UNIT-2

ATTENTION, PERCEPTION AND MEMORY

MEANING AND DEFINITION OF ATTENTION

Attention is the term used or given to the perceptual processes that select certain inputs for inclusion in our conscious experience, or awareness at any given time. It is the process involving the act of listening, and concentrating on a topic, object or event for the attainment of desired ends.

"Attention is the concentration of consciousness upon one object other than upon another"—Dumville.

"Attention is the process of getting an object or thought clearly before the mind"—Ross.

"Attention is being keenly alive to some specific factors in our environment. It is a preparatory adjustment for response"—Morgan.

Thus attention is essentially process and not a product. It helps in our awareness or consciousness of our environment, which is of selective kind, because in a given time, we can concentrate or focus our consciousness on a particular object only.

The concentration provided by the process of attention helps us in the clarity of the perception of the perceived object or phenomenon. Thus attention is not merely a cognitive factor but is essentially determined by emotions, interest, attitude and memory.

Thus attention is a process which is carried out through cognitive abilities and helped by emotional and behavioral factors to select something out of the various stimuli present in one's environment and bring it in the centre of one's consciousness in order to perceive it clearly for deriving the desired end.

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NATURE OF ATTENTION

Attention, in Psychology, **the concentration of awareness on some phenomenon to the exclusion of other stimuli**. Attention has to do with the immediate experience of the individual; it is a state of current awareness.

- Attention is focusing of consciousness on a particular object.
- Attention is constantly shifting /changeable
- Attention is selective
- Attention is a mental process
- Attention is a state of preparedness or alertness

- Attention has narrow range /span

DETERMINATION OF ATTENTION

The determinants of attention can be categorized as internal and external.

External determinants of span of attention are:

- Nature of stimulus
- Intensity of stimulus
- Location of stimulus
- Contrast of stimulus
- Change of stimulus
- Isolation of stimulus
- Duration of stimulus
- Movement of stimulus
- Repetition of stimulus

Internal determinants of span of attention are:

- Interest
- Basic drives
- Mental set
- Aim
- Meaning
- Habit
- Disposition and Temperament

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- Past experience
- Emotion
- Social motives

Determinants of Attention:

Two types.

1. External factors or condition

2. Internal factors

I. External Factors or Condition:

These conditions are generally those characteristics of outside situation or stimuli which make the strongest aid for capturing our attention.

These can be classified as:

1. Nature of the stimulus:

All types of stimuli are not able to bring the same degree of attention. A picture attracts attention more readily than words. Among the pictures, the pictures of human beings invite more attention and those of human beings related to beautiful women or handsome men, who attract more attention. In this way an effective stimulus should always be chosen for capturing maximum attention.

2. Intensity and size of the stimulus:

In comparison with the weak stimulus, the immense stimulus attracts more attention of an individual. Our attention become easily directed towards a loud sound, a bright light or a strong smell, and also a large building will be more readily attended to, than a small one.

3. Contrast, change and variety:

Change and variety strike attention more easily than sameness and absence of change, e.g. we do not notice the ticking sound of a clock put on the wall until it stops ticking, that is any change in the attention to which you have been attracted immediately capture your attention. The factor,

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contact or change is highly responsible for capturing attention of the organism and contributes more than the intensity, size or nature of the stimulus.

4. Repetition of stimulus:

Repetition is the factor of great importance in securing attention. Because one may ignore a stimulus at first instance, but if it is repeated for several times it captures our attention, e.g. a miss-spelled word is more likely to be noticed, if it occurs twice in the same paragraph than, if it occurs only once. While giving lecture the important aspects of the speech are often repeated so that the attention of the audience can be easily directed to the valuable points.

5. Movement of the stimulus:

The moving stimulus catches our attention more quickly than a stimulus that does not move. We are more sensitive to objects that move in our field of vision, e.g. advertisers make use of this fact and try to catch the attention of people through moving electric lights.

Duration and Degree of Attention:

People may possess the ability to grasp a number of objects or in other words, to attend a number of stimuli in one short “presentation”. This ability of an individual is evaluated in terms of the span of attention, which differs from person to person and even situation to situation.

The term “span of attention” is designed in terms of the quality, size extent to which the perceptual field of an individual can be effectively organized in order to enable him to attain a number of things in a given spell of short duration.

II. Internal or Subjective Factors:

These factors predispose the individual to respond to objective factors, to attend to those activities that fulfill his desires and motives and suit his interest and attitude. It is the mental state of the perceiver.

