

Edexcel

AS Psychology

***Selected Content, Studies in Detail
and Key Issues***

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Selected Content, Studies in Detail and Key Issues

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Chapter 1 Study in detail

Tajfel et al. (1970, 1971)

Tajfel carried out a number of studies to develop and test social identity theory. He outlined the 1970/71 study in an article that also included another study. Both are covered here, as their findings help to explain each another.

Aims

Tajfel et al. (1970, 1971) wanted to test the idea that prejudice and discrimination can occur between groups even when there is no history between the groups and no competition. Having found prejudice and discrimination between such **minimal groups**, Tajfel et al. (1970, 1971) wanted to investigate the possible causes. In order to study discrimination as well as prejudice, it was important to have an experimental situation that involved real behaviour. Therefore, they aimed to generate a situation in which members of a group had to act in some way in relation to another group.

Minimal groups are groups where there is no history or competition.

Tajfel et al. carried out two experiments. The first created groups from judgements about how many dots were in an image and the other created groups from an apparent preference for the artists Klee and Kandinsky.

Experiment 1: estimating the number of dots

Procedure

The participants were 64 boys aged 14 and 15 years from a comprehensive school in Bristol. They were tested in a laboratory in eight separate groups of eight boys. The boys in each group knew each other well.

The experimenters set out to:

- establish in-group categorisation (the formation of the groups)
- assess the effect of the formation of the groups on behaviour

To form the two groups the boys were taken into a lecture room and told that the study was about visual judgements. Forty clusters of varying numbers of dots were flashed onto a screen. The boys had to estimate the number of dots and record their estimates on score sheets.

- In condition 1, after they had estimated the number of dots, they were told that people constantly overestimate or underestimate the number.
- In condition 2, they were told that some people are more accurate than others.

The judgements were then 'scored' by one of the experimenters and the boys were told that they could help the researchers with something else. They were told that for this task they would be put into groups according to the judgements they had made about the number of dots. The boys were allocated randomly to the groups and told which group they were in. In condition 1, they were said to be 'overestimators' or 'underestimators'. In condition 2, they were either better at making the judgements or worse.

The boys were told that the task used real money for rewards and punishments. They would have to decide whether or not to allocate money and they would know the code

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number of the boy receiving the reward or punishment, and which group he was in. They had to choose how much to reward or punish another boy in either their own group or the other group.

The experimenters showed the boys the type of matrix that they would use. Each matrix had two rows each with 14 numbers, with each number in a box. Some numbers had minus signs, which meant that amount of money would be taken away from that person; the other numbers represented the amount of money allocated to that person.

The boys could not allocate money to themselves; at the end, they would receive the money allocated to them by the other boys. They worked through a booklet of matrices. Each time they were told either, 'These are rewards and punishments for member XX of your group' or 'These are rewards and punishments for member XX of the other group'. They had to choose which pair of numbers to allocate. One row referred to one boy and one to another boy, so they had to choose which pair they wanted that would affect both boys.

Table A matrix similar to those used in the (1970) study by Tajfel et al.

1.1	-14	-12	-10	-8	-6	-4	-2	-1	3	7	11	15	19	23
	23	19	15	11	7	3	-1	-2	-4	-6	-8	-10	-12	-14

The important part of the study was that the boys had to make decisions about the rewards and punishments that they would impose. They were faced with three types of decision:

- 'in-group/in-group'
- 'in-group/out-group'
- 'out-group/out-group'

If they allocated as much as possible to one boy, this was given a score of 14 (because there were 14 decisions for each row of each matrix). If they allocated as little as possible to a boy, this was given a score of 1. For each decision they were allocating to two boys. Therefore, a fair score would be 7 because this would mean that they had allocated rewards (or punishments) equally.

Results of experiment 1

- When decisions involved two boys, one from each group (an 'in-group/out-group' decision), the average score was 9 out of 14.
- When boys were making 'in-group/in-group' or 'out-group/out-group' decisions, the average score was 7.5.

