

# Developing Memory Techniques

LONG-TERM MEMORY SHORT-TERM MEMORY RECALL RECOGNITION  
RECONSTRUCTION RE-LEARNING SAVINGS REHEARSAL LEVELS OF  
PROCESSING MEMORY MODALITIES PRIMACY AND RECENCY EFFECTS  
SUBLIMINAL PROCESSES ORGANISATION MNEMONICS STATE-  
DEPENDENT LEARNING EXTERNAL AND INTERNAL CONTEXT WORKING  
MEMORY MEMORY INTERFERENCE LEARNING AND RETRIEVAL



Imagine that you are asked to make a phone call on a night out and you are given a telephone number of 6 digits to remember. All you have to do is walk down the corridor to the nearest phone and so you decide not to write the number down. Instead you keep rehearsing the number as you walk and by the time you get to the phone you can easily remember it. You have used your short-term or working memory and it has served you very well. However, when you are asked to ring the same number a week later you appear to have forgotten the number. It does not seem to have been transferred to more permanent storage, at least in a manner that can be easily recalled. You may be able to remember the name of the person you had called, and you will remember having made the phone call, so the memory is not entirely dead. Or if someone had distracted you as you walked at the time of the first call or you had to wait in a queue for the phone you may have 'lost' the number.

# 8

KEY CONCEPTS				
1		1		1
1		1		1
	1		1	
1		1		1
		1		1
	1		1	

Your memory may be better than you think

Short term and long term memory

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It appears that some of the information evaporates at the short-term stage and other aspects are transferred to more abiding storage (long-term memory). Although this is an oversimplification of memory structure and function (Baddeley, 1999), it illustrates the point that some memories are readily retrieved and some appear to go AWOL. Many people underestimate the power of their own memory, perhaps partly because they chiefly access their short-term memory (now more commonly referred to as 'working memory'), or have not used good memory techniques or have not sufficiently focused on the large volume of information that they do remember. The human brain has an enormous capacity for remembering, and some understanding of storage and retrieval procedures will help improve memory use.

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There are some memories that we do not have to try to retrieve because they just spring into our conscious mind without solicitation. It is possible that these memories were important to us or we were especially interested in their content or that they were just catchy and humorous such as the following limerick:

There once was a man from Trinity, who thought he'd  
cracked the square root for infinity;  
but there were so many digits, it gave him the fidgets,  
so he dropped it and studied divinity.

Many years ago a speaker used this to illustrate the point that perhaps some people study theology because they would fail at everything else! Because there is rhyme, humour, a moral and a context, this limerick is remembered effortlessly. You should be encouraged to know that some of the things you study at college/university will stay with you and you will be able to recall them for use whenever you need them.




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Some years ago a mature first year student went to his tutor for advice about whether he should sit his exams. He had attended many of the lectures and had completed all assignments but had been robbed of revision time because of family pressures and work commitments. The tutor's advice was that he should sit the exams because he would remember much from the lectures, seminars and

*DIRECT RECALL WITHOUT CUES*

Capitalising on memory

## DEVELOPING MEMORY TECHNIQUES / 171

assignments and all that was required in first year was a pass (40 per cent). However the student did not have enough confidence in his memory to believe that with limited revision he could recall sufficient material to attain a pass. The result was great inconvenience to himself when he really had in effect little to lose and much to gain for trying.

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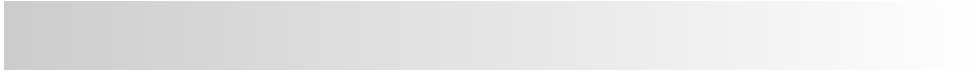
Think back to the illustration about the phone number that you were given to remember. One week after the event you had forgotten the number completely. However, suppose someone handed you the number on a piece of paper and asked you if you could remember it. Perhaps you would instantly identify it as the number you had rung a week previously, even though you could not recall it spontaneously. It could be said that it 'rang a bell' in your memory!

For example, you have probably had the experience where you recognise someone's face although you cannot remember where and when you saw him or her before. Also you may be quite sure that you have heard a certain tune at least once before but you do not know its name, composer or performer. Indeed you may even recall a particular smell merely from one previous encounter, especially if it is distinctive.

In short, your recognition memory is probably much better than you think, and it is particularly useful to you in multiple choice tests where you are asked to identify the one right answer in the midst of wrong answers.