Some of the subjective factors are:

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1. Interest:

Interest is said to be the mother of attention. We attend to objects in which we have interest. We would like to watch a movie or a serial in TV because we are interested in the subject around which the movie or serial revolves. In any get-together if any subject of our interest is discussed that attracts our attention easily and makes us to participate in the discussion. In our day-to-day life we pay attention to the stimulus we are interested in.

2. Motives:

Our basic needs and motives to a great extent, determine our attention, thirst, hunger, sex, curiosity, fear are some of the important motives that influence attention, e.g. small children get attracted towards eatables.

3. Mind set:

Person’s readiness to respond determines his attention. If we are expecting a stimulus, occurrence of that stimulus along with many other stimuli may not come in the way of attending to that particular stimulus. At a time when students are expecting the examination time table by the end of the semester the time table put out on the notice board along with other notices would attract their attention easily.

4. Moods and attitudes:

What we attend to is influenced by the moods and attitudes. When we are disturbed or in angry mood, we notice the smallest mistake of others very easily. Likewise our favourable and unfavourable attitudes also determine our attention. After discussing subjective and objective factors, we realize that these factors are interrelated. How much or in what way we attend to a stimulus depends on subjective as well as objective factors.

SENSATION & PERCEPTION - When we smell a fragrant flower, are we experiencing a sensation or a perception? In everyday language, the terms "sensation" and "perception' are often used interchangeably.

I. Sensations and Perceptions

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Sensations can be defined as ***the passive process of bringing information from the outside world into the body and to the brain.*** The process is passive in the sense that we do not have to be consciously engaging in a "sensing" process. Perception can be defined as ***the active process of selecting, organizing, and interpreting the information brought to the brain by the senses.***

Sensation is the process by which we receive
information from the environment.

A. What kind of information? A stimulus is a detectable input from the environment:

1. Light—vision
2. Sound—hearing
3. Chemicals—taste and smell
4. Pressure, temperature, pain—sense of touch
5. Orientation, balance—kinesthetic senses

B. Environmental information (stimuli) exists in many forms:

1. A physical stimulus must first be introduced. For example: air,vibrations, gases, chemicals, tactile pressures
2. Our senses respond to a limited range of environmental stimuli. For example, we cannot hear sound of frequencies above 20,000 Hz, even though dogs can hear them.

C. Some physical stimuli that our bodies are sensitive to:

1. Light as experienced through vision

a. Visible light is part of the electromagnetic spectrum.b. Properties of light
i. Intensity (experienced as brightness)
ii. Wavelength (experienced as hue)
iii. Complexity or purity
(experienced as saturation)

2. Sound as experienced through audition

Properties of sound
i. Intensity (influences mainly loudness)
ii. Frequency (influences mainly pitch)
iii. Wave form (influences mainly timbre)
iv. As noted above, there is not a one-to-one relationship between physical properties and

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perceptual experience. For example, intensity can also influence perception of pitch.

D. Sensory processes are the initial steps to perception.

1. Transduction is the process of converting energy of a stimulus into neural activity. The stimulus is recoded as a neural pattern.
2. Transduction can be affected by our experiences, such as through adaptation; a constant level of stimulus results in a decreased response over time. With continued exposure, the neural response to the stimulus may change. Adaption is also perceptual, not just sensory.

II. Perception is the process of selecting and identifying information from the environment.

A. Perception is the interpretation of information from the environment so that we can identify its meaning.

B. Sensation usually involves sensing the existence of a stimulus, whereas perceptual systems involve the determination of what a stimulus is.

C. Expectations and perception: Our knowledge about the world allows us to make fairly accurate predictions about what should be there—so we don't need a lot of information from the stimulus itself.

1. Bottom-up processes are processes that are involved in identifying a stimulus by analyzing the information available in the external stimulus. This also refers to information processing that begins at the receptor level and continues to higher brain centers.
2. Top-down processes are processes that are involved in identifying a stimulus by using the knowledge we already possess about the situation. This knowledge is based on past
experiences and allows us to form expectations about what we ought to perceive.

a. This also refers to information processing that begins in higher brain centers and proceeds to receptors.

b. Top-down processes allow for perceptual judgments and bias to start influencing how we process incoming stimuli and information. Early incoming information is already being processed in terms of top-down influences and previous experience.

