

1. Details of Module and its structure

Module Detail	
Subject Name	Psychology
Course Name	Psychology 02 (Class XI, Part- 2)
Module Name/Title	Learning – Part 3
Module Id	keypy_10603
Pre-requisites	The learner should have an understanding of the nature of learning, classical and operant conditioning and determinants of classical and operant conditioning. The learners will also be expected to have a knowledge of observational learning and cognitive learning.
Objectives	<p>The learner would be able to:</p> <ul style="list-style-type: none">● describe verbal learning, concept learning, skill learning and transfer of learning● enumerate the procedures used in such types of learning,● understand various psychological processes that occur during the course of these types of learning,● explain the determinants of verbal learning, and● gain familiarity with the phases of skill learning.
Keywords	Verbal learning, Paired-Associates Learning, Free recall, Serial learning, verbal learning, Concept-artificial concepts and natural concepts, cognitive phase, associative phase, autonomous, transfer of learning, negative transfer, positive transfer, general (generic) transfer, specific transfer

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1. Verbal Learning

Human beings, as you must have observed, acquire knowledge about objects, events, and their features largely in terms of words. Words then come to be associated with one another. Psychologists have developed a number of methods to study this kind of learning in a laboratory setting. Each method is used to investigate specific questions about learning of some kind of verbal material. In the study of verbal learning, psychologists use a variety of materials including nonsense syllables, familiar words, unfamiliar words, sentences, and paragraphs etc.

<i>Nonsense syllables</i>	<i>Unfamiliar words</i>	<i>Familiar words</i>
YOL	ZILCH	BOAT
RUV	PLUMB	NOSE
TOJ	VERVE	KNOW
LIN	BLOUT	GOAL
LUF	THILL	BOWL
GOW	SCOFF	LOAD
NOK	TENOR	FEET
RIC	WRACK	MEET
NEZ	BOUGH	TENT
TAM	MALVE	FOAM
SUK	PATTER	TALE
KOZ	MANSE	JOKE
GUD	KYDRA	MALE
MUP	BORGE	BALM
KUG	DEVEN	SOLE

Table 1. Sample List of Items used in Verbal Learning Experiment

Methods used in Studying Verbal Learning

(i). Paired-Associates Learning: This method is similar to S-S conditioning and S-R learning. It is used in learning some foreign language equivalents of mother tongue words. First, a list of paired-associates is prepared. The first word of the pair is used as the stimulus, and the second word as the response. Members of each pair may be from the same language or two different languages.

<i>Stimulus - Response</i>	<i>Stimulus</i>	<i>Response</i>
GEN - LOOT	LUR	ROOF
BEM - TIME	RUL	GOLD
DIV - LAMP	VAK	HILL
WUF - DEER	KER	NAME
JIT - LION	HOZ	GOAT
DAX - COAL	MUW	BULL

Table 2. A list of such words paired associates

The first members of the pairs (stimulus term) are nonsense syllables (consonant-vowel-consonant), and the second are English nouns (response term). The learner is first shown both the stimulus-response pairs together, and is instructed to remember and recall the response after the presentation of each stimulus term. After that a learning trial begins. One by one the stimulus words are presented and the participant tries to give the correct response term. In case of failure, s/he is shown the response word. In one trial all the stimulus terms are shown. Trials continue until the participant gives all the response words without a single error. The total number of trials taken to reach the criterion becomes the measure of paired-associates learning.

(ii). Serial Learning: This method of verbal learning is used to find out how participants learn the lists of verbal items, and what processes are involved in it. First, lists of verbal items, i.e. nonsense syllables, most familiar or least familiar words, interrelated words, etc. are prepared. The participant is presented the entire list and is required to produce the items in the same serial order as in the list. In the first trial, the first item of the list is shown, and the participant has to produce the second item. If s/he fails to do so within the prescribed time, the experimenter presents the second item. Now this item becomes the stimulus and the participant has to produce the third item that is the response word. If s/he fails, the experimenter gives the correct item, which becomes the stimulus item for the fourth word. This procedure is called serial anticipation method. Learning trials continue until the participant correctly anticipates all the items in the given order. E.g. Learning of alphabets follows the serial learning method.

