience.

Planning pedestrian environments requires suppositions about how pedestrians will react to qualities of the climate as they plan and establish their walking schedules. As an outcome, most exploration interest in open environments centres around conduct comparable to those attributes. For instance, there is a considerable group of clear and typological investigations of pedestrian environments. Metric, mathematical, and topological models have been helpful in describing thickness and bearing of development.

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The need to understand the components of decision making has inspired micro level examination with respect to exploratory spatial conduct inside walking regions. Investigations of conduct according to comfort, the manner by which pictures of spots encroach on decisions, and how powerful and sequential experience of the city influences singular schedules have all evolved as specific fields of understanding. As a rule, investigations of pedestrian climate elements have both broadened and increased as its frameworks and approaches are adjusted for arranging different environments.

Movability is a more extensive idea that includes a few methods of movement, at the same time, in this investigation, the emphasis was on common adaptability (i.e., city walking). The person's own view of environmental ease of use is required to impact the quality and recurrence of adaptability. Great degrees of adaptability and convenience are known to help influence results by supporting the person's feeling of autonomy and reason throughout everyday life, except lower or diminished portability is related with weakness, gloom, and disengagement (Lawton and Nahemow, 1973; Banister and Bowling, 2004; Spinney et al., 2009). These last emotions are frequently found in circumstances where inabilities are available and where the degree of admittance to various freedoms isn't equivalent (Casas, 2007).

With regards to pedestrian walking, personal satisfaction is recommended as a general pointer of the person's fulfilment with life. For an individual with handicaps, this needs to increase when strolling takes places in areas accessible to them. The ideas of accessibility and adaptability are known to be significant markers of the nature of the strolling experience, and, as communicated in personal satisfaction, they are relied upon to influence results.

12.4.1 Care Facilities and Non Institutional Residences for the Aged

People identify with the living environment physically and mentally. Environmental psychology has a rich created history while experience configuration arose as of late in the industrial design area. Regardless, these methodologies have scarcely been mixed, perceived or implemented in architectural practices. A few investigations investigated the relationship between experience plan and environmental brain research. Care facilities for the aged include board and care homes, helped living facilities, nursing homes, and others. A few such facilities have just lodging and housekeeping, however, numerous other facilities for the aged also give individual consideration and health benefits. Some health care facilities offer exceptional schemes for individuals with Alzheimer's sickness and different sorts of dementia.

Some investigations on health care facilities examined questions on emotion, user experience configuration, experience plan and environmental brain research,

followed by the analyses of spatial settings and environmental quality information of a selected health care facility.

Check Your Progress

1. How many types of residential settings are there?
2. In what environments do children learn faster?
3. List some of the various types of care facilities for the aged.

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12.5 ANSWERS TO CHECK YOUR PROGRESS QUESTIONS

1. There are seven types of residential settings which are given below:
   - Single member household
   - 21st century household
   - Extended or joint household
   - Shared household
   - In home caretaker household
   - Provider managed household
   - Collective living household
2. According to research, irrespective of cultural beliefs, children learn faster in an environment that provides them sufficient opportunities to play, feel happy, and secure.
3. Care facilities for the aged include board and care homes, helped living facilities, nursing homes, and others.

12.6 SUMMARY

- As per Proshansky (1987), the future of environmental psychology may be in jeopardy. Its ability to endure and continue to develop as a social institution and, therefore, in its scientific achievements is in doubt.
- In the current times, as people become more environmentally conscious, climate and environmental psychologists are playing a larger role in the workforce. Many work for non-profits or the government, often serving as research psychologists or clinicians with environmental expertise.
- Environmental psychology covers with numerous other set up plan disciplines, including space arranging, ergonomics, lighting, acoustics, marking, and interior designing.

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- Residential settings are of many types. In fact there are seven types of residential settings which are given below:
  - Single member household
  - 21st century household
  - Extended or joint household
  - Shared household
  - In home caretaker household
  - Provider managed household
  - Collective living household
- The propensity of people to frame close associations with individuals they experience over and over. That is, the more frequently one comes into contact with someone else, the more probable it is that one will shape a companionship or sentimental relationship with that individual.
- The Propinquity Effect in Psychology alludes to the propensity to frame fellowships and different types of relational associations with individuals we go over frequently in our everyday lives.
- The zones of psychology that relate most straightforwardly to classroom design and learning environments are natural, educational, human variables (designing), and social psychology.
- According to research, irrespective of cultural beliefs, children learn faster in an environment that provides them sufficient opportunities to play, feel happy, and secure.
- An important part of the ambience of a classroom is providing children space for easy and safe movement.
- Motion permits children to move freely in the allocated spaces, create their own boundaries, and explore their abilities by handling different objects.
- Classroom arrangement that emphasize on space for groups to work and play, appropriate materials placed in their respective learning areas, and good room lighting system, are considered environmentally appropriate classrooms
- Behaviour in a library is also quite unique to observe and studies have shown with their results that an environment like a library has sufficient influence on one's behaviour and learning abilities.
- Over the previous thirty years, the idea of 'training' in galleries has been logically extended by museum experts and scholars to make a hypothetical and methodological system for examining learning exercises in the museum environment.

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- Urban planners are keen on the environmental characteristics of areas that allow for ample opportunities for pedestrians to walk, in addition to sensorial and social settings.
- Planning pedestrian environments requires suppositions about how pedestrians will react to qualities of the climate as they plan and establish their walking schedules.
- The person's own view of environmental ease of use is required to impact the quality and recurrence of adaptability.
- Care facilities for the aged include board and care homes, helped living facilities, nursing homes, and others. A few such facilities have just lodging and housekeeping, however, numerous other facilities for the aged also give individual consideration and health benefits.

12.7 KEY WORDS

- **Propinquity:** It can mean physical proximity, a kinship between people, or a similarity in nature between things ("like-attracts-like").
- **Pedestrians:** It refers to persons who are walking in the street (not travelling in a vehicle).
- **Privacy:** It means the state of being alone and not watched or disturbed by other people
- **Personal Space:** It means the physical space immediately surrounding someone, into which encroachment can feel threatening or uncomfortable.

12.8 SELF ASSESSMENT QUESTIONS AND EXERCISES

Short-Answer Questions

1. List the various scopes of research in environmental psychology.
2. What is propinquity?
3. Write a short-note on the environment of care facilities for the aged.

Long-Answer Questions

1. Discuss how classroom environments are designed.
2. Explain how pedestrian environments are planned.
3. Discuss the design of various learning environments.