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Ebbinghaus (1885) and his assistant tried to learn lists of nonsense syllables by rote in order to ascertain if they could recall these spontaneously without any cues to assist memory. Some lists they were able to recall freely but others apparently could not be retrieved. However, whenever they saw again the lists they could not freely recall, they were able to recognise if the order had been changed, and were able to reconstruct the lists into the correct order. In addition, when they went to learn again the lists they had appeared to forget, they found these much easier to learn second time round. This implied that they possessed re-learning savings. Therefore the four forms of memory that are identified from the experiments of Ebbinghaus are recall, recognition, reconstruction and re-learning savings.



*MEMORY BY RECOGNITION*

*MEMORY BY RECONSTRUCTION*



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A variation of reconstruction might be very useful for you in preparing for exams. You may find it helpful to take the outline of a lecture with headings and subheadings and reconstruct it into a different form. You could then try to reverse this procedure by rearranging the material back into its original form. Indeed some of the material you are given might need to be reconstructed properly into a good structured form for the first time! The general point is that making some changes to the material and re-arranging it into different forms may help learning, retention and recall.

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One of the best ways to remember a good joke is to tell it to someone else as soon as possible after you have heard it. People often remark that they wish they had a better memory for jokes – getting into the habit of passing them on immediately is one good strategy to start with. In this way the memory is transferred to longer-term storage and you will hopefully be reinforced by the laughter of those you tell the joke to!

You can also write out a few of the pointers from each lecture as ‘pegs’ on which to ‘hang’ the subject matter from the lecture. Each of these becomes like a key for a little box of information that you can open and unpack. From time to time you can take a cursory glance at your summary outlines to keep the overall vision of the module before you.



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There was a popular TV game show in which contestants were given limited time to watch valuable objects pass before them on a conveyor. Subsequently, with the objects out of sight, they were asked to recall as many

*MEMORY BY REHEARSAL*

A similar approach will also help you imbibe and digest your academic material. For example, during coffee or lunch break students can attempt to recall the major points they have learned from an important lecture. It would be most useful to set aside regular times to do this as it would give a lot of mutual stimulation and would not be too much of a imposition on your time.

*PRIMACY AND RECENCY EFFECTS*

TV game show



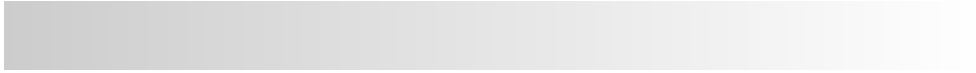
## DEVELOPING MEMORY TECHNIQUES / 173

objects as they could remember within about 20 or 30 seconds. The contestants got to keep all the objects they could remember, so there was a big incentive to learn and recall. According to the theory of primacy and recency effects, contestants would be more likely to remember the last objects (recency) and the first objects (primacy), and would be more likely to forget the objects in the middle. It would be interesting to test if that is what actually happened in the game show, but these effects have been demonstrated in experiments.

Primacy and recency effects are most likely to occur where there are a series of things to be learned within a short time frame with limited time for recall. Their effects are likely to kick in if you leave your revision until the night before your test. However, if you pace yourself out well, you can learn the material 'in the middle' (as well as at both ends) by going back over it and giving due attention to it. Psychologists have explained primacy and recency effects by displacement and distraction coupled with attention and rehearsal. These effects lead to the apparent loss of some material but this can be avoided if time pressure is removed. Planning your revision and allowing sufficient time for it will facilitate good memory processing and counteract primacy and recency effects.

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Subliminal activity refers to the process where the mind takes in information without having given conscious attention to it. Psychologists use an instrument called a tachistoscope to demonstrate the reality of subliminal processes in memory function. Advertisers have also attempted to capitalise on this facility within the human psyche in order to sell their products. Pleasant music in a shopping environment may help to lift the mood of shoppers, even though they may not be consciously listening to the music. An associated idea is referred to as 'the cocktail party phenomenon'. An example of this is where you are in a crowded room at a party and engrossed in conversation with one or two friends. Although you are not paying any attention to the many conversations around you, if someone happens to mention your name it is possible that you will pick up on this and turn toward them. Even as you read this book you are monitoring sights, sounds, smells, temperature etc. around you, and although you are not diverting attention toward them, you are likely to pick up on changes around you. This understanding is very encouraging for the process of learning, for much more than we are consciously aware of goes on in the academic environment related to reading, listening and interacting with others, and we should not underestimate our capacity to learn.