(iii). Free Recall: In this method, participants are presented with a list of words, which they read and speak out. Each word is shown at a fixed rate of exposure duration. Immediately after the presentation of the list, the participants are required to recall the words in any order they can. Words in the list may be interrelated or unrelated. More than ten words are included in the list. The presentation order of words varies from trial to trial. This method is used to study how participants organise words for storage in memory. Studies indicate that the items placed in the beginning or end of the lists are easier to recall than those placed in the middle, which are more difficult to recall.

Determinants of Verbal Learning

Verbal learning has been subjected to the most extensive experimental investigations. These studies have indicated that the course of verbal learning is influenced by a number of factors. The most important determinants are the different features of the verbal material to be learned. They include

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- length of the list to be learned and
 - meaningfulness of the material.

Meaningfulness of material is measured in several ways. The number of associations elicited in a fixed time, familiarity of the material and frequency of usage, relations among the words in the list, and sequential dependence of each word of the list on the preceding words, are used for assessing meaningfulness. Lists of nonsense syllables are available with different levels of associations. The nonsense syllables should be selected from a list containing the same association value. On the basis of research findings, the following generalisations have been made.

Learning time increases with increase in length of the list, occurrence of words with low association values or lack of relations among the items in the list. The more time it takes to learn the list, stronger will be the learning. In this respect psychologists have found that the total time principle operates. This principle states that a fixed amount of time is necessary to learn a fixed amount of material, regardless of the number of trials into which that time is divided. The more time it takes to learn, the stronger the learning becomes.

If participants are not restricted to the serial learning method and are allowed to give free recall, verbal learning becomes organisational. It implies that in free recall participants recall the words not in their order of presentation, but in a new order or sequence.

Bowesfield first demonstrated this experimentally. He made a list of 60 words that consisted of 15 words drawn from each of the four semantic categories, i.e. names, animals, professions, and vegetables. These words were presented to participants one by one in random order. The participants were required to make free recall of the words. However, they recalled the words of each category together. He called it *category clustering*. It is worth noting that, though, the words were presented randomly the participants organised them category-wise on recall. Here category clustering occurred because of the nature of the list. It has also been demonstrated that free recall is always organised subjectively. Subjective organisation shows that the participants organise words or items in their individual ways and recall accordingly.

Verbal learning is usually intentional but a person may learn some features of the words unintentionally or incidentally. In this kind of learning, participants notice features such as whether two or more words rhyme, start with identical letters, have the same vowels, etc. Thus, **verbal learning is both intentional as well as incidental.**

2. Concept Learning

The world, in which we live, consists of innumerable objects, events and living beings. These objects and events are different in their structures and functions. One of the many things human beings have to do is to organise the objects, events, animals, etc., into categories so that within the category, objects are treated as equivalent even though they are different in their features. Such categorisations involve concept learning.

What is a Concept?

A concept is a category that is used to refer to a number of objects and events. Animal, fruit, building, and crowd are examples of concepts or categories. It may be noted that the terms, concept and category, are interchangeably used. A concept is defined as 'a set of features or attributes connected by some rule'. Instances of a concept are those objects or events or behaviours, which have common features. A feature is any characteristic or aspect of an object or event or living organism that is observed in them, and can be considered equivalent to some features observed or discriminated in other objects. Features are of innumerable kinds and their discriminability depends upon the degree of the observer's perceptual sensitivity. Properties like colour, size, number, shape, smoothness, roughness, softness, and hardness are called features.

Rules that are used to connect the features to form a concept may be very simple or complex. A rule is an instruction to do something. Keeping in view the rules that are used in defining concepts, psychologists have studied two types of concepts:

- artificial concepts and
- natural concepts.

Artificial concepts are those that are well-defined and rules connecting the features are precise and rigid. In a well-defined concept the features that represent the concept are both singly necessary and jointly sufficient. Every object must have all the features in order to become an instance of the concept. Let us take the example of the concept of a square. It is a well-defined concept. It must have four attributes, i.e. closed figure, four sides, each side of equal length, and equal angles. Thus a square consists of four features connected by a conjunctive rule. In order to understand various rules for creating well-defined concepts let us look at Figure 1.