It seemed that decisions about boys in the same groups were fairer than decisions when one boy was in the same group as the boy making the judgements and one boy was in the other group. A large majority gave more money to their own groups and showed in-group favouritism. This was found in all trials in the study.

Experiment 2: the Klee and Kandinsky study

Procedure

The second experiment involved three new groups with 16 boys in each group. The boys were shown 12 slides, six showing paintings by Klee and six showing paintings by Kandinsky. The boys had to express a preference for one of the 'foreign painters'. The paintings were not signed, so half of the boys could be assigned randomly to 'Klee' and half to 'Kandinsky'.

The first experiment showed that forming groups led to in-group favouritism. The experimenters wanted to investigate this further by examining the factors that led the boys to make their decisions. They chose to investigate:

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- maximum joint profit — what was the most the two boys represented by each matrix would 'receive' from the boys?
- maximum in-group profit — what was the most the boys would give to their in-group members?
- maximum difference — what was the most difference between an in-group and out-group member benefiting the in-group member?

As in experiment 1, there were three conditions when making the choices: the 'in-group/in-group', 'out-group/out-group' and 'in-group/out-group'. There were matrices as before, and again a choice was made of one pair of 'rewards and punishments'. The experimenters could see if the boy had chosen the highest possible for his own group member, the lowest possible for the other group member or a decision that was the lowest for both (and other similar patterns).

Results

Maximum joint profit did not seem to guide the boys' choices. Maximum in-group profit and maximum difference in favour of the in-group worked against maximum joint profit. If the boys had a choice between maximum joint profit for all and maximum profit for their in-group, they acted on behalf of their own group. Even if giving more to the other group did not mean giving less to their own group, they still gave more to their own.

Conclusions of the studies

- Out-group discrimination was found and is easily triggered.
- There is no need for groups to be in intense competition. This goes against the realistic conflict theory.
- In the two experiments, all the boys needed was to see themselves as in an in-group and out-group situation, and discrimination ensued.
- People acted according to the social norms that they had learnt, such as favouring the in-group.
- The boys responded to the social norms of 'groupness' and fairness and in general kept a balance between the two.
- In real life 'groupness' may over-ride fairness — for example, if the group is more important than 'Klee or Kandinsky' or 'counting numbers of dots'.
- Given the side effects of discrimination that were found in these experiments, teams in schools may not be a good idea.

Evaluation of the study of minimal groups by Tajfel et al. (1970, 1971)

Strengths

- The controls that they used meant that they could draw cause-and-effect conclusions. The boys were randomly assigned into groups that made some sense to them. The number of matrices used and the balance of rewards and punishments were controlled.
- Reliability — all eight trials in experiment 1 found in-group favouritism and out-group discrimination, as did the trials in the second study.

Weaknesses

- The groups were minimal groups. Although this helped to show that discrimination can be produced by groups, it is possible that the boys did not see the importance of the task because they were already a group before the experiment. They may not have taken the task of rewarding and punishing seriously. This means that the study lacks validity with regard to the task itself.
- The study took place in a laboratory setting, which means that not only was the task unnatural but the setting was unnatural for the boys. Therefore, the study lacks ecological validity.

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Table Strengths and weaknesses of the study of minimal groups by Tajfel et al. (1970, 1971)

1.2	Strengths	Weaknesses
	<ul style="list-style-type: none">• Cause-and-effect conclusions can be drawn because of the careful controls (e.g. the matrices)• The procedure was replicated and the same results were found, so the study is reliable	<ul style="list-style-type: none">• The study lacks validity because the task was not natural and the groups were not formed naturally• The study also lacks ecological validity because it took place in a laboratory setting

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Chapter 1 Key issues

Race riots

Describing the issue

Race riots are civil disorder with race as the key factor, so usually it means rioting between two or more races. There can be destruction of property and a crowd that becomes a mob over which there is no control. The destruction is often in an area where there is tension. One racial group may feel that another racial group has some unfair advantage and that advantage is targeted. A race riot may turn against the police or any other people who try to enforce calm.