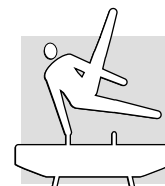


*THE ROLE OF SUBLIMINAL PROCESSES*





If a library is well organised and the books are kept in place, then the task of finding the book you require is much easier. For example, if each subject has a designated area in the library, you know that you should be able to find your book in that vicinity, and if authors' names are arranged alphabetically, that will further simplify the task. Moreover, if the book has a code number that you can look up on a computer, then it should not be difficult to trace its whereabouts. In short, the more efficient the organisation and coding in the library, the easier and quicker it is to pinpoint the book you want. Libraries that are well organised and kept tidy are the best public servants. Similarly, there is much you can do to organise your memory and keep it as tidy as possible. If you store the information in an organised manner, you will have the cues at your disposal to recall the information you want when you need it.



Get a friend to read over Form A below and another friend to read over Form B. Give both the same time limit to memorise the list.

Give the friend who memorised Form A, a blank sheet of paper to write down as many words as they can remember, but give the friend who did Form B a sheet of paper with the four headings below, and see who can recall the most words. The experiment will only work if the time limits (for example, 30 to 45 seconds) are strict and the two people are around the same age group and have the same educational background. It should illustrate the point that good organisational strategies assist memory recall. Some participants may, however, organise the material themselves without any prompting, and if they do then this should be taken into account in the attempt to understand the results. If you have the time and opportunity, you may want to run the experiment on two groups of students from the same class.

## Organisational aspects of learning

*THE LIBRARY*

### Illustration

### Exercise – Organised memory

## DEVELOPING MEMORY TECHNIQUES / 175

**Form A.**

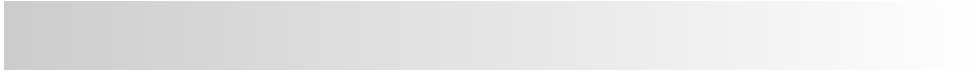
Potato, Pen, Car, Bus, Shoes, Shirt, Paper, Book, Cabbage, Train, Dress, Eraser,  
Mayonnaise, Lorry, Hat, Stapler, Pizza, Bicycle, Denims, Lasagne

**Form B**

Potato	Pen	Car	Shoes	
Cabbage	Paper	Bus	Shirt	
Mayonnaise	Book	Train	Dress	
Lasagne	Eraser	Lorry	Hat	
Pizza	Stapler	Bicycle	Denims	
Headings:	Food	Stationery	Transport	Clothes

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Look carefully at what you have to learn and then think of how you can make it manageable and workable. Take the typical news programme on TV or radio as an example to illustrate the point. At the beginning of the programme you are given the news headlines and these may be comprised of five or six items of news in capsule form. As the programme unfolds, all the basic headlines are elaborated on and all the necessary details are filled in. What the newsreader does at the beginning is to summarise and map out the shape and direction of the programme. You will have a very clear impression in your mind of what is about to follow. Moreover, at the end there will again be a summary of the main bullet points, so that the viewers/listeners will be left with a clear impression of all the news events. Producers of the programme also have to make a number of important decisions, for example, which items are most newsworthy and should be included in the programme? How long should each item be given? In what order should the items appear? If you are taking a written test or preparing a written assignment for college/university you will also have to make decisions about these kinds of questions. In terms of using your memory well, you need to think about the main points (your news headlines) and the order in which it is best to remember them.



*ARRANGING MATERIAL IN STRUCTURED POINTS*



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The word 'mnemonics' refers to aids that are used to assist memory recall. It is a most interesting word in that it is derived from the Greek word for 'tomb' – the place that is visited to recall memories of a loved one or friend. Many people find comfort in this practice because it brings back powerful and pleasant memories. In the same way it is wise to use the full range of materials that will produce cues for recalling the subject matter you aim to learn.

One of these techniques is the use of alliteration, where a series of words are used that all begin with the same letter, for example, 'alliteration's artful aid'. In this case the retrieval cue is the common letter at the beginning of each word. Previously we made reference to the four strategies used by Ebbinghaus and described these by the use of alliteration: recall, recognition, reconstruction and re-learning savings.

Another useful mnemonic is where the first letter from a series of words is taken and one word is made from these. For example, in the personality theory known as 'The Big Five', a word is derived from the five key words in the theory. The five words are Extraversion, Conscientiousness, Openness, Agreeableness and Neuroticism. The first letter from each of these can be taken and rearranged into the acronym, OCEAN. An example that is often used in brainstorming sessions is SWOT – the four key words here are Strengths, Weaknesses, Opportunities and Threats. You can also devise your own acronyms or use nonsense words as mnemonics!

These methods are especially useful for remembering a series of key words that are linked in some way. Other strategies include rhyme – finding words or ideas that fit into a memorable rhyme, or chime – words with similar endings such as clarity, brevity, certainty or perception, sensation and reaction.