LAWS OF PERCEPTION

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The Gestalt principles are a set of laws arising from 1920s' psychology, describing how humans typically see objects by grouping similar elements, recognizing patterns and simplifying complex images. The Gestalt principles of grouping ("Gestalt" is German for "unified whole") represent the culmination of the work of early 20thcentury. German psychologists Max Wertheimer, Kurt Koffka and Wolfgang Kohler,who sought to Understand how humans typically gain meaningful perceptions from chaotic stimuli around them. Wertheimer and company identifies a set of laws addressing this natural compulsion to seek order amid disorder, where the mind "informs" what the sees by making sense of a series of elements as an image or illusion.

Gestalt principles:

1.**Law of similarity**:The law of similaritysuggests that things similar things tend to appear grouped together. Grouping can occur in both visual and auditory stimuli.

2. **Law of closure**:Preferring complete shapes,we automatically fill in gaps between elements to perceivea complete image,so,we see whole first.

3.**Law of proximity** :-According to the law of proximity, things that are near each other seem to be grouped together.

4.**Law of pragnanz** :-The word pragnanz is a German term meaning "good figure". The law of pragnanz is sometimes referred to as the law of good figure or the law of simplicity.

5.**Law of continuity**:-The law of continuity states that elements of objects tend to be grouped together, and therefore integrated into perceptual wholes if they are aligned within an object.

6.**Law of Figure/Ground** :-Disliking uncertainty, we look for solid,stable Items ,unless an image is truly ambiguous, its foreground catches the eye first.

7.**Law of symmetry and order** :-We seek balance and order in designs,struggling to do so if they are not readily apparent.

ERRORS IN PERCEPTION

Illusion: Illusion came from the Latin word, "illusio" which means "to mock". Rightly so, it occurs when something seems to be different from what it actually is. With the alteration of the stimulus, people experience "misperception". This happens when the brain tries to fill in gaps in the organized sensory information. Though illusions are usually related with visual processes as it dominates the others, they are also associated with

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the other senses.

Illusion is a wrong perception or mistaken perception.Illusion is confused or misinterpreted perception. The classical example is our perception of a coil of rope in darkness as a snake. This is visual illusion. There are illusions in case of other sensations also.
X Y
Muller – Lyer Illusion
X is not longer than Y (X = Y)
Y
Horizontal – Vertical Illusion
X is not longer than Y (X = Y)
An illusion is a sensory distortion that can fool a person's senses. Illusions can involve any of the senses, but visual (optical) illusions are the best understood by science.

For instance, if a person is watching a magician perform it can truly appear that the magician is doing things that are impossible. Illusions occur when a situation distorts a person's capacity for depth and motion perception and perceptual constancy.

For example, when I was younger I was taken to an attraction at an amusement park that was called the "Dutchman's Shack." This was a room that was constructed in such a way, with sloping floors and tilted walls, That there was actually the appearance of water of running uphill. This was an example of how the senses can be tricked when it tries to apply the rules of normal reality to a distorted situation.

Another example of a distorted room is the Ames room in which distorted dimensions create an optical illusion. Additionally, various processes of brain pathology can cause a person to experience "hallucinations" that are illusions created by faulty connections within the brain. These can be the sensations of seeing things that don't exist such as hearing voices and smelling or tasting substances that are not present in the environment.

The following are the different kinds of illusions:

- Optical illusion- makes use of visually deceptive illustrations like the *Ebbinghaus* and *Hermann Grid* illusions

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- **Auditory illusion-** characterized by sounds which are not actually present or improbable such as those in psychoacoustic tricks
- **Tactile illusion-** this involves deceptions via touch such as the phantom limb wherein a patient still perceives pain in a leg which has already been amputated
- **Temporal illusion-** concerned with the perception distortion of time like when minutes seem to significantly slow down to hours

Hallucination:

A hallucination is a false perception. This is a concept often associated with abnormal psychology and psychiatry. A person who hears voices or sees mystic signs in the sky is suffering from hallucination (e.g. seeing a ghost, talking to spirits).

What is Hallucination?

Hallucination came from the Latin word “hallucinat” which means “gone astray in thought”. Indeed, a hallucination is a false perception as the pertinent external stimuli is actually absent. As the supposed stimuli is only internally present, a person going through this sees or hears something that cannot be perceived by others. Hence, the perceptual event is not consistent with reality. This is the reason why prolonged states of hallucination is closely linked with psychological illnesses such as schizophrenia.