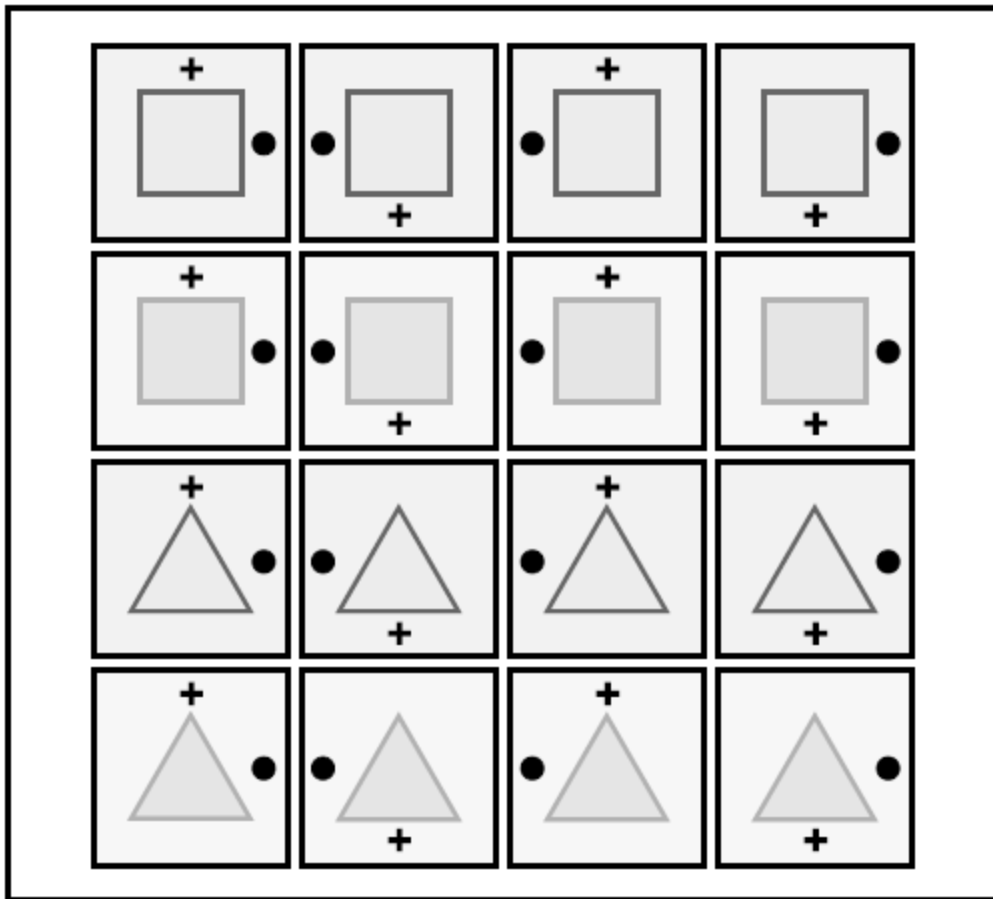


Fig 1: Sixteen figures containing two shapes - square and triangle, two shades - pink and grey, cross on top and bottom, circle - right or left sides of figure. These are used as instances of and non-instance of an artificial concept.

On the other hand, natural concepts or categories are usually ill-defined. Numerous features are found in the instances of a natural category. Such concepts include biological objects, real world products, and human artefacts such as tools, clothes, houses, etc.

In Figure 1 there are 16 cards having two shapes - square and triangle, two shades-pink and grey, signs of cross on top or bottom, and small circle on right side or left side. With the help of these cards one can create a number of concepts by using different rules. The set of features that are connected by some rule are called relevant features. The features that are not included in the rule are considered to be irrelevant features. For example, in the cards shown in Figure 6.4 there are four features — shape, shade, cross or no cross on the top, and circle on the right or left side. In creating a conjunctive concept by using two features one may use shape and side as the relevant ones, and leave out two others as irrelevant. For such a concept, the exemplars and non-exemplars are given in Figure 2.