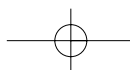
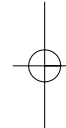
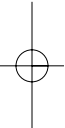
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An old adage says that a picture is worth a thousand words. What you might be able to do with material you find difficult to learn is to turn it into a picture, or series of small pictures, no matter how bizarre these may seem. It is reported that James Joyce could remember the names and types of shops up and down a range of streets in Dublin from his earliest days. Although he had a phenomenal memory, it was no doubt facilitated by visualisation techniques in this instance. In learning another language, vocabulary can be built by use of visualisation techniques. One frequently



*SOME USEFUL MNEMONICS*

*VISUALISATION STRATEGIES*





## DEVELOPING MEMORY TECHNIQUES / 177

cited example is that the Spanish word for tent, 'carp', can be remembered by visualising a fish (carp) in a tent. The Hebrew word for the earth is 'ha-arats' and this can be remembered by 'the carrots' (sounds alike) – the earth is the place where you get the carrots! This example combines both audio and visual images!



Try to arrange the words below (from a previous exercise) into a simple story where you go shopping for food just before lunch time, and then for clothes and stationery in the afternoon.

Potato, Pen, Car, Bus, Shoes, Shirt, Paper, Book, Cabbage, Train, Dress, Eraser, Mayonnaise, Lorry, Hat, Stapler, Pizza, Bicycle, Denims, Lasagne.

Does this help you to remember the words?



Many students demonstrate their powers of memory at a student formal when they get up to dance to the popular songs. They seem to know almost all the songs and all the words and also remember the appropriate movements to accompany each song. These are frequently the same students who complain about poor memory in relation to their academic work! When students listen to their favourite pop albums they even remember the precise sequence in which the songs appear! Even if they cannot document these on paper by direct recall, as they come to the end of listening to each track this acts as a memory cue for the next track.

That is precisely what can happen in an exam/test setting when the autonomic nervous system has been triggered and the adrenaline is pumping. Once you start

## Exercise – Memory by visualisation

*TRIGGERS AND CHAIN REACTIONS*

Students' song and dance routines

writing your essay plans you are likely to find that the ideas will begin to flow. One idea triggers another in a chain reaction until you finish. Sometimes you appear to dry up for a while, but the flow will come back again. However, when you are in 'full throttle' like this, watch that you don't go off at a tangent. Keep a regular check on your planning, pacing and timing.



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A psychology teacher explained memory storage and retrieval by the analogy of little people in the brain. This idea had no doubt been derived from a regular feature, called 'The Numbskulls', in a popular children's comic. The idea the teacher used was that the little people ran and searched all over our brain for the stored memories that we requested. If we used a good system of storage, we made the task easier for them, but if not then their task was harder and took longer (like the library illustration). However, the encouraging fact in the illustration is that once we commission these 'people' in our brain, they do not stop working until they find the required object! This relates back to the point on subliminal processes. You will no doubt have had the experience where you have tried so intensely to remember some item of information and it would not come. However, later when you were not thinking about it, it suddenly came forcibly into your mind. It is just as if the imaginary little people beavered away at it until they found it, even though you had forgotten that you had sent a request.

Students should not therefore be discouraged in their reading even if they cannot initially regurgitate what they have read. There is every likelihood that during an exam or assignment, some important fact will flash into the mind as if from nowhere.

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Research suggests that memories may be more readily retained and retrieved if they are processed at various levels and not merely by rote learning. An important aspect

## The little people in the brain

## Levels of processing in memory

*UNDERSTANDING FACILITATES GOOD MEMORY*

## DEVELOPING MEMORY TECHNIQUES / 179

of this is the element of understanding, and especially if the understanding is followed by related practise.


Part of learning the history of a war, is not only to know how many nations were involved, but also when and why each entered the fray. Learning the proper sequence of events is more easily facilitated if you understand why each nation entered the battle.

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If you learn to enjoy what you are doing you are more likely to remember it. Previous reference was made to the students who remember their favourite songs and the range of dance movements that accompany these. Ardent followers of sport often know large volumes of facts and figures about their favourite teams. Because they enjoy the games and are always keen to know how their team is faring, there is no resistance to mastering all the relevant details. Moreover, students can eventually come to enjoy subjects that did not have much initial appeal to them. The key is to be patient, to give yourself time and to work steadily.

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Closely allied to enjoyment is motivation, and an illustration of the role of motivation in memory is the TV game previously referred to where contestants can win every valuable item they can remember seeing. In this case the motivation to learn is likely to be high and therefore the effort and application to learn is also likely to be high. It will help the learning process if you remind yourself of the range of prizes that stand at the end of your course. For example, there is the satisfaction of completing the task, the expertise that will have been acquired, the congratulations you will receive from family and friends and the awareness of their sense of pride in your achievement, the passport to the career of your choice etc. Use whatever you can to get yourself motivated, and try to use both long-term and short-term 'reinforcers' for learning.