In 2001, there were race riots in Bradford, UK. Two people were stabbed and many were injured when white and Asian gangs started fighting. Crowds at an Anti-Nazi League meeting discovered National Front sympathisers gathering in a nearby pub. When police reinforcements arrived, they were set upon. The police arrested 18 people, 11 white and seven Asian. Around the same time there were also riots in Oldham and Burnley.

Application of concepts and ideas

- Similar forces are at work with regard to race riots as there are with football violence — two groups that are usually easily identifiable and the members of the in-group see themselves as superior. This superiority means that they see the members of the other group as inferior and are prejudiced against them. This prejudice can lead to violence and discrimination.
- Social identity theory explains that, whenever people categorise themselves as a group, they will become prejudiced and will discriminate against another group, which becomes the out-group.
- There is in-group favouritism which enhances the self-esteem of the group members. This leads the group members to compare their group with the out-group, which is seen as inferior. This can lead to rioting. In race riots, it is not necessary for everyone in the group to know one another, merely to identify with their group. So, to this extent, it could be said that just being in the group is enough to lead to prejudice.
- Realistic conflict theory suggests that it is the competition for resources that leads to prejudice. Race riots often, but not always, focus on issues such as economic success, which suggests that realistic conflict theory has merit as an explanation of prejudice.
- Issues about deindividuation can help to explain race riots, just as they can help to explain football violence. When people are deindividuated, they are not identifiable and so act in ways in which they would not normally act. This can explain why protests sometimes turn to riots.

Cult behaviour

Members of cults are dependent on the leader — and to a lesser extent on the others in the group — for both spiritual and material needs. Some people who study cults say that their leaders use brainwashing to ensure that their followers obey them. There are several processes at work and it is suggested that the methods cult leaders use might involve psychological knowledge. The claim is that as more is learned, for example, about behaviour modification, then cult leaders and others can use this knowledge to control their members. Behaviour modification is covered in Chapter 6.

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Describing the issue

In a cult there tends to be:

- compliance with a group
- dependence on a leader
- avoidance of dissent
- devaluing of outsiders

Study hint Notice that each issue involves some sort of question. For example, the issue here is not so much cult behaviour itself as why it is feared. Make sure that when you are presenting a key issue you describe it as a subject for discussion, perhaps in the form of a question.

Members of a cult are often financially dependent on it. They usually break off ties with everyone outside the cult, which means they are even more dependent on the group, making it easier to manipulate and exploit them.

The issues are: why people in a society seem to fear cults; why they are not within the idea of 'normal' behaviour and whether or not cults should be accepted. There is the feeling that cult leaders manipulate behaviour and pressurise members to conform. It is these factors that make cult behaviour an issue. Members of a cult are often secretive and cut off from others — for example their families, which is also unacceptable behaviour. Cults apparently cultivate the idea that they are *the* one group ('us') and everyone else is not in the group ('them'). There have been some high-profile cases in which all the members of a cult have committed collective suicide or made a similar pact. An extreme example was the People's Temple of San Francisco, a cult whose members committed mass suicide in Guyana. Other cults sterilise the males or use females as prostitutes. It is almost as though a cult forms a separate alien society, which is difficult for those outside the cult to understand.

Application of concepts and ideas

- Social identity theory suggests that all people are members of at least one group and see themselves as part of an in-group. Everyone else, not part of the group, becomes the out-group, and the in-group members are prejudiced against the out-group members. On a simple level, it could be said that cult members are the out-group for those who are not members. Therefore, people are prejudiced against them, just because they form a group.
- However, the social approach does not help to explain the fascination that people have with cults. The psychodynamic approach might suggest that people have unconscious wishes to be dominated, as they were dominated by their parents. These unconscious wishes lead to an interest in cults where, in some cases, domination is great enough for people to obey an order to kill themselves. (Chapter 3 looks at the psychodynamic approach.)