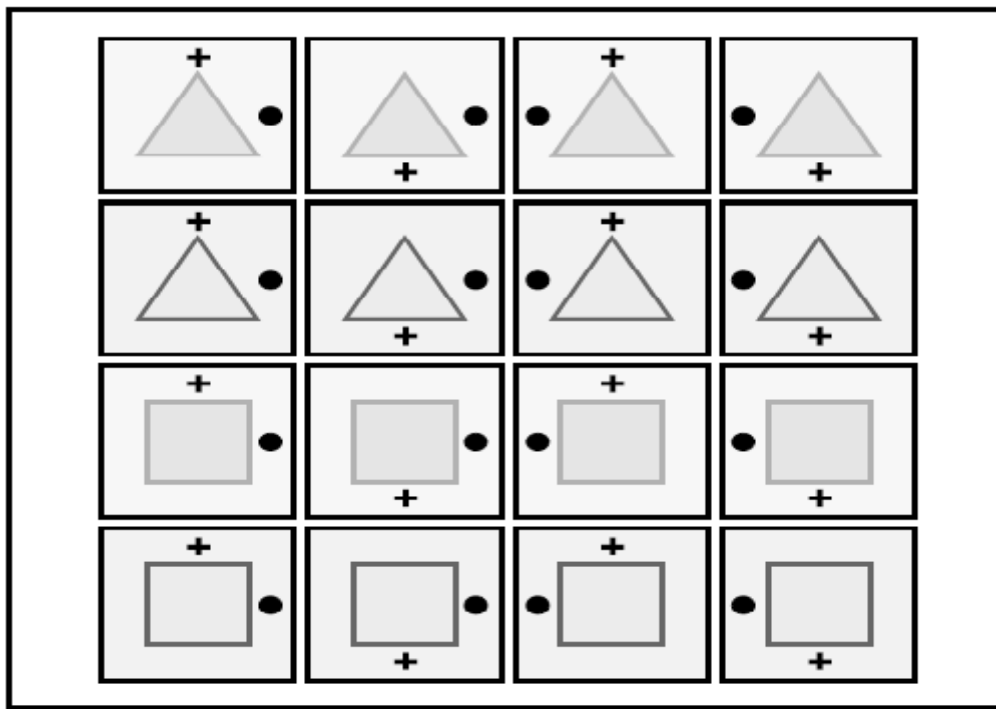


Fig 2: The four figure on the top are the examples of the concept, and rest of the figures are non-exemplars. The exemplars of the figure must be triangle and grey. Other features are irrelevant.

3. Skill Learning

Nature of Skills

A skill is defined as the ability to perform some complex task smoothly and efficiently. Car driving, airplane piloting, ship navigating, shorthand writing, and writing and reading are examples of skills. Such skills are learned by practice and exercise. A skill consists of a chain of perceptual motor responses or as a sequence of S-R associations.

Phases of Skill Acquisition

Skill learning passes through several qualitatively different phases. With each successive attempt at learning a skill, one's performance becomes smoother and less effort demanding. In other words, it becomes more spontaneous or automatic. It has also been shown that in each phase the performance improves. In transition from one phase to the next, when the level of performance stands still, it is called performance plateau. Once the next phase begins, performance starts improving and its level starts going up.

One of the most influential accounts of the phases of skill acquisition is presented by Fitts. According to him, skill learning passes through three phases, viz

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- cognitive,
 - associative and
 - autonomous.

Each phase or stage of skill learning involves different types of mental processes. In the *cognitive phase* of skill learning, the learner has to understand and memorise the instructions, and also understand how the task has to be performed. In this phase, every outside cue, instructional demand, and one's response outcome have to be kept alive in consciousness. For e.g. a child learning to play a guitar identifies the parts of the guitar, the role of the strings, how to hold the guitar correctly, what sounds these strings produce etc.

The second phase is the *associative phase*. In this phase, different sensory inputs or stimuli are linked with appropriate responses. As the practice increases, errors decrease, performance improves and time taken is also reduced. With continued practice, errorless performance begins, though, the learner has to be attentive to all the sensory inputs and maintain concentration on the task. E.g. as in the case of guitar learning how to tune the guitar, how to produce low and high pitch through the strings, strumming the guitar, playing the notes and the more one practices the better the performance will be.

Then the third phase, i.e. *autonomous phase*, begins. In this phase, two important changes take place in performance: the attentional demands of the associative phase decrease, and interference created by external factors reduce. Finally, skilled performance attains automaticity with minimal demands on conscious effort. This is the phase when a skilled guitarist can play the guitar without getting distracted and can give performances without making errors.