For example, you can learn off the ingredients required for a recipe and can then understand how to add each ingredient to the mixture in a particular sequence in order for the consistency to be exactly right. However, learning is really complete when you successfully mix the ingredients together in practise. If you make a mistake in the sequencing at the first attempt then your understanding of why the ingredients should be mixed in a particular sequence is likely to be strengthened.

*ENJOYMENT HELPS ACCESSING MEMORIES*

*MOTIVATION BRINGS MEMORIES INTO CLEAR FOCUS*



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Human memory is functional in all five senses – sight, hearing, smell, touch and taste. Many things are remembered by several of these modalities, for example, a Madras curry by its colour, smell and taste. As previously asserted, memories can be strengthened by rehearsal, because re-learning savings are operative.

Making use of as many modalities as are available to you is likely to be an advantage in learning. It is not good to become conditioned into thinking that you can only learn at set times and in particular contexts. In the busyness of life and with many deadlines looming it is wise to adapt learning to various contexts.

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It is always a profitable exercise to reproduce learned material in your own words. When it comes to writing examination essays and assignments, what your educators want to see is the fruits of your own work. Of course they want to see evidence carefully and faithfully presented, but they also want to see your interpretative comments. Moreover, it is vital to acquire through practise, the ability to condense and summarise the main points from cited research because the time and space is not available to give an exhaustive account. You will be expected to cite the main findings from key studies, so it is import to learn to reproduce the material in skeleton form.



Think about your own choice of career and how the sequence of events in your life has led you to be where you are at present. This should include qualifications you have acquired and opportunities that have opened or closed for you. Also included would be important life events that may have changed your intended career direction. Make a brief résumé of all the important things that may have moulded the direction you have taken to date. Ensure that each is in proper sequence. Why do you think these things are likely to be clear in your memory?

*MEMORY IN A VARIETY OF MODALITIES*

Memories can be strengthened by the use of various senses and by learning in a variety of contexts. You can learn the same material by reading and listening and then by reproducing this in writing and interacting with others. You can learn effectively in a library, a lecture room, in your private study room, on a bus, a park bench etc.

*PROCESSING BY REPRODUCING MATERIAL*

**Exercise - Reviewing your career experience**



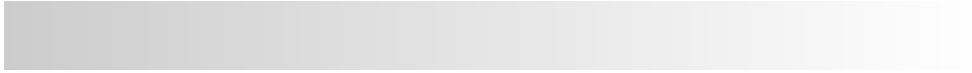
## DEVELOPING MEMORY TECHNIQUES / 181

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People frequently try to remember things that are important to them such as the birthday of someone near and dear. Important dates are noted in a diary so that they will not be easily forgotten. Also some important event may be recorded at the top of a diary the week before it is scheduled to take place. Students at university are seen near examination times taking notes of the dates and venues for their exams. Some then record these details in several sources so that this important information is not mislaid. Job applicants are very keen to know what the pay scales are for the vacant post and where they are likely to be placed on this scale if their application is successful. Most people will have good clear memories about these matters because they have personal implications for them. It is always encouraging to see students who have that extra enthusiasm for learning. After a lecture they come to the front to follow up on some reference, or fill in some detail they have missed or get further clarification of some point. They may be more likely to remember what they really need to know because they are focused and learning is important to them.

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It is clear that well-structured systems help improve learning, retention and retrieval. These give you immediate access to the cues that you need to retrieve what you are looking for. For example, if you cannot remember someone's name, it might help to work through each letter of the alphabet. When the correct letter is arrived at, the name of the person may spring suddenly to mind or you may at least remember that the person's name begins with that letter. This may indicate that memories are stored or more easily retrieved under categories. Therefore there is some value in grouping information together in sensible clusters in order to facilitate recall. Furthermore, it may also be helpful to connect clusters of information in a kind of network, such as in a flow chart or in a hierarchical structure. For example, you could write the continents of the world as the top category on your page, and a country from each, followed by the capital city from each country and then another city from each country. If you draw out a structure for the material you intend to learn, this will not only assist the memory process but will also equip you with good strategies for examinations and assignments. For an example of a structure that is drawn out in diagram form, see the plan for an essay on depression at the end of Chapter 5.