12.9 FURTHER READINGS

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UNIT 13 ENVIRONMENTS FOR WORK, LEISURE AND THE FUTURE

Structure

13.0 INTRODUCTION

In contemporary times, new lifestyles demand new behaviours in changing environments. Our workplaces have unique decorum to promote professional

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behaviour among the employees, be it an operating public organization or an academic school or a diligent police department. Parenting also requires an accommodating environment around children to promote their overall personality development. Understanding the influence of the environment, especially in our work and personal spaces, one is forced to wonder what the future has in store for us. The increasing rate of employment related migration and the consequences one faces for the same, and how by making minor changes in our environmental conditions we can achieve required behaviours at our workplace is an intriguing topic. By applying organizational and behavioural theory to understanding the creation of environmental problems, the cognitive, cultural, and institutional systems can be examined. In this unit, we will throw some light on our work and leisure environments and what we can expect our near future to be.

13.1 OBJECTIVES

After going through this unit, you will be able to:

- Describe the meaning and importance of work and leisure environments
- Discuss future environments
- Assess environments for the present and future

13.2 WORK ENVIRONMENTS

Office is a place where people come and gather for handling information and taking decisions. There, people are expected to read, think, work with each other and they are also expected to communicate and collaborate.

Traditionally, offices depicted the hierarchy or structure of the organization with the largest and the most prominent or desirable office location and resources given to the highest-ranking members of the organization. In most of the traditional offices, job titles and office size and furnishings were indications of status. However, with the change of the corporate structure, offices have now become less well defined.

Example:

Rhea does not want to work from home, because being a housewife and with children at home she could not manage her work. Once her office started a crèche facility with a professional nanny, she could comfortably focus on her work and by end of the year she even got a bonus for her outstanding performance.

13.2.1 Study the Design of the Work Environment

In these changing times, the field of environmental psychology has taken the limelight to build the physical environment (i.e., architecture, technology, and engineering) and how it affected human behaviour and well-being (Bonnes and Bonaiuto 2002).

The focus on building our environment was largely supported by the political and social context of the time. The recent modern architecture tried to respond to

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post-war challenges (Pol 2006), such as decent housing. But, questions such as 'how could homes, offices, or hospitals be best built for their potential users?" and "how would environmental stressors (e.g., extreme temperatures, humidity, crowding) affect human performance and well-being were still the focus of many environmental concerns under psychological studies?" (Wohlwill 1970). Hence environmental psychology as a study to design buildings that would facilitate behavioural functions was officially born.

13.2.2 Designing the Office Landscape

Evidence-based design (EBD), which is essentially the approach to design buildings, is based on the best available evidence on the effectiveness of design measures. Research suggests that environmental psychologists have spent much time in identifying qualities of the man-made environment, which lead to consistent appraisals from observers (Stamps and Nasar 1997). One such attribute is a building's exterior, or façade. As per (Frewald 1990), many people prefer facades that express a sense of the past, and have detailed, decorated, grooved, or three dimensional surfaces that appear to provide shelter and invite touch and exploration.

13.2.3 Personalization

Studies have shown that open office layouts could negatively impact employees' performance. Moreover, their productivity can be affected by environmental noise and interruptions can become distracting, impairing workers. Employees in open offices do undergo higher levels of stress, lower levels of concentration and motivation, and they even seem to take more sick leaves. The researchers consider that open-office workers might be able to maintain a sense of control over their space by personalizing it. Bringing in personal items such as photos may provide workers with a greater sense of ownership and control over their space, this could help to buffer against the negative effects of a lack of privacy. If such practices are followed, the findings suggest that both employer and employee can benefit when workers are allowed to personalize their workspaces, especially in open-office settings (Laurence et al 2013).

13.2.4 Territoriality and Status in the Work Environment

Territoriality is a recently emerging concept of importance in organizations. Organizations are particularly fertile grounds for territoriality. First, there are many objects in an organization to which people are territorial. One of the most important objects is the employee's workspace. Empirical research suggests that employee workspaces are central to the experience of work and that many employees mark and defend even temporary spaces against intrusions from others (Buchannan, 1998).

Territories become more important to employees compared to the upper management in the organization. As per Sundstrom, (1987), at higher ranks, territories would be considered as symbol of status. Some have also indicated that the size of territory is used to indicate status (Sommer, 1969). Using the above information we can establish adequately that the work environment can be used as a space to practice and showcase territoriality and status.

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13.3 LEISURE AND RECREATION ENVIRONMENTS

A large scale of migration to urban settings indicates many people looking for a vast choice of positive vibes, knowledge, and facilities for housing, work, and leisure. The famous 'Lakeland study' aimed to find out how choices between fishing and mining of agents having multiple needs (subsistence, leisure, identity, and freedom) affect the quality of a lake, and how, in turn, the quality of the lake affects the choices of the agents (Jager et al. 2000). Leisure time itself means having ample time post work and household work and being able to enjoy this time satisfactorily. Hence, on a day-to-day, basis we come across several such leisure environments that play a crucial role in affecting our lives.

13.3.1 Wilderness and Camping Areas

Wildlife tourism and recreation are increasingly popular (Newsome and Rodger 2013) and wildlife TV documentaries attract large audiences (Jacobs 2009). Even though the relationships between humans and wild creatures are complex, they are closely tied to the evolution of humans in natural environments, and also are manifestations of socialization and past experiences. The human brain have progressed to meet wilderness-related challenges. Research into human thought, emotion, and action, can reveal insights into the general workings of the human brain. Research conducted on human dimensions of wilderness life is proved to be of practical relevance, which helps us to understand current standpoints or public debates about wildlife-related issues such as the reintroduction of predators or the killing of species that cause harm to humans or damage crops. Studies have consistently revealed that mutualists are more likely to participate in wildlife viewing, whereas those with a domination orientation are more likely to be hunters and anglers. Likewise, those with a mutualism orientation are also less likely to be dominant to support management interventions that harm wildlife or favor human interests over wildlife preservation.

As per (Wells and Lekies 2006), a large-scale survey conducted among adult residents of US cities, people who engaged in nature-based activities such as hiking or playing in the woods, camping, and hunting or fishing before the age of eleven were more likely to exhibit pro-environmental behaviours and attitudes as adults.

13.3.2 Recreation Environments Affording Exercise

According to World Health Organization (WHO) physical activity is defined as 'any bodily movement produced by skeletal muscles that requires energy expenditure' (such as activities undertaken while working, playing, carrying out household chores, travelling, and engaging in recreational actions -dance, yoga, tai chi).

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It is not only any particular type of physical activity which results in health benefits, but all forms of physical activity can provide health benefits if undertaken regularly and of sufficient duration and intensity. At all ages advantages of being physically active outweigh potential harm such as accidents.