Study hint When considering a key issue from the point of view of one approach, you can make a point criticising that approach's explanation of the issue by saying that another approach explains it better in some way. Once the point has been made, further examples of alternative explanations will not score any more marks, so only do this once in your answer.

- Social identity theory can explain why, on joining a cult, individuals would identify with a group that promises to give them sanctuary or a purpose in life. Seeing the group as good and purposeful would raise their self-esteem, so they are likely to view it in that way.

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- Social identity theory says that they would become prejudiced against people not in the group, including their families. This explains why cult members cut themselves off from people not in the group.
- Agency theory can help to explain why cult members stay in the group and obey the leader, even though it may be against their own interests. The cult operates as a small society, providing for the individual's needs. The leader gives the orders and the members see themselves as agents of the leader, with the consequences of their actions being the leader's responsibility. The members stop acting in an autonomous way.
- Milgram found that people obey orders and go against their own moral code. This helps to explain issues such as mass suicide, where people even obey an order to kill themselves.
- One theory from the social approach that is not covered by your course is that of cognitive dissonance, put forward by Festinger. This holds that when there is conflict between behaviour, thoughts and emotions, people have to resolve that conflict. One way of doing this is to change the area of conflict. For example, if their behaviour does not match what they think is right, people can either change the behaviour or change what they think is right. This overcomes the cognitive (thinking) dissonance (mismatch). This can explain why people who become part of a cult change almost completely and become what their families describe as 'different people'. They have to change in order to resolve the dissonance that allowing themselves to be controlled by someone else is likely to cause.

To explain your key issue, you can use theories and studies from the social approach even if they are not part of the course content.

Explore Find other examples of cults and investigate what is involved. Read about at least two examples, so that you can look for common features. Would you be attracted to the idea of joining a cult? Can you see why your family would probably be horrified? Using your knowledge of psychology, make a list of points that you would use in an argument to persuade someone not to join a cult.

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Chapter 2 Content

The spreading-activation theory of semantic processing

The spreading-activation theory of semantic processing is about memory, but as the name suggests it is mainly about processing, just as the levels-of-processing framework is about processing. The term 'semantic' refers to meaning, so the model is about processing meaning. The spreading-activation theory is explained by Collins and Loftus (1975) and came from a theory developed by Collins and Quillian (1969).

The main idea of the spreading-activation theory

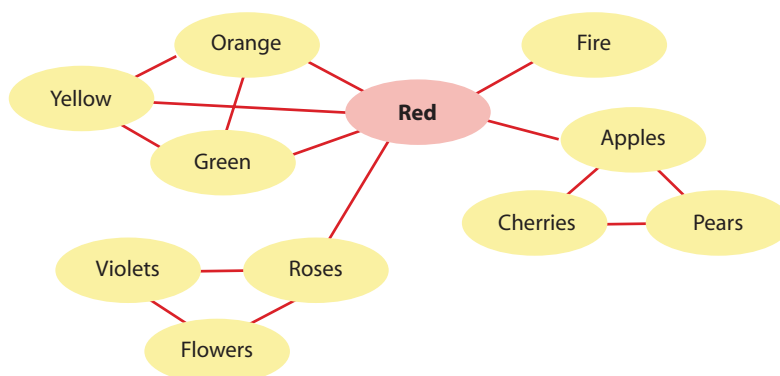
The spreading-activation theory is about information processing. It focuses mainly on searching the memory to find answers to questions, or to find words or ideas. It examines how concepts and ideas (and words) are stored so that they can be found when required. The idea is to see how long it takes to find an answer to a question because it is assumed that the longer it takes, the further away from the question the answer is stored. The other main point is that this theory can also help to find what would be needed to program a computer to answer questions. So not only does this theory focus on information processing, which is a key idea in the cognitive approach, it also focuses on the computer analogy.

Study hint The spreading-activation model is useful as an example of key assumptions and a definition of the cognitive approach because it illustrates the emphasis on information processing and information flow. It also illustrates the idea of understanding the brain by looking at how computers work (the computer analogy).