The following are the different kinds of hallucinations:

- **Visual Hallucination** – seeing something which is not actually there like seeing strange insects on somebody’s face
- **Auditory Hallucination** (“paracusia”) – hearing voices or sounds without any external stimuli
- **Command Hallucination-** hearing or being impressed with certain commands which are erroneously perceived to be from somebody else
- **Olfactory Hallucination (phantosmia)**– smelling something which is

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not there

- **Tactile Hallucination-** having the feeling that something is crawling under one's skin or any related sensation involving touch
- **Gustatory Hallucination-** tasting something without the pertinent external stimulus such as feeling that something which is usually eaten has a very odd taste
- **General Somatic Sensations-** having the erroneous perception that one's body is being mutilated

Hallucination, the experience of perceiving objects or events that do not have an external source, such as hearing one's name called by a voice that no one else seems to hear. A hallucination is distinguished from an illusion, which is a misinterpretation of an actual stimulus.

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Causes

There are many different causes. It could be a mental illness called **schizophrenia**, a nervous system problem like Parkinson's disease, epilepsy, or of a number of other things. If you or a loved one has hallucinations, go see a doctor.

Example

A crawling feeling on the skin. Hearing ordinary sounds that aren't there, like doors closing or footsteps. Hearing voices, including those that command a person to do something. Seeing lights or patterns.

Educational Significance of Perception:

A large part of our learning is accompanied by perception. Without perception, the higher-level cognitive processes such as imagination, thinking, reasoning and problem solving will not function. Memory largely depends upon one's apperception mass. Perception furnishes the experiences that promote understanding and reflective thinking. It is true

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that we learn through perception.
It is equally true we learn to perceive. The relation between sensory experience and its meaning is mainly a product of learning. We not only perceive objects but also perceive symbols representing objects or concepts. The spoken word, the printed
word, the number code constitute symbols. They have a meaning of higher order since they signify facts beyond themselves. They become more definite, refined, and specific. Perceptions are modified by the activities themselves – by trial and error methods. It is enhanced by needs, motivations and value systems. That is
why nature study, field trips, laboratory work have now become supplements to learning. It is more important to learn the moods and motives of people by perceiving their behaviour signs, facial expressions, their words and so on. Some persons are very sensitive to social stimuli but many are ignorant. This is due to
lack of training in social perception at home, in the peer groups and in the school. Training in social perception is as important as in the perception of objects or events. The chief characteristic of a scientist which he acquires by training is the maintenance of an attitude free from personal bias when he sees to discover facts by observation. Observation is regulated perception – disciplined perception – perception of critical incidents or behaviors. The scientist uses instruments to extend the limits of sense organs. We can find the perceptual training and its results in the alertness of the proof reader and in the laboratory work of a good student of science. In every field of human endeavor the expert is the person
who is well trained to make observations, which are keener, more critical and more analytical.

A perceptual error is the inability to judge humans, things or situations fairly and accurately. Examples could include such things as bias, prejudice, stereotyping, which have always caused human beings to err in different aspects of their lives.20-May-2020

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Perceptual error has strong impact in organization and it hampers in proper decision making skill while hiring, performance appraisal,review,feedback

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etc

There are many types of perceptual errors in workplace

1. **Selective Perception**-People generally interpret according to their basis of interests, idea and backgrounds. It is the tendency not to notice and forget the stimuli that cause emotional discomfort. For example we might think that fresher graduates with above 80 % marks will exceptionally do well in technical interviews of respective subjects

2. **Halo Effect**-We misjudge people by concentrating on one single behavior or trait. It has deep impact and give inaccurate result most of the time.For example we always have an impression of a lazy person can never be punctual in any occasion.

3. **Stereotypes**-We always have a tendency to classify people to a general groups /categories in order to simplify the matter. For example-Women are always good homemakers and can do well in work life balance

4. **Contrast Effect**-We again sometimes judge people in comparison to others . This example generally found in sports, academics and performance review

5. **Projection**-This is very common among Perceptual errors. Projection of one's own attitude, personality or behavior into some other person. For example- To all honest people, everybody is honest.

6. **Impression**-We all know the term "first impression is the last impression" and we apply that too .For example-During the time of hiring, thought like this "The most decent and modest person in the interview can do very well in every roles and responsibilities " always arise.