The term physical activity should not be confused with exercise, which is the subgroup of physical activity. Exercise is planned, organized, repetitive movements carried out to sustain or improve health and fitness. Apart from exercise, any other physical activity that is done during leisure time, for getting transport to and from places, doing (paid or unpaid) domestic tasks or as part of a person's work (lifting, carrying or other active tasks), and recreation has a health benefit. By staying active throughout the day in relatively simple ways is more beneficial than doing none. Some small changes in daily routine can make a difference. Taking stairs instead of elevators, walking or using bicycle instead of driving to neighbourhood grocery shop, milk booth; such types of changes in everyday life can keep us healthy. Moreover, the health benefits of physical activity are maintained only with regular practice.

Regular physical activity is beneficial in many ways as it reduces the risk of non-communicable diseases – ischaemic heart disease, hypertension, stroke, diabetes, breast and colon cancer, depression. Additionally, it also prevents, overweight and obesity, and can improve mental health, musculoskeletal problems (osteoarthritis, osteoporosis), and balance and coordination in elderly population. Yet much of the population is becoming less active.

Physical activity has multiplicative health, social and economic benefits. Actions to promote physical activity will directly contribute to achieving the target of 15% relative reduction in the global prevalence of physical inactivity in adults and in adolescents by 2030 and achieving many of the 2030 Sustainable Development Goals (SDGs).

13.3.3 Recreational Environments for Children

Several children who are diagnosed with attention deficit hyperactivity disorder (ADHD) suffer from deficits in their attentional functioning. Studies suggest that natural environments might provide supportive settings to these children. There is also enough evidence as parents have reported a decrease in children's ADHD symptoms after their child played in a natural environment (Kuo and Faber Taylor 2004). In urban settings children's leisure time is as much an issue of space as it is of time. High building density, combined with housing pressure on open spaces, and a higher density of traffic, lead to mobility issues (Oliver et al. 2011). Sufficient research has demonstrated the importance of incorporating play and leisure amenities into public space including areas other than parks (Lennard 1992,

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Southworth 1990, Tranter 1996, and others). Child-friendly play amenities have been shown to do various things like:

- Foster socialization and a sense of community membership.
- Provide important opportunities to learn social skills and competencies.
- Increase self-sufficiency and independence as community members.
- Increase understanding of the physical world.

There are three major categories of play as per the above study and they are to be facilitated in the design of the street environment. First comes the physically active play, the importance here is for large and fine muscle development, eye-hand-foot coordination, balancing, locomotion, etc. This kind of play encourages social and cooperative play, and could also help connect players with the physical environment of the street. Secondly, quiet play – which is for contemplation, creation, and conversation. Similar to physically active play, it encourages social and cooperative interactions. It provides a balance to physically active play and can be included in locations where physically active play may not be possible because of space constraints or concerns about noise. Third is free play; its opportunities are particularly appropriate to the street setting and include the development of dramatic and imaginative play and interesting social intersection.

Example:

According to Convention on the Rights of the Child (United Nations General Assembly and World Health Organization), recreational environment for children must have four essential perspectives:

1. Accessibility to services and infrastructures, or the freedom of choice and free disposition of one's own free time, and also to the right to play.
2. Public health priorities with special focus on the health of the children, so that they do not become obese and suffer from non-communicable diseases.
3. Socio-educational environment such as school readiness, equity in school achievement, or language acquisition.
4. Public investments, through the setting of priorities, with creation of public parks, community recreational areas, sports complex, cycling path, and so on.

13.4 FUTURE ENVIRONMENT

As per (Proshansky, 1987) the future of environmental psychology may still be in jeopardy. Its ability to endure and putting efforts to develop as a social institution and, therefore, its scientific achievements, is still in doubt. Having said that, there

are various scopes of research which suggest a promising future in environmental psychology.

13.4.1 Living in Space

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Living in space is one of the future ambitions that humans want to achieve in the future. Over the last two decades, space agencies have created more comfortable conditions on the International Space Station, but we need to explore the concept of 'living in space' much further if humans are to ever live and work on another planet, such as the Moon or Mars.

13.4.2 Experimental Undersea Environments

Be it for recreation or scientific research the technological advancements today allow us to explore the deep waters like never before. How underwater environments can affect one's learning is explained in a free recall experiment, where divers learnt lists of words in two natural environments: on dry land and underwater, and recalled the words in either the environment of original learning, or in the alternative environment. Lists learnt underwater were best recalled underwater, and vice versa.

13.5 CHANGING BEHAVIOUR TO SAVE THE ENVIRONMENT

Environmental sustainability is a main issue for human societies even in the millennium world. All countries would require to secure sufficient quality, in the short and the long term of natural resources, ecosystems, and the diversity of plant and animal species, including the human living environment. The start of it is right from littering to vandalism, it is important to put enough emphasis on fostering behaviour to save the environment.

13.5.1 Environmental Psychology and Saving the Environment

Today, as people become more environmentally conscious, climate and environmental psychologists are playing a larger role in the workforce. Many work for non-profits or the government, often serving as research psychologists or clinicians with environmental expertise.

In particular, climate and environmental psychologists direct following suggestions:

1. Lead research on messages that inspire individuals to change their conduct
2. Spread the word about environmental alternatives

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3. Reveal why individuals may not receive positive behaviours
4. Urge individuals to reconsider their situations in the common world
5. Assist people with carrying on with more sustainable lives

Box 13.1 *Environment and Climate Emergency in UK*

Lawmakers in the UK Parliament have declared **"an environment and climate emergency",** making the UK the **first country** in the world to do this.

Climate Emergency:

A simple definition of what that means is many local areas say they want to be **carbon-neutral by 2030**. It's a much more ambitious target than the UK government's which is to reduce carbon emissions by 80% (compared to 1990 levels) by 2050.

Why did UK declare an emergency?

The United Nations says we could have just 11 years left to limit a climate change catastrophe. It's not just about reducing carbon emissions on a local scale, but also raising awareness about climate change.

Two times nominated for the Nobel Peace Prize, a 16-year old Swedish Environmental activist, Greta Thunberg stood against climate change, right from the age of 9 she became depressed as she learned that we humans are destroying our planet as she sensed a collective condition of self-deception.

13.5.2 Environmental Education

Environmental education is a process that allows individuals to explore environmental issues, engage in problem solving, and take action to improve the environment. As a result, individuals develop a deeper understanding of environmental issues and have the skills to make informed and responsible decisions.

The components of environmental education are:

1. Awareness and sensitivity to the environment and environmental challenges
2. Knowledge and understanding of the environment and environmental challenges
3. Attitudes of concern for the environment and motivation to improve or maintain environmental quality
4. Skills to identify and help resolve environmental challenges
5. Participation in activities that lead to the resolution of environmental challenges

13.5.3 Reinforcement Techniques

Reinforcement techniques can be either positive like rewarding the people for performing environmentally constructive acts, such as recycling or negative where policies offer relief from a noxious situation like high energy bills in exchange of

desirable behaviour, such as turning down the thermostat. Governments subsidies for solar and other renewable energies is an example of the same.