In the spreading-activation model, 'spreading' means that, as a search starts from one concept to find another, the search spreads out further and further until the answer is found. 'Activation' means that as the search spreads it moves from one concept to another and activates them. The ideas of spreading and activation are illustrated in Figure 2.1, in which 'Red' is used as the main concept.

Figure Using a concept to illustrate the spreading-activation model

2.1



An example of spreading activation

To answer the question: 'Do robins fly?' the process could be:

- find the concept 'robin' in the 'database'
- search the database from 'robin'
- connected to 'robin' would be 'bird', connected to 'bird' would be 'fly'

The conclusion would be that 'yes, robins do fly'.

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This is the basis of the model, but there is more to it. The other concept in the question is 'fly'. A connection could be made from this to 'bird'. 'Bird' connects 'fly' and 'robin', so the answer would be 'yes'.

Study hint Note that Loftus is Elizabeth Loftus who did much work on eyewitness testimony. Her work is also covered in criminological psychology, which you might study for a later unit. It is helpful to think of the named people in studies as real people. Look them up using the internet to make the subject more 'alive'.

Explaining the spreading-activation model of semantic processing

According to the spreading-activation model, a memory search is activation spreading from two or more **nodes** in a semantic network until an **intersection** is found.

- A node can be a word, an idea, a concept or anything in memory.
- An intersection is where activation from a starting node crosses over with activation from another starting node.

In the example above, spreading from robin to bird and from fly to bird, there is an intersection at 'bird', which means that people can decide that robins can fly. The model is complicated and is simplified here. The original basic ideas are:

- People's concepts contain indefinitely large amounts of information. For example, when Quillian (1966) asked people what a machine is, initially they gave common properties, but the more they described 'machine', the more they moved onto other things that were less and less obvious.
- Concepts can be complex structures — for example, 'machine', 'to machine', 'what a machine is for' and 'how to use a machine'.
- Links between concepts can go in one way or both ways — for example, a typewriter is a machine but a machine is not a typewriter in the same sense.
- The spread of activation expands from the starting nodes (e.g. 'robin' and 'fly') to all connecting nodes, *not* one at a time. A tag is attached to the starting node and at each node the starting node and the node before are also attached as tags. When another path from a starting node is met, this is the intersection.
- The path to the intersection can be evaluated to make sure the syntax fits. For example, 'fall' will cross with 'leaves' but the syntax will not fit if the sentence is about tripping over.
- **Priming** a concept means activating the nodes and links. For example, priming 'red' will activate relevant nodes such as other colours, 'fire', 'apple', 'cherries' and 'roses' (Figure 2.1).

Priming involves activating concepts that connect with those being learnt or retrieved.

Extended model of Craik and Loftus (1975)

Craik and Loftus extended Quillian's idea. They added more assumptions about the model:

- Activation spreads from a concept in a decreasing gradient and the gradient depends on the strength of the path. Paths that are close together are 'steep', which means that those concepts are found close to one another. Paths that are far apart are 'flat', which means those concepts are not often found together.
- Longer processing means longer activation at a fixed rate. Only one concept is activated at a time. This means that there is **serial processing** *not* parallel processing. Serial processing means that the brain performs one operation or process at a time.

Parallel processing means that more than one operation can take place at the same time. There is debate about whether humans use very fast serial processing or parallel processing.

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- Activation decreases over time and somehow goes away gradually. It also goes away if there is an intervening activity. The more concepts there are, the less each will be primed.
- The intersection needs a **threshold** for firing. This means that an answer is not produced immediately simply because two paths cross. There has to be a level of activity before an answer is given.
- The more concepts have in common, the nearer together they are in the network. Therefore, colours are closely linked, but red objects (e.g. roses, fire and cherries) are less closely linked.
- Names of concepts are stored in a dictionary or **lexical network**, which is also available (as well as a **semantic network**).
- Concepts in the lexical network are stored by phonemic similarity (what they sound like) and are linked to the semantic network, where storage is by meaning.
- When answering a question and trying to match the concepts to the semantic and lexical networks, bits of both positive and negative evidence are gathered to make a decision about the answer. For example, if asked whether 'mink are farm animals' a person might link 'mink' with 'cat' but is not likely to link 'cat' with 'farm animals'. However, a person might link 'reared for money' to 'mink' and to 'farm animals' and decide that mink are farm animals. If the evidence is not conclusive, then the answer is 'don't know'.