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MEMORY

Memory is the ability to take in information, store it, and recall it at a later time. In psychology, memory is broken into three stages: encoding, storage, and retrieval. Memory refers to the processes that are used to acquire, store, retain, and later retrieve information. There are three major processes involved in memory: encoding, storage, and retrieval.

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Human memory involves the ability to both preserve and recover information we have learned or experienced. As we all know, however, this is not a flawless process. Sometimes we forget or misremember things. Sometimes things are not properly encoded in memory in the first place.

Memory problems can range from minor annoyances like forgetting where you left your car keys to major diseases, like Alzheimer's and other kinds of dementia, that affect the quality of life and the ability to function.

The study of human memory has been a subject of science and philosophy for thousands of years and has become one of the major topics of interest within cognitive psychology.

MEMORY PROCESS AND MEANING

1. Encoding (or registration): the process of receiving, processing, and combining information. Encoding allows information from the outside world to reach our senses in the forms of chemical and physical stimuli. In this first stage we must change the information so that we may put the memory into the encoding process.
2. Storage: the creation of a permanent record of the encoded information. Storage is the second memory stage or process in which we maintain information over periods of time.
3. Retrieval (or recall, or recognition): the calling back of stored information in response to some cue for use in a process or activity. The third process is the retrieval of information that we have stored. We must locate it and return it to our consciousness. Some retrieval attempts may be effortless due to the type of information.

Problems can occur at any stage of the process, leading to anything from forgetfulness to amnesia. Distraction can prevent us from encoding information initially; information might not be stored properly, or might not move from short-term to long-term storage; and/or we might not be able to retrieve the information once it’s stored.

TYPES OF MEMORY

SENSORY MEMORY

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Sensory memory allows individuals to retain impressions of sensory information after the original stimulus has ceased. One of the most common examples of sensory memory is fast-moving lights in darkness: if you've ever lit a sparkler on the Fourth of July or watched traffic rush by at night, the light appears to leave a trail. This is because of "iconic memory," the visual sensory store. Two other types of sensory memory have been extensively studied: echoic memory (the auditory sensory store) and haptic memory (the tactile sensory store). Sensory memory is not involved in higher cognitive functions like short- and long-term memory; it is not consciously controlled. The role of sensory memory is to provide a detailed representation of our entire sensory experience for which relevant pieces of information are extracted by short-term memory and processed by working memory.

Short-Term Memory

Short-term memory is also known as *working memory*. It holds only a few items (research shows a range of 7 +/- 2 items) and only lasts for about 20 seconds. However, items can be moved from short-term memory to long-term memory via processes like *rehearsal*. An example of rehearsal is when someone gives you a phone number verbally and you say it to yourself repeatedly until you can write it down. If someone interrupts your rehearsal by asking a question, you can easily forget the number, since it is only being held in your short-term memory.

Long-Term Memory

Long-term memories are all the memories we hold for periods of time longer than a few seconds; long-term memory encompasses everything from what we learned in first grade to our old addresses to what we wore to work yesterday. Long-term memory has an incredibly vast storage capacity, and some memories can last from the time they are created until we die.

There are many types of long-term memory. *Explicit* or *declarative* memory requires conscious recall; it consists of information that is consciously stored or retrieved. Explicit memory can be further subdivided into *semantic* memory (facts taken out of context, such as "Paris is the capital of France") and *episodic* memory (personal experiences, such as "When I was in Paris, I saw the *Mona Lisa*").

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In contrast to explicit/declarative memory, there is also a system for procedural/implicit memory. These memories are not based on consciously storing and retrieving information, but on implicit learning. Often this type of memory is employed in learning new motor skills. An example of implicit learning is learning to ride a bike: you do not need to consciously remember how to ride a bike, you simply do. This is because of implicit memory.

Strategies for Improving Perceptual Skills: 7 Strategies

1. Knowing oneself accurately: one of the powerful ways to minimize perceptual distortions is to know yourself.
2. Emphathize with others
3. Have a positive attitude
4. Postpone impression formation
5. Communicating openly
6. Comparing one's perceptions with that of others
7. Introducing diversity management programs

Tips

No matter how great your memory is, there are probably a few things you can do to make it even better. Fortunately, cognitive psychologists have discovered a number of techniques that can help improve memory:

- **Jot it down.** The act of writing with a pen and paper helps implant the memory into your brain—and can also serve as a reminder or reference later on.1
- **Attach meaning to it.** You can remember something more easily if you attach meaning to it. For instance, if you associate a person you just meet with someone you already know, you may be able to remember their name easier.
- **Repeat it.** Repetition helps the memory become encoded beyond your short-term memory.
- **Group it.** Information that is categorized becomes easier to remember and recall. For example, consider the following group of words: Desk, apple, bookshelf, red, plum, table, green, pineapple, purple, chair, peach, yellow. Spend a few seconds reading them, then look away and try to recall and list these words. How did you group the words when you listed them? Most people will list using three

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different categories: color, furniture, and fruit.