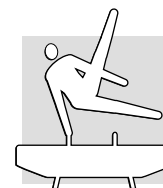
*REMEMBERING THINGS IMPORTANT TO YOU*

*DRAWING OUT THE FACTS*



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In recent years there have been a variety of food scares that threaten to upset the balance between health and disease. Many people are passionately concerned about this because the well-being of humans and animals is involved. If the procedures involved in the production of food did not have such serious implications then not too many people would be interested in the results of the various pieces of research that have been commissioned. However, because of the implications for human health and animal welfare, the studies are given high profile media coverage and are the subject of endless controversial debates, with passions often running very high. The lesson learnt from this is that people are more likely to attend to and remember the facts associated with matters that have important implications related to real issues. Therefore your learning will be more effective if you can relate the subject to 'live' issues. With an essay or assignment you should always try to make an interesting story and if possible demonstrate the implications and applications from your study.



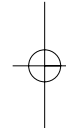
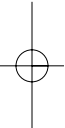
What are the arguments for and against the corporal punishment of children?  
What are the likely implications of laws that are passed either for or against it?  
This is an example of how people may be able to remember the arguments  
because they have strong views one way or the other.

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If you take a trip back to your old school you are likely to find a chain of memories are triggered as you visit the various places where significant events occurred, for example, the gymnasium, the assembly hall, various classrooms, the restaurant, the common room etc. There may be memories triggered that you would not ordinarily recall spontaneously. A similar experience may occur as you rummage through the roof space in your house and discover some old toy that you cherished as a child – a whole host of childhood memories may flood into your consciousness. The same may



*GIVING LIFE TO ABSTRACT IDEAS*



**Exercise – Corporal punishment  
debate**

**Contextual factors in memory**

*EXTERNAL CONTEXT*



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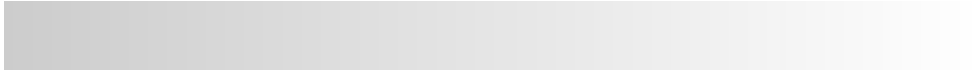
happen as you look over an old photograph or return to a place where you enjoyed a holiday many years previously. The memories had been well and truly stored but you suddenly found a key to unlock their treasures. This phenomenon is referred to as 'context dependent memory' and is associated with 'context dependent learning'. That does not necessarily imply that the memories will only come back if you return to the context in which they occurred. However, it might imply that there is some value in learning your material in a variety of contexts so that the material can have a variety of cues to aid recall. Moreover, you may find it useful to project your mind into the context where you learned the material, such as in a lecture room.

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Context dependent learning relates not only to the external setting but also to the internal state, that is, state dependent learning. For example it is suggested that you may not remember events that occur when you were drunk but they will come back when you get drunk again! Or when you are in a depressed or happy mood the memories associated with these may be more likely to return when you in the same mood again. Probably the best advice is not to rely too heavily on state dependent learning, especially if you cannot recreate the same state in an exam room. A calm and steady mood is more likely to be useful to you for revision and examinations. However, some students do prefer to study with the buzz of other people around them or with the sound of some music in the background. Whatever works best for you as an individual is OK, but there would be value in allowing yourself some practise at an exam room type situation so that you do not feel like an alien when you enter it for the real test! You might want to consider setting yourself some exam questions from previous exam papers and attempt them under test conditions.

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Some educators have argued that students should get conditioned to studying at one desk in one room and should ensure that they do nothing else but study at that desk. That advice was doubtless designed to help students adjust to regular and disciplined patterns of study. If that approach is working well for an individual student then there is no need to give it up, although it could also be extended to other contexts. Many students are, however, compelled to share houses and study places and are forced to compete with many distractions. Necessity dictates that they learn in



*INTERNAL CONTEXT*

*LEARNING IN VARIOUS CONTEXTS*



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a variety of contexts and this is no bad thing, provided there is rhythm and regularity in their practise.

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Bem's self-perception theory suggests that individuals tend to adopt certain beliefs about themselves and then feel obliged to act these out in practise: they need congruence between their beliefs and practice (see Aronson, Wilson & Akert, 1994). To do anything contrary to the image they have of themselves would cause them to experience a state of 'dissonance'. In relation to study habits, students describe themselves variously as a 'morning person', an 'evening person', 'an afternoon person' or a 'late night person'. The downside of being confined in this way is that if an exam falls outside the time when the student feels they are at their best, they start with a psychological disadvantage. For these students there is likely to be some advantage in changing their self-perception and then acting out the dynamics of their new extended self-image. A student can still, of course, have preference for a particular time of day without restricting their potential by imposing inhibiting limits on themselves.