There are further ideas about this model. However, the material here gives a good outline of what the model is suggesting about information processing and how complex it is.

There are also links between the spreading-activation model and the levels-of-processing framework. This means that it is a useful model to study as your second choice.

Evaluation of the spreading-activation model

With all models of memory, there are strengths and weaknesses.

Strengths

- One strength of the model is the evidence that supports it. For example, one of Loftus's studies to test the model asked participants about categories and their starting letter or about categories and their properties. For example, she could ask for:
 - a fruit starting with the letter 'a'
 - something that starts with the letter 'a' and is a fruit
 - a fruit that is red
 - something that is red that is a fruit
 She asked either about letters (e.g. 'a') or descriptions (e.g. 'red'). She either put the category first (e.g. 'fruit') or the letter or description first in the sentence. The model predicts that if primed for 'red' the participant will not get to fruits as quickly as if primed for 'fruit'. A similar argument applies to 'a'. If the category 'fruit' is primed, then fruits are activated. If 'red' or 'a' is primed, it is more difficult to get to fruit. So it should be quicker to find a fruit beginning with 'a' or a fruit that is 'red' than if asked for something that starts with the letter 'a' and is a fruit or if asked for something that is red that is a fruit. This is what she found, so this supports the model. There is also other evidence, which is a strength of the model — it predicts what happens.
- Testing can be carried out experimentally with clear controls. Loftus's studies have been replicated, so the findings are reliable. This means that a body of scientific knowledge can be built up.

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Weaknesses

- It is a complex model. This arose partly because one main aim was to use the model to program a computer to answer questions that a human being can answer, such as: 'Are mink farm animals?' The complexity means that there have to be more rules in order for the model to work. This is shown by the amendments that Collins and Loftus (1975) made to the original model (Quillian 1966). These rules have to be added, as studies show that the model does not work in all instances — for example, humans can answer easily: 'Is a canary a canary?' whereas, using the model, this would challenge the capability of a computer.
- The spreading-activation model only looks at semantic processing and not at other aspects of processing — for example, when meaning is not registered. The multi-store model of memory examines how information is taken into the brain via the senses and how processing an item before meaning is added takes place — for example, in short-term memory. So the spreading-activation model could be criticised because it studies only one aspect of information processing. This is likely to be because the aim was to program a computer to answer questions in the way that humans do. This is a specific aim that results in a limited model.

Table Strengths and weaknesses of the spreading-activation model

2.1	Strengths	Weaknesses
	<ul style="list-style-type: none"> • Studies support the model. Loftus found that priming helped to speed up finding answers to questions, as predicted by the model • Studies are experiments with clear controls and careful operationalisation; the results are firm because they come from scientific study 	<ul style="list-style-type: none"> • To explain findings of studies, the model has been added to, which has made it rather complex; a model that has to be added to may not be useful • The model only looks at answering questions and finding meaning, rather than other aspects of memory and processing, such as rehearsal

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Chapter 2 Study in detail

Ramponi et al. (2004)

Ramponi et al. (2004) is a useful modern study that connects with the levels-of-processing framework, which is the main theory of memory for your course.

Brief background

Ramponi et al. (2004) based their study on previous research:

- In **intentional memory tests** there is deliberate recall or recognition and the participants know what the test requires.
- **Incidental learning** is where participants are tested but are not asked specifically to retrieve material, so retrieval is incidental and implicit.

It has been found that levels-of-processing effects occur more with intentional memory tests than with implicit ones.

Age has been found to affect memory when intentional retrieval is tested, but not when incidental retrieval is tested. The general idea is that voluntary intentional tests involve **conceptual priming** because the participants know that they have to retrieve the material. Incidental learning does not involve deliberate priming.