In addition to these techniques, keeping your brain healthy by exercising regularly, maintaining social connections, managing stress, and performing challenging activities (like doing crossword puzzles or playing an instrument) have been proven to help boost memory.

METHODS FOR IMPROVING MEMORY

11 research-proven strategies can effectively improve memory, enhance recall, and increase retention of information.

FOCUS YOUR ATTENTION

Attention is one of the major components of memory. In order for information to move from your short-term memory into your long-term memory, you need to actively attend to this information. Try to study in a place free of distractions such as television, music, and other diversions. Getting rid of distractions might be a challenge, especially if you are surrounded by boisterous roommates or noisy children.

Set aside a short period of time to be alone. Ask your roommates to give you some space or ask your partner to take the kids for an hour so you can focus on your work.

AVOID CRAMMING

Studying materials over a number of sessions gives you the time you need to adequately process information. Research has continuously shown that students who study regularly remember the material far better than those who do all of their studying in one marathon session.

STRUCTURE AND ORGANIZE

Researchers have found that information is organized in memory in related clusters. You can take advantage of this by structuring and organizing the materials you're studying. Try grouping similar concepts and terms together, or make an outline of your notes and textbook readings to help group related concepts.

UTILIZE MNEMONIC DEVICES

Mnemonic devices are a technique often used by students to aid in recall. A mnemonic is simply a way to remember information. For example, you might associate a term you need to remember with a common item that

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you are very familiar with. The best mnemonics are those that utilize positive imagery, humor, or novelty. Come up with a rhyme, song, or joke to help remember a specific segment of information.

ELABORATE AND REHEARSE

In order to recall information, you need to encode what you are studying into long-term memory. One of the most effective encoding techniques is known as elaborative rehearsal. An example of this technique would be to read the definition of a key term, study the definition of that term, and then read a more detailed description of what that term means. After repeating this process a few times, you'll probably notice that recalling the information is much easier.

VISUALIZE CONCEPTS

Many people benefit greatly from visualizing the information they study. Pay attention to the photographs, charts, and other graphics in your textbooks. If you don't have visual cues to help, try creating your own. Draw charts or figures in the margins of your notes or use highlighters or pens in different colors to group related ideas in your written study materials. Sometimes even just making flashcards of various terms you need to remember can help cement information in your mind.

RELATE NEW INFORMATION TO THINGS YOU ALREADY KNOW

When you're studying unfamiliar material, take the time to think about how this information relates to what you already know. By establishing relationships between new ideas and previously existing memories, you can dramatically increase the likelihood of recalling the recently learned information.

READ OUT LOUD

Research published in 2017 suggests that reading materials out loud significantly improvesyour memory of the material. Educators and psychologists have also discovered that having students actually *teach* new concepts to others enhances understanding and recall.

PAY EXTRA ATTENTION TO DIFFICULT INFORMATION

Have you ever noticed how it's sometimes easier to remember information at the beginning or end of a chapter? Researchers have found that the order of information can play a role in recall, which is known as the serial position effect. While recalling middle information can be difficult, you

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can overcome this problem by spending extra time rehearsing this information. Another strategy is to try restructuring what you have learned so it will be easier to remember. When you come across an especially difficult concept, devote some extra time to memorizing the information.

VARY YOUR STUDY ROUTINE

Another great way to increase your recall is to occasionally change your study routine. If you're accustomed to studying in one specific location, try moving to a different spot during your next study session. If you study in the evening, try spending a few minutes each morning reviewing the information you studied the previous night.

By adding an element of novelty to your study sessions, you can increase the effectiveness of your efforts and significantly improve your long-term recall.

GET SOME SLEEP

Researchers have long known that sleep is important for memory and learning. Research has shown that taking a nap after you learn something new can actually help you learn faster and remember better.

In fact, one study published in 2014 found that sleeping after learning something new actually leads to physical changes in the brain. Sleep-deprived mice experienced less dendritic growth following a learning task than well-rested mice.

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