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Sometimes learning and retrieval may be inhibited because the material is being interfered with by other facts previously learned. It may be the case that either the old material is interfering with the new or vice-versa. One may dislodge and displace or confound the other. The result may be that either the information cannot be recalled at all, or else the wrong information is recalled. This is likely to happen when two words have similar meanings with subtle differences or when two words sound similar but have different meanings.

If a student has difficulty with recall they should write down the two words or ideas and try to devise some useful mnemonic to distinguish between them.

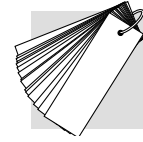
*LEARNING AT DIFFERENT TIMES*

## Memory problems in learning and retrieval

*INTERFERENCE IN LEARNING AND RETRIEVAL*

In a popular TV quiz show, the contestants are asked to choose the right answer from a series of four given answers. Two of these are usually the more likely answer, but it is said by the host of the show that all the right answers are easy if you know them! However the introduction of an answer similar to the right one tests the human weakness of interference and confusion in recall.





'Continual' means at regular intervals but 'continuous' means without interruption. The difference can be remembered by thinking of a dripping tap (continual) and a flowing tap (continuous). Furthermore, the difference can be remembered by thinking of the 'ous' at the end of continuous as a sound like flowing water.

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Earlier it was asserted that we may be taking in information even when we are not consciously aware of it (by subliminal processes). Although it is useful and encouraging to know about these processes, it would not be wise to bank on them as a primary source of learning. Good memory process is facilitated by attention, interest, motivation and by the use of good mnemonics. That does not imply that memory should be relentlessly bombarded with heavy and complex material continually. Therefore, it is important that revision strategy should be planned rather than trying to make a desperate attempt to swamp the memory on the eve of a test or examination. Such a maladaptive practice is likely to lead to interference, confusion and inefficiency. In the course of the academic semester, students can highlight the points they will later build on for revision. As the time for revision approaches, the material that was previously selected can be worked through systematically with revision sessions being spaced out to allow for adequate breaks so that the memory will function optimally.



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Larger marathons extend over a distance of 26 miles, and no runner, no matter how enthusiastic, would attempt this distance in their first practise run. Runners set themselves much shorter targets initially and then increase these in gradual

## Example — Mnemonics for subtle differences

*SATURATION — THE DANGER OF RELENTLESS BOMBARDMENT*

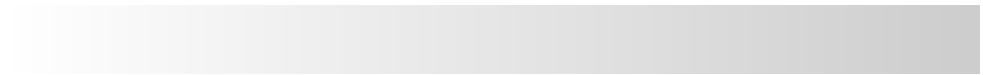
*THE NEED FOR GRADUAL MEMORY DEVELOPMENT*

## Work outs and marathons

increments. If their ultimate goal is to complete a 26-mile marathon, they may aim at a 'mini-marathon' of 4-6 miles in the shorter term. Through regular practise and exercise the muscles gain strength, breathing improves and determination and discipline are strengthened. In the same way memory will improve by practise if the student is patient and determined enough. It should also be borne in mind that because re-learning savings are possessed from previous memory deposits, consolidation is easier than first time learning. If students feel that they are suffering from memory 'cramp' they should allow themselves time for a break to replenish their 'memory muscles'. While students are learning to develop the use of memory they should give themselves realistic 'work outs' and 'warm ups'.

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Some people are characteristically over-confident in their own memory. Most of us have at times been certain in recalling the 'facts' only to discover later that we had dressed them up considerably. Sadly, innocent people have been wrongly convicted of crimes because someone claimed to remember distinctly seeing their face at a crime scene and the accused had no alibi to vindicate their claim of innocence. The damage has often been done before the full truth can be ascertained. Therefore, although our memories are good and can be developed, it is important to remember that they are far from infallible and are prone to distort facts. Excess confidence in our memory will lead us astray but the memory techniques and strategies advocated here will serve as safeguards. Students can work at improving the use of memory by selection, attention, enjoyment, processing, visualisation, structure, consolidation and whatever else may prove effective. Realistic confidence in our memory is desirable, but reckless presumption should be avoided.



*FAILURE TO EMPLOY SUITABLE STRATEGIES*



## DEVELOPING MEMORY TECHNIQUES / 187

Memory appears to have long-term and short-term aspects, and many people have better memories than they suppose.

Four functional elements in memory are recall, recognition, reconstruction and re-learning savings.

Primacy and recency effects can be countered by consolidation, and recall is facilitated by organised learning techniques.

Some useful mnemonics include alliteration, acronyms, rhymes, chimes, visualisation, pegs and memory cues.