Transitions from one phase to the other clearly show that practice is the only means of skill learning. One has to keep on exercising and practicing. As the practice increases, improvement rate gradually increases; and automaticity of errorless performance becomes the hallmark of skill. That is why it is said that 'practice makes a man perfect'.

4. Transfer of Learning

The term transfer of learning is often called *transfer of training* or *transfer effect*. It refers to the effects of prior learning on new learning. Transfer is considered to be positive if the earlier learning facilitates current learning. It is considered to be negative transfer if new learning is

retarded. Absence of facilitative or retarding effect means zero transfer. Psychologists use specific experimental designs in the study of transfer effects. One such design is presented in Table 3

<i>Group of Participants</i>	<i>Phase 1</i>	<i>Phase 2</i>
Experimental	Learns task A	Learns task B
Control	Does not learn but rests	Learns task B

Table 3. Experimental Design used in the Study of Transfer Effects of Learning

Suppose you want to know whether learning of English language affects learning of French. To study this, you select a large sample of participants. Now you randomly divide the sample into two groups, one to be used in the experimental condition and the other as control group. The experimental group of participants learn English language for a year and is tested to find out their achievement in English. In the second year, they study French. In the end this group is tested to find out its achievement scores in French. The control group in the first phase does not learn English language and just does its routine work for one year. In the second year, these participants learn French for a year and their achievement scores are obtained. The achievement scores in French of the two groups are then compared. If the achievement score of the experimental group is higher than that of the control group, it implies that positive transfer has taken place. If the score is lower than the control group, it means negative transfer has taken place. If the two groups perform equally well, then it shows that the transfer effect is zero.

It must be noted that in the study of transfer effect, a distinction is made between general transfer and specific transfer. It is now a well-known fact that prior learning always leads to positive general transfer. It is only in specific transfer that transfer effects are positive or negative, and in some conditions there is zero effect. Let us try to understand the nature of general transfer and specific transfer.

General (Generic) Transfer

General transfer is not clearly conceptualised and defined in its details. However, prior learning predisposes one to learn another task in a better manner. The learning of one task warms-up the learner to learn the next task more conveniently. You must have seen a cricketer going to the pitch to take her/his position near the wicket. The cricketer walks by jumping on one foot then on the other. S/he moves her/his two hands holding the bat sideways to loosen up. When you write answers while appearing at the examination, your writing is slow and sitting position awkward for efficient writing. However, you get warmed up after having written two or three pages. Your speed increases and your body gets well-adjusted to the writing task. This

continues until the writing of the last answer is over. After some time, warm-up effect disappears. Warm-up effect lasts over one session of learning. Only in that session one can learn two or more tasks.

Specific Transfer

Whenever an organism learns something, it consists of a series of stimulus-response associations. Any task can be understood as a chain of discriminable stimuli, each of which has to be associated with a specific response. Specific transfer means the effect of learning of task A on learning of task B. The learning of task A may make the learning of task B easier or more difficult or have no such effect. Such transfers depend on similarity-dissimilarity between the initial learning task and the second task. The possible relationships between stimuli and responses are as follows.

1. The initial and transfer tasks are very different both in stimuli as well as in responses. Hence no specific transfer is expected. However, due to the mechanism of general transfer some degree of positive transfer may occur. For example, learning of a foreign language and baking a cake, no specific transfer is expected. There is very little transfer between dissimilar learning experiences.
2. Secondly, the stimuli of the two tasks are the same and responses are highly similar. Learning of one language and another very similar language. Therefore, maximum transfer may occur. It has been regularly shown that in this condition positive transfer takes place. E.g. learning of Hindi and learning of Sanskrit. As there is some similarity, maximum transfer might occur.
3. Thirdly, the stimuli are the same but responses are different. In such conditions also, only some positive transfer occurs. For example, for a geometrical figure one has to measure the angles in the figure and in another task has to solve the reasoning problem related to the figure.

Summary

- In verbal learning words get associated with one another on the basis of structural, phonetic, and semantic similarity and contrast.
- Concept is a category. It involves a set of features connected with a rule or instruction.
- Skill refers to the ability to carry out complex tasks smoothly and efficiently.
- Effect of prior learning on new learning is called transfer of learning.