13.5.4 Positive Reinforcement: Encouraging Good Behaviour

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The positive technologies encourage the environment friendly behaviours. Approaching environmental education in childhood and insisting on the benefits of some individual acts on a personal and collective level, we can form a conscious population, with healthy values and attitudes, which will shape correspondent behaviours (McKenzie, 2000; Oskamp, 2000).

You will never want to reward you child when he misbehaves. But, positive reinforcement, here, can be one of the most effective behaviour modification techniques as it will inspire him to learn prosocial behaviour, like sharing or following directions. Moreover, this can used by us to prevent misbehaviour such as like rule violations and hitting. A child feels motivated to be responsible, do his own work, and get along with other family members without getting into any argument.

13.5.5 Negative Reinforcement and Punishment

Negative reinforcement consists of the development and combination of the existing environmental education which includes attitude change, negative techniques of punishment for the destructive behaviours.

Although sometimes the use of negative reinforcement and punishment has been considered controversial and unpopular, an experimental analysis of those procedures is important for achieving our goal of predicting, controlling, and interpreting the behaviours. As the study of only positive consequences of behaviour will give only half results, it becomes important to include negative reinforcement and punishment also. It has been a topic of debate that positive reinforcement is ultimately a negative reinforcement in disguise, because all behaviours are based on escape and avoidance (Hull, 1943). It is a sad thing that the study of negative reinforcement and punishment is on decreasing trend (Baron, 1991), because its analysis is needed to increase the data base of our discipline, and the procedures can be used therapeutically to improve the lives of many people (e.g., by reducing self-injurious behaviour).

13.5.6 Alternatives to Positive Reinforcement

Positive reinforcement plays an important role in creating required behaviour change. Moreover, attitudes change through persuasive or informational messages which involve making people aware of the scope and nature of environmental problems and of behavioural alternatives that might alleviate them (Fischhoff et al, 1987).

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13.5.7 Feedback: Letting Us Know We are Doing

Positive reinforcement gives effective results if used correctly. It is the most effective when it takes place immediately after the behaviour. Also, to have a sustained effect, reinforcement should be presented enthusiastically and should take place frequently.

- A shorter period of time between a behaviour and positive reinforcement, makes a stronger connection between the two.
- The connection will be weaker if a long period of time has passed between the behaviour and the reinforcement.
- The longer the time, the more likely it becomes that an intervening behaviour might accidentally be reinforced.

Moreover, the type of reinforcement used, the time of presentation can also play a role in the strength of the response.

13.6 INTEGRATING AND EVALUATING THE VARIOUS APPROACHES TO ELIMINATING ENVIRONMENTALLY DESTRUCTIVE BEHAVIOUR

Even after witnessing a remarkable economic growth and human prosperity, the past century has seen unprecedented damage to the natural environment. In order to pursue an improved quality of life, we are engaging in environmentally destructive acts and behaviour that is unsustainable and, therefore, opposite to our long-term interests. For example the human population is exploding while fertile and crop producing land is eroding, forests are decreasing, many species are on the verge of extinction, fresh water supplies are reducing, and pollution threatens human health.

Though technological and economic practices may be the direct cause of environmentally destructive behaviour, it is actually the personal beliefs, cultural norms and societal institutions which guide the progress of such practices. Here, environmentally destructive acts and behaviours have been classified into three categories:

(1) Human population growth

(2) Over-consumption of natural resources like forests, fisheries, wetlands, rivers, etc.

(3) Pollution of air, water, and land

A multi-level analysis of the destructiveness of taken-for-granted belief and behaviour is needed to resolve the environment changes. First, by knowing how individuals are guided in their perception of environmental problems through cognitive biases. Second, by understanding how individuals are influenced in these perceptions and biases by the organizations of which they are a part. Finally, we consider the institutions that persist and guide our awareness of our connections

and impact on the environment. By doing this multi-level analysis, the persistence of environmentally destructive acts and behaviour can be addressed.

The rational change at the root level of our core beliefs and values toward the natural environment is necessary to solve the environmentally destructive behaviour. It involves the process of unlearning of what has been ingrained earlier. Assumptions, heuristics, norms, and beliefs that have been established within individuals, organizations, and society must be dismantled and reset to reflect new perspectives.

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13.7 APPROACHES TO SPECIFIC ENVIRONMENTAL PROBLEM

Here, we will discuss the approaches to particular environmental problem like littering, energy conservation, vandalism, etc.

13.7.1 Littering

Lee Chambers, an environmental psychologist, explains that littering is more complex than people think and sometimes more than just a moment of selfishness. He says that people choose to do either the right thing by disposing of their litter in the correct way, or the wrong thing by leaving the litter in an unsuitable place. The more it is studied, the more we have realised that both environment and context play a significant role.

The current state of an individual's surroundings can play a role in his decision to litter. If an area is well maintained and free of garbage then we are less likely to litter. Therefore, it is possible that people who would not generally litter have been encouraged by the 'environmental cues' of the existing litter.

Along with the environmental cues, Chambers also proposes that individual beliefs or values may play some part in the likelihood of littering. An individual's views on the environment affect how he approaches disposing of waste. Most of the times people justify littering the area as it is already untidy and littered. With such kind of social proof, others also join the bandwagon saying that their little bit of litter would not matter in all that rubbish.

13.7.2 Saving Energy at Home

Environmental changes like conservation of energy by adopting energy saving methods start from our homes. Despite the fact that saving energy frequently brings about generally little financial saving, individuals may in any case be slanted to take energy saving measures when they foresee that such activities would inspire positive feelings of contributing towards a sustainable environment. For example, studies that have been used in-home energy displays have found this type of continuous feedback to be more effective than less frequent (monthly) feedback (Van Houwelingen and Van Raaij 1989).

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13.7.3 Residential Energy Conservation

Energy consumption in the private area offers a significant open door for preserving resources.

Nonetheless, a large part of the present issue with respect to energy effectiveness in the residential areas centers around the physical and specialized determinants of energy consumption, dismissing the role of the economic behaviour of the occupant families. In an experiment scientists attempted to break down the level to which the utilization of gas and power is controlled by the people living in a home when contrasted with the demographic characteristics of the inhabitants. The outcomes suggest that private gas consumption is resolved essentially by basic house characteristics, for example, the age, building type, and

characteristics of the residence, while power consumption changes directly with family arrangement, specifically pay and family creation. Consolidating these outcomes with projections on future monetary and demographic patterns, we distinguish that, even missing cost increments for private energy consumption, the maturing of the populace and their expanding presence will generally counterbalance enhancements in the energy proficiency of the building.