Memory function is likely to be strengthened by understanding and enjoying the learning material, and by processing at various levels and in diverse modalities.

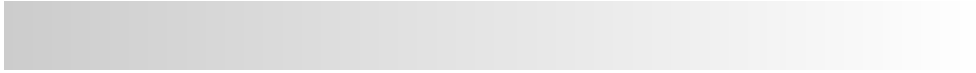
Memory process is enhanced where there is good motivation to learn, where the facts are important to an individual and where the learner has the opportunity to reproduce the material as soon as possible after initial learning.

It may be advantageous to memory to learn and revise material at different times and in different contexts.

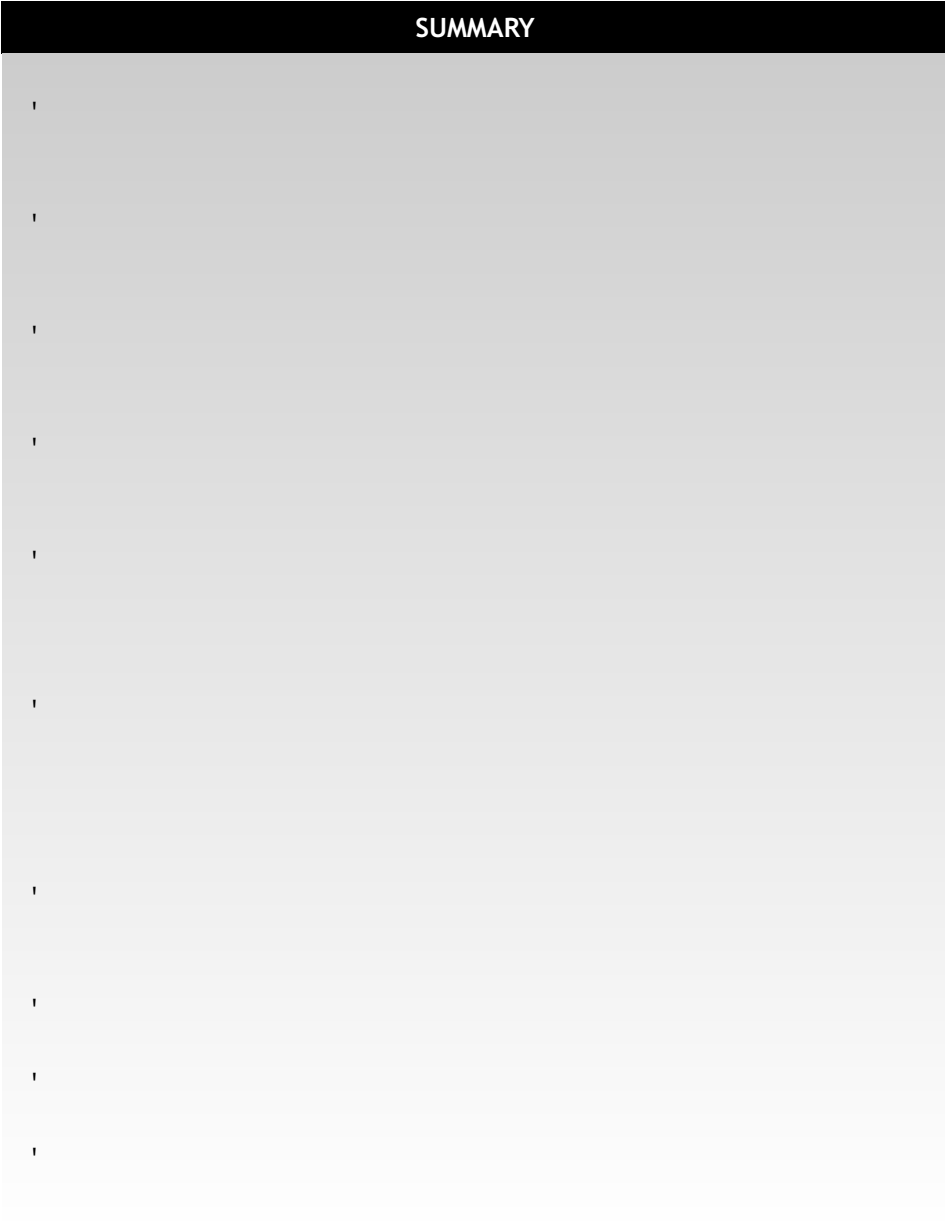
Learning can be thwarted by continual bombardment and saturation.

Memory recall can be confounded by interference.

Memory efficiency can be improved by the use of sensible strategies that include breaks from learning.



**SUMMARY**



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