Priming involves activating concepts that connect with those being learnt or retrieved.

- Incidental learning or retrieval involves only perceptual processing— *not* thinking about related concepts.
- Intentional learning or retrieval involves conceptual processing — thinking about concepts.

Free-association tasks (e.g. table–chair) would be helped by priming (conceptual processing) so would be affected in intentional learning, but not in incidental learning. It could be that a strong free-association task (two words commonly associated, such as ‘table–chair’) does not produce a levels-of-processing effect. This could be because no depth is needed to process the first word and to retrieve the second. They are linked so closely that the connection is easy. A weak free-association task, (for example, ‘table–meal’) may give a levels-of-processing effect because processing would be needed to retrieve the link. It could be that older adults find it harder to make new associations between words so they are affected by weak free-association tasks and do not perform them as well as younger people. Age may affect only recall of weakly associated words.

Aims

Ramponi et al. (2004) set out to compare the memories of younger and older adults. They wanted to see what differences there were with regard to the relevance of the level of processing, and also whether there were differences between incidental and intentional retrieval. The background suggests that age effects and levels-of-processing effects are found only in intentional tasks.

To test the effects of age, the study used:

- weakly associated tasks and strongly associated tasks
- intentional and incidental retrieval

The four conditions were:

- weak intentional
- weak incidental
- strong intentional
- strong incidental

The levels of processing were tested for each of the four conditions.

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Hypotheses

The experimenters predicted that:

- the level of processing and the age of the participants would affect both weak and strong intentional conditions
- deep processing would give better recall, as predicted by the levels-of-processing framework
- younger participants would do better than the older adults, as predicted by previous research

The strong free-association tasks would not show any effects of age or levels of processing.

Procedure

Participants

The sample was selective. The older adults were 48 retired people aged from 63 to 84 years. The younger participants were 48 students aged from 18 to 38 years. All 96 participants were from London and were chosen for their age and occupation. Once chosen, those from each age group were assigned randomly to the conditions.

Design and materials

There were four levels-of-processing tasks:

- **graphemic** — the look of the word, e.g. how many letters extended above the main body, as in 'b' and 'd'
- **phonemic** — the sound of the word, e.g. how many syllables there were
- **semantic** — the meaning of the word, e.g. whether the meaning was pleasant or not
- **image** — the participant created an active image and was asked which of two words was easier to fit into the image

All the participants undertook all four tasks and within each age group each participant did two conditions (incidental and intentional).

There were 168 pairs of target words. The experimenters set up the free-association tasks before the study by using a reference list. If the percentage of correct pairs was between 55% and 77% this was seen as a strong association (e.g. 61% for umbrella–rain). If the percentage was between 6% and 15%, this represented a weak association (e.g. diamond–jewel). Only semantic word pairs were selected, not pairs that were ideas or abstract.

There were, therefore, 84 word pairs for the strongly associated condition and 84 pairs for the weakly associated condition. The frequency of the words in each condition was controlled. Then six lists each containing 28 word pairs were produced, each with 14 strongly and 14 weakly associated pairs.

Each participant was shown four lists, one for each task (graphemic, phonemic, semantic and image). At this stage, counterbalancing was carried out so that a particular list was not always for one condition. All the lists were used. Each person saw four lists, and so did not study 56 of the word pairs.

In terms of experimental design:

- When looking at age, this was an independent groups design because different participants (according to age) did the two conditions.
- When looking at levels of processing, this was a repeated measures design because all the participants did all four levels of processing.

There were three phases to the study:

- the study phase where the pairs were 'learnt'
- the distractor task phase, which was before the testing
- the test phase

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The study phase

The two words in the pair were displayed to the left and right of a computer screen. The words were displayed for 6 seconds, with a 1-second gap between presentations. The graphemic task asked which words or word had more letters that extend above the main body (such as 'b' and 'd'). The phonemic task asked which word had more syllables. The semantic task asked which word had the more pleasant meaning. The image task required an interactive image to be made and then asked which word was the easier to fit into the image. This phase lasted 15 minutes and participants pressed keys to indicate their decisions.