13.7.4 Energy Conservation and Transportation

Energy efficiency in transportation is for the most part talked about using terminology explicit to this area of the economy. The essential terms used to measure the fuel used by a vehicle as it is driven are mileage and fuel utilization. In 2006, petroleum oil represented 96 percent of the energy utilized for transportation; gasoline represented 62 percent of the energy utilized (EIA, 2006). Albeit public travel burns-through a generally little division of by and large transportation energy, it serves a few significant parts in metropolitan transportation frameworks. Plug-in hybrid-electric vehicles are hybrid vehicles that can be run on electricity. The petrol or diesel fuel saving can be acknowledged directly by identifying the measure of electricity used.

13.7.5 Vandalism

Vandalism can be characterized as the demonstration of intentionally and energetically hurting a property, vehicle or a public establishment. When considered from the environmental perspective, individuals are frequently faced with practical examples of vandalism in their daily lives. For example names engraved on the outside of a tree or on a bank in the recreation center, broken lighting fittings, compositions on the dividers, unusable public latrines, etc.. In a recent study the metropolitan territories where the issue of vandalism was noticed, were analyzed and models identified with them were introduced. The issue of vandalism is identified with the ideas of environment, region, owing a place, and proprietorship, and arrangement recommendations are introduced accordingly.

13.7.6 Curbing Environmentally Destructive Acts

There can be two approaches to curbing the environmentally destructive acts, viz., mitigative and adaptive approaches. Mitigation implies the proactive efforts to prevent unfavourable environment changes, whereas adaptive alludes to the reactive responses to the causes of environment changes. Both the approaches can be differentiated by the factor that for non-psychologists, adaptation generally includes building seawalls whereas for psychologists the meaning of adaptation is more oriented towards more personal responses, for e.g., emotions, cognitions, decision processes and coping strategies.

Environment changes can have dire consequences if not checked upon timely, so it is necessary to focus on psychological adaptation. Besides the impacts already seen in some of the Northern regions, some opportunities are still available to study the psychological adaptation to mitigate the present effects of environment changes. People should prepare themselves on a personal level to deal with the imminent climatic changes such as rising sea-level, global warming, etc., at both behavioural and emotional levels. People who have more resilience and weaknesses will have greater adaptive capacity.

13.7.7 Assessment of the Present and the Future

Psychological research has for decades conveyed the understanding of people, environment and relations and their applications in architecture, urban planning and other design arenas. In this unit we tried to understand the role of the environment in the current setting and what it has to offer for us in our near future.

Check Your Progress

1. What do you mean by office?
2. What is evidence based design?
3. What is an object in an organization to which people are territorial?
4. Define leisure time.
5. What is environmental education?
6. Name the categories of environmentally destructive acts and behaviours.
7. Name the two approaches to curb environmentally destructive acts.

13.8 ANSWERS TO CHECK YOUR PROGRESS QUESTIONS

1. An office is a place where people come and gather for handling information and taking decisions. There, people are expected to read, think, work with each other and they are also expected to communicate and collaborate.

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2. Evidence-based design (EBD), which is essentially the approach to design buildings, is based on the best available evidence on the effectiveness of design measures.
3. One of the most important objects in an organization to which people are territorial is the employee's workspace.
4. Leisure time itself means having ample time post work and household work and being able to enjoy this time satisfactorily.
5. Environmental education is a process that allows individuals to explore environmental issues, engage in problem solving, and take action to improve the environment.
6. environmentally destructive acts and behaviours have been classified into three categories:
   (i) Human population growth
   (ii) Over-consumption of natural resources like forests, fisheries, wetlands, rivers, etc.
   (iii) Pollution of air, water, and land
7. There can be two approaches to curbing the environmentally destructive acts, viz., mitigative and adaptive approaches.

13.9 SUMMARY

- Office is a place where people come and gather for handling information and taking decisions. There, people are expected to read, think, work with each other and they are also expected to communicate and collaborate.
- The focus on building our environment was largely supported by the political and social context of the time. The recent modern architecture tried to respond to post-war challenges (Pol 2006), such as decent housing.
- Employees in open offices do undergo higher levels of stress, lower levels of concentration and motivation, and they even seem to take more sick leaves. The researchers consider that open-office workers might be able to maintain a sense of control over their space by personalizing it.
- Organizations are particularly fertile grounds for territoriality. First, there are many objects in an organization to which people are territorial. One of the most important objects is the employee's workspace.
- Territories become more important to employees compared to the upper management in the organization. As per Sundstrom, 1987, at higher ranks, territories would be considered as symbol of status.
- Leisure time itself means having ample time post work and household work and being able to enjoy this time satisfactorily. Hence on a day-to-day basis

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we come across several such leisure environments that play a crucial role in affecting our life.

- Research conducted on human dimensions of wilderness life is proved to be of practical relevance, which helps us to understand current standpoints or public debates about wildlife-related issues such as the reintroduction of predators or the killing of species that cause harm to humans or damage crops.
- There are three major categories of play as per the above study and they are to be facilitated in the design of the street environment.
- Several children who are diagnosed with attention deficit hyperactivity disorder (ADHD) suffer from deficits in their attentional functioning. Studies suggest that natural environments might provide supportive settings to these children.
- Living in space is one of the future ambitions that humans want to achieve in the future. Over the last two decades, space agencies have created more comfortable conditions on the International Space Station, but we need to explore the concept of 'living in space' much further if humans are to ever live and work on another planet, such as the Moon or Mars.
- Be it for recreation or scientific research the technological advancements today allow us to explore the deep waters like never before.
- A multi-level analysis of the destructiveness of taken-for-granted belief and behaviour is needed to resolve the environment changes.
- The rational change at the root level of our core beliefs and values toward the natural environment is necessary to solve the environmentally destructive behaviour. It involves the process of unlearning of what has been ingrained earlier.
- Littering is more complex than people think and sometimes more than just a moment of selfishness.
- Most of the times people justify littering the area as it is already untidy and littered. With such kind of social proof, others also join the bandwagon saying that their little bit of litter would not matter in all that rubbish.
- Vandalism can be characterized as the demonstration of intentionally and energetically hurting a property, vehicle or a public establishment.
- There can be two approaches to curbing the environmentally destructive acts, viz., mitigative and adaptive approaches. Mitigation implies the proactive efforts to prevent unfavourable environment changes, whereas adaptive alludes to the reactive responses to the causes of environment changes.

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13.10 KEY WORDS

- **Work environment:** It is the setting, social features and physical conditions in which one performs one's job.
- **Environmentally destructive acts:** It refers to the human practices which deteriorate the environment through depletion of resources such as air, water and soil; the destruction of ecosystems; habitat destruction; the extinction of wildlife; and pollution.

13.11 SELF ASSESSMENT QUESTIONS AND EXERCISES

Short-Answer Questions

1. How does personalization of open-offices affect employees' performance?
2. How have the child-friendly amenities helped the children?
3. How can we explain that underwater environments affect one's learning?
4. Mention the suggestions given by climate and environmental psychologists to saving the environment.
5. What are the components of environmental education?
6. Differentiate between negative reinforcement and positive reinforcement.
7. How can the current state of an individual's surroundings play a role in his decision to litter?

Long-Answer Questions

1. Describe the major categories of play.
2. Write an essay on the 'role of environmental education in solving environmental problems'.
3. Explain the various approaches to eliminating environmentally destructive behaviour.
4. Discuss the ways to curb environmentally destructive acts and behaviours.

13.12 FURTHER READINGS

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UNIT 14 MENTAL HEALTH AND SOCIAL LEARNING

Structure

14.0 INTRODUCTION

In the 21st century, along with the rapidly changing technological lifestyle, unfortunately, people have forgotten the role of mental health in their life. The rising numbers of suicides and depression medication are an indication that more emphasis has to be given on one's mental health. As human beings are social beings, the majority of their learning happens through their social interactions as explained by Bandura in his theory of social learning. In our present world, it is essential that children are taught the importance of mental health right from their childhood, both by their families and teachers. In this unit, you will learn about fostering mental health and social development, characteristics of mental health, social learning in the classroom, self-concept and behaviour and teachers' guidance of self.

14.1 OBJECTIVES

After going through this unit, you will be able to:

- Discuss the characteristics of mental health
- Describe the role of social learning in the classroom
- Explain the role of social learning in maintaining mental health
- Discuss the meaning of self-concept and behaviour

14.2 FOSTERING MENTAL HEALTH AND SCHOOL DEVELOPMENT

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Fostering mental health, just like education should start right from the child's family. Researchers have developed numerous parenting interventions as a part of general strategies that help in fostering mental health. Many parenting interventions target early developmental stages for two reasons: first, parents generally have the most extensive contact and exert the greatest influence while their offspring are infants, toddlers, and young children; second, early brain development is critical for various mental health outcomes.

Studies suggest that for 90% of people, mental health issues are indicated when they are young, out of which, half of all mental disorders are seen from the age of 14 years old to 25 years old, a phase where the people are in education. Aside from a child's home, no other setting has more influence on a child's mental health and well-being, and it is a critical place to foster healthy mental, emotional, and behavioural development. The relationship between school environment and some mental health outcomes has been well documented, and both researchers and practitioners have explored ways to intervene at the school level to bring organizational changes that affect whole populations, as opposed to delivering isolated programs aimed at preventing single disorders.

In a child's lifetime, preventing adverse childhood experiences and peer rejection may have significant positive effects on mental health development, and schools nationwide should begin to support staff education about the effects of trauma on children. In the past decade, research has added to the evidence that high-quality early childhood interventions have long-term positive effects on mental health lasting into adulthood. For example, programs designed to foster social-emotional learning in preschool settings have been found to improve socioemotional development, prosocial behaviour, and adjustment to kindergarten.

For example, parent student review meetings, which will help to establish good well-being. Schools and educators need to develop a more meaningful relationship with parents and guardians. Both stakeholders must understand that, according to Samuel R. Laycock, the behaviour of the child "is a barometer to the stresses and strains he is subjected to at home and in the community." Laycock suggests 15-20 minutes of engaged discussions between parents and educators twice a year to help achieve this.

Happiness Curriculum is an educational program for children in grades one to eight in schools run by the Government of Delhi since July 2018. The objective is to improve the mental well-being of pupils, and it teaches mindfulness, social-emotional learning, critical thinking, problem solving, and relationship building.

14.2.1 Characteristics of Mental Health

According to WHO (1948), "Health is a state of complete physical, mental, and social well-being and not merely the absence of disease or infirmity."

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According to WHO (2004), Illness refers to a person's own perceptions, experience and assessment of a disease or condition, or how he or she feels. Example, a person may feel pain, discomfort, weakness, depression or anxiety, but a disease may or may not be present.

Given below are the points that tell us that we need to know about mental wellness and illness:

- Mental Health and access for basic mental healthcare is everyone's right.
- Mental health is connected to socio-economic and environmental factors.
- Persons with mental disorders are associated with societal problems if their illness is unrecognized or inappropriately managed (National Mental Health Survey of India, 2015-20).

What is mental health?

According to WHO, "Mental health is a state of well-being in which the individual realizes his or her own abilities, can cope with the normal stresses of life, can work productively and fruitfully, and is able to make contribution to his or her community."

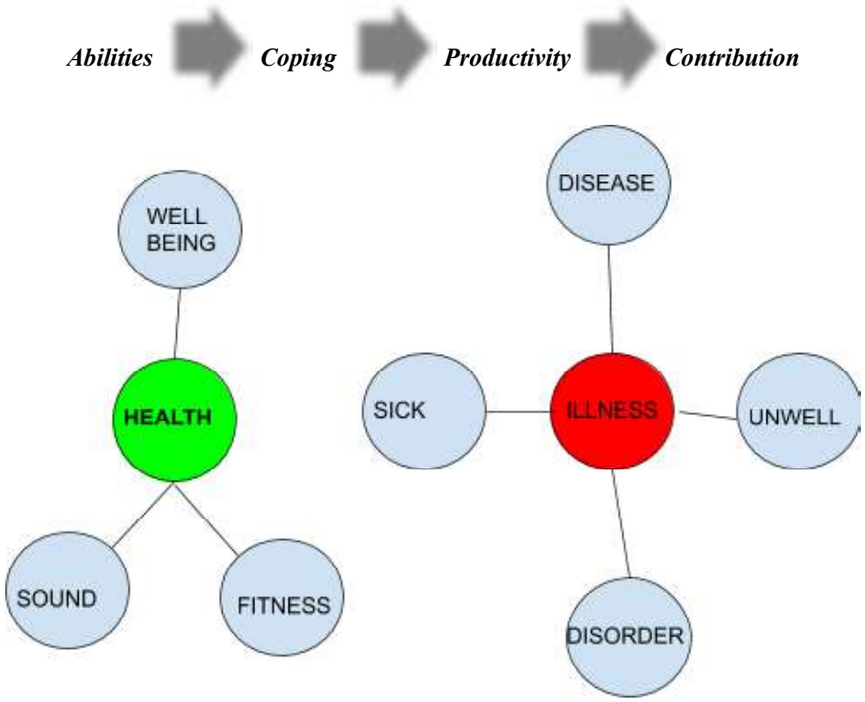

Fig 14.1 *Health and Illness*

Mental health is seldom thought to be more than just the absence of mental illness. Positive mental health and well-being is a combination of feeling good and functioning well.