Two distractor tasks

In the first distractor task, the participants had to give the first city name that they thought of, beginning with a letter that they were given. In the second distractor task, they were given a common first name and had to give the first surname they thought of. Both tasks had to be completed quickly, with automatic responses. There were 20 trials each for the two tasks. The overall time taken was about 10 minutes.

The test phase

In the intentional task, participants were told they would see a word they *might* have seen as part of a pair earlier. They had to say the associated word if they were sure that they knew it, otherwise they had to pass.

In the incidental task, they were told to say the first word that came into their heads when given the cue word. They were told that they may have seen some of the words earlier, but they were encouraged to respond immediately.

Results

In the test phase, if a word was produced that was identical to the word in the pair, then this was a result. The words produced that had not been studied were a baseline measure. A statistical test was carried out to measure the primed words (seen by the participants in the study phase) and the unprimed (unstudied) words. The question was whether they gave more primed words in one condition than the other.

The researchers noted that priming does not usually affect graphemic processing. These results were discounted because the study task would not result in those words being retrieved better than the unstudied pairs.

Phonemic, semantic and image processing were tested. Table 2.2 shows the mean recall proportions (taking away the baseline proportions). The baseline results (no priming) were the same for both age groups.

Table 2.2 The mean proportions for recall in the conditions of the study by Ramponi et al. (2004)

Condition	Phonemic	Semantic	Image
Weak/intentional			
Younger	0.11	0.65	0.59
Older	0.03	0.37	0.32
Strong/intentional			
Younger	0.30	0.83	0.78
Older	0.12	0.63	0.58
Weak/incidental			
Younger	0.08	0.29	0.26
Older	0.04	0.18	0.15
Strong/incidental			
Younger	0.13	0.16	0.18
Older	0.08	0.13	0.15

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- The strong/incidental condition does not show a level-of-processing effect; the other conditions do. However, in the weak/incidental condition, the level-of-processing effect is not so marked as it is in the intentional conditions. Overall, intentional retrieval shows more of a level-of-processing effect.
- All the conditions show age effects, but the incidental conditions less so. Where there is an age effect in the incidental conditions, it is in the weak pairs.
- The highest proportion recalled is usually in the semantic condition with the younger age group (shown in bold in the table). The exception to this was the strong/incidental condition, although the highest proportion was still in the younger age group.
- The lowest proportion recalled is always in the phonemic condition and in the older age group (shown in italics in the table).
- The differences in recall in the strong/incidental condition are nowhere near as great as in the other three conditions. Even in the weak/incidental condition recall is not as great as in the two intentional conditions.

Conclusions

The levels-of-processing effect is shown clearly and, in the main, semantic processing gives the best retrieval. Except on one occasion, image processing (which also involved the meaning of words) was second. The study supports the idea that the deeper the processing the better is the recall and, therefore, supports the levels-of-processing framework. As predicted, intentional retrieval was better than incidental retrieval. Intentional retrieval uses priming to search for the pair word; incidental retrieval does not. The study found that incidental retrieval involves a levels-of-processing effect to a lesser extent than does intentional retrieval. As predicted, older participants had fewer problems with strongly associated pairs in incidental retrieval conditions, probably because the pairs are so well known. Both sets of participants had problems in incidental retrieval conditions when there are weak associations between the words.

In general:

- the level of processing affects recall
- age affects recall unless the words are so strongly paired that recall is almost automatic

Evaluation of the study by Ramponi et al. (2004)

The study by Ramponi et al. (2004) has strengths and weaknesses. It is difficult to summarise because of the number of conditions and hypotheses. There is one main study, with more than one aim. Having many hypotheses is not necessarily a weakness — using one task to achieve more than one aim is an economical way of running a study.

Practical Do not use more than one hypothesis for your own study. You need to keep everything clear and straightforward.