Few important components of good mental health include:

1. Experiencing positive emotions: happiness, joy, pride, satisfaction, and love

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2. Having positive relationships: people you care for, and who care for you
3. Feeling engaged with life
4. Meaning and purpose: feeling your life is valuable and worthwhile
5. A sense of accomplishment: doing things that give you a sense of achievement or competence
6. Emotional stability: feeling calm and able to manage emotions
7. Resilience: the ability to cope with the stresses of daily life
8. Optimism: feeling positive about your life and future
9. Self-esteem: feeling positive about yourself
10. Vitality: feeling energetic

14.2.2 Home and Mental Health

As mental health is majorly nurtured at home, it is important to study how the environment we live in shapes our mental health. Studies have shown household crowding as an important source of chronic stress (Riva et al. 2014). Living in a crowded home is also negatively associated with multiple aspects of child wellbeing, even after controlling for several dimensions of socioeconomic status (SES). There is a significant harmful effect of household crowding on academic achievement, on external behaviour problems, and the physical health of children (Solari and Mare 2012).

Also, women living in crowded homes are more likely to be depressed, while men report higher levels of withdrawal, and some males respond with both aggression and withdrawal (Regoeczi 2008).

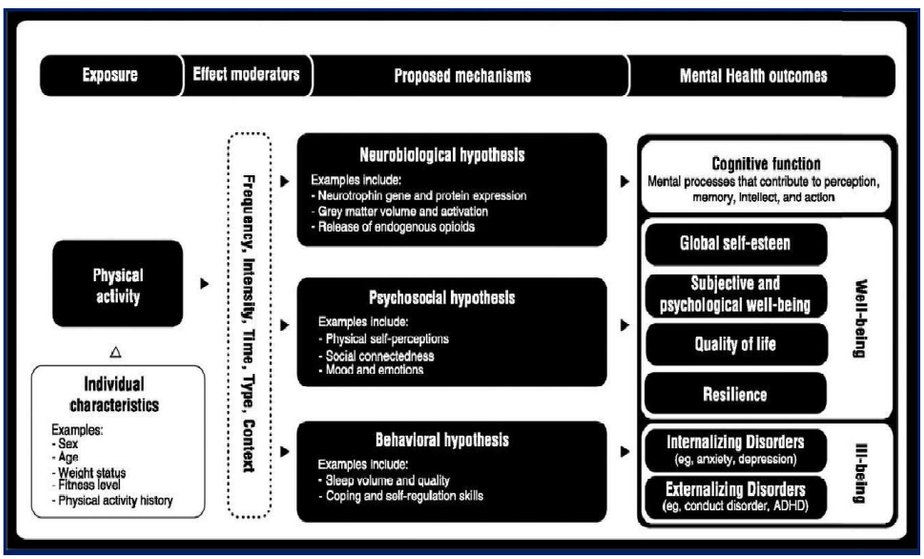

Fig 14.2 *Mental Health*

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14.2.3 School and Mental Health

As we have adequately established the role our house and school environment play in moulding our knowledge about mental health, it is almost intuitive that we pay enough attention to what happens in our schools. And when we talk about school and mental health we don't just mean the children, after all, if our teachers are not well maintained the children's career may be in jeopardy.

A survey on nature based coping strategies of elementary school teachers suggests that micro-restorative experiences are especially helpful when stress levels are low (Gulwadi 2006). Teachers who frequently suffered from vocational stress (having to teach in overcrowded classrooms, poor working conditions) preferred to actually go out and be in nature (such as taking a walk in the woods), whereas those with low levels of vocational stress found sufficient merit in brief sensory interactions with nearby nature, such as listening to birds' voices.

Ample research has been done to prove how simple changes in our school environment can result in huge stress reduction in children. For example, a study in rural Austrian middle schools reported an increase in students' psychological well-being and a reduction in stress after greening the school ground, compared to children in control schools (Kelz et al. 2015).

Having nature nearby can also make children less vulnerable to the negative impacts of stressful events, by helping them to cope better with adversities (Corraliza et al. 2012).

Furthermore, several studies have revealed a relation between greenery in the school surroundings and a decrease of antisocial behaviours, such as bullying and aggressive behaviours (Cheskey 2001). In addition, at green playgrounds more prosocial behaviour occurs than at barren, paved playgrounds.

Example:

Playgrounds reduce stress in children. Schools that play a huge role in shaping a child's personality should also have a well-nourished playground for relieving their stress. Various studies have proven that a good playground promotes the mental health of the children.

14.3 SOCIAL LEARNING IN THE CLASSROOM

Apart from a passive role of the environment in classrooms, children who are actively learning in the same classrooms attract some attention. This strategy is based on Bandura's social learning theory (1977) and assumes that people make inferences about how to behave in a given situation by observing the behaviour of others.

Within the school environment, it has been found that children perform better on standardized tests of mathematics and English if there is more green space around their school (Wu et al. 2014). Furthermore, a study at five high schools

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showed that students who were randomly assigned to classrooms with views to green space, as compared to students in classrooms without green views, performed better on attention tests and recovered faster from a stressful experience (Li and Sullivan 2016). The greening of classrooms has similar benefits. Placement of a green wall in four classrooms of elementary schools, compared to control classrooms without green walls, resulted in better scores on a test for selective attention (Van den Berg et al. 2016). Nature around schools thus has the potential to improve children's school performance, which may have a life-changing impact on career and future goals.

Perspectives in Social learning: There are two dominant theoretical perspectives of learning, they are the socio-cultural and the cognitive perspective.

1. **Socio-cultural perspective**: Socio cultural views of learning rest on theories that emphasize socio-cultural development. The most influential of these theories is based on the work of L.S. Vygotsky and his followers. The socio-cultural perspective emphasizes the situatedness of thinking and speaking in the context of activity (Wertsch et. al., 1966).

   According to this perspective, an individual's mental activity can be understood only by investigating it within its cultural, historical and institutional context.

   It emphasizes the social and situational nature of knowledge formation, with cognition being seen as including action distributed and constructed with others in cultural context, including the use of tools and symbols formed by culture.

2. **Cognitive Perspective**: The cognitive perspective on learning emphasizes the individual's mental activity, the development of thinking, cognitive strategies and their applications. The learning is seen as the process during which the individual organizes his or her activity in order to eliminate conflicts and imbalances.

   Special attention is given to the individual's goals and purposes, which lay grounds for learning. Also, special stress is also laid upon the development processes, since development is seen as making the conditions for learning (Piaget, 1954). At the beginning of an individual's development, he or she is seen as egocentric who gradually develops into a social-being.

14.4 SOCIAL DEVELOPMENT

Research has suggested changes in our environment and lifestyles to accommodate the social development of children.

Example: Wapner made recommendations for the design of urban contexts for children which had the following two prime goals:

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1. To provide optimal environmental contexts (physical, interpersonal, sociocultural) to the contexts of the child on welfare of her or his physical, mental and social development;
2. To optimize the transactions (experience and action) of the child with the physical, interpersonal, and sociocultural contexts of the environment.

As per the recent analyses we see how population growth is difficult to separate from a whole set of questions of economic, social development and from the environmental issues related to the chaos of production and consumption throughout the world (e.g., Lindahl-Kiessling & Landberg, 1994).

Hence the idea of environmental psychology is to increase the opportunities for children to acquire complete social development along with the well-being offered because of sustainable environmental conditions.

14.5 SELF CONCEPT AND BEHAVIOUR

We should also understand how the behaviour of our children is shaped in these environments and how the structure of a child's self-concept shapes their successful future. The social identity approach that incorporates two interrelated theories – social identity theory (SIT) and self-categorization theory (SCT) can be used to understand the same.

Social identity theory (Tajfel and Turner 1979) proposes that individuals derive part of their self-concept – their social identity – from their knowledge of, and emotional attachment to group(s). For example, an individual's self-concept may be made up, in part, of the social identities of being a woman, a student, and a vegetarian. According to SIT, these social identities are defined and evaluated through comparisons with other relevant groups (i.e., intergroup comparisons) made salient by the particular social context. People are motivated to see themselves positively, which is more likely when they see the group they are a member of as positively distinct from relevant outgroups (e.g., vegetarians versus non-vegetarians). Various surveys among American youth who participated in a wilderness program revealed an increased sense of personal autonomy, improved self-concept, a greater capacity for taking action and being decisive, and improved interpersonal skills (Kahn Jr. and Kellert 2002).

Furthermore, many studies have revealed a relation between greenery in the school surroundings and a decrease of antisocial behaviours, such as bullying and aggressive behaviours (Cheskey 2001).

14.5.1 Teachers Guidance of Self and Social Development

Report extracted from Csikszentmihalyi and Schneider (2000) states that secondary school students spend over one-third of their class hours listening to their teachers' lecture or to audiovisual presentations but they are actually thinking about the

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subject matter only 54% of the time. Hence it should be understood that teachers play a direct role in student's social development as they act as direct role models. For example youths who have mostly peers rather than parents or teachers in their physical environment can be expected to have less support for their normative goal-frame (and show more deviant behaviour) than youths whose environment clearly shows signs of the presence of norm-relevant significant others. Clearly we can hypothesize that teachers' guidance is crucial for a child's self and social development.

Check Your Progress

1. How do men and women behave in crowded homes?
2. Which goals did Wapner recommend for the design of urban contexts for children?
3. Name the theories of social identity approach.

14.6 ANSWERS TO CHECK YOUR PROGRESS QUESTIONS

1. Women living in crowded homes are more likely to be depressed, while men report higher levels of withdrawal, and some males respond with both aggression and withdrawal.
2. Wapner made recommendations for the design of urban contexts for children which had the following two prime goals:
   (i) To provide optimal environmental contexts (physical, interpersonal, sociocultural) to the contexts of the child on welfare of her or his physical, mental and social development;
   (ii) To optimize the transactions (experience and action) of the child with the physical, interpersonal, and sociocultural contexts of the environment.
3. The social identity approach incorporates two interrelated theories – social identity theory (SIT) and self-categorization theory (SCT).

14.7 SUMMARY

- Many parenting interventions target early developmental stages for two reasons: first, parents generally have the most extensive contact and exert the greatest influence while their offspring are infants, toddlers, and young children; second, early brain development is critical for various mental health outcomes.

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- In a child's lifetime, preventing adverse childhood experiences and peer rejection may have significant positive effects on mental health development, and schools nationwide should begin to support staff education about the effects of trauma on children.
- Mental health is seldom thought to be more than just the absence of mental illness. Positive mental health and well-being is a combination of feeling good and functioning well.
- A survey on nature based coping strategies of elementary school teachers suggests that micro-restorative experiences are especially helpful when stress levels are low (Gulwadi 2006).
- Placement of a green wall in four classrooms of elementary schools, compared to control classrooms without green walls, resulted in better scores on a test for selective attention (Van den Berg et al. 2016).
- Socio cultural views of learning rest on theories that emphasize socio-cultural development. The most influential of these theories is based on the work of L.S. Vygotsky and his followers.
- The cognitive perspective on learning emphasizes the individual's mental activity, the development of thinking, cognitive strategies and their applications. The learning is seen as the process during which the individual organizes his or her activity in order to eliminate conflicts and imbalances.
- The idea of environmental psychology is to increase the opportunities for children to acquire complete social development along with the well-being offered because of sustainable environmental conditions.
- People are motivated to see themselves positively, which is more likely when they see the group they are a member of as positively distinct from relevant outgroups (e.g., vegetarians versus non-vegetarians).
- Teachers play a direct role in student's social development as they act as direct role models.

14.8 KEY WORDS

- **Social learning theory:** A theory positing that people learn from one another via observation, imitation, and modelling.
- **Mental health:** Mental health, defined by the WHO, is "a state of well-being in which the individual realizes his or her own abilities, can cope with the normal stresses of life, can work productively and fruitfully, and is able to make a contribution to his or her community".
- **Behaviour:** It refers to the actions and mannerisms made by individuals, organisms, systems or artificial entities in conjunction with themselves or their environment, which includes the other systems or organisms around as well as the physical environment.

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- **Social development:** It refers to the process by which a child learns to interact with others around them.
- **Situatedness:** It is a theoretical position that posits that the mind is ontologically and functionally intertwined within environmental, social, and cultural factors.

14.9 SELF ASSESSMENT QUESTIONS AND EXERCISES

Short-Answer Questions

1. Why do many parenting interventions target early developmental stages?
2. What are the characteristics of mental health?
3. Mention the important components of good mental health.
4. What effect does the green surroundings have on students' academic performance?
5. How do teachers play a direct role in a student's social development?

Long-Answer Questions

1. How can simple changes in school environment result in huge stress reduction in children? Explain.
2. Describe the theoretical perspectives of learning.

14.10 FURTHER READINGS

Bell, P A, J D Fisher, Loomis R J. 1978. *Environmental Psychology*. Philadelphia: W.E. Saunders Co.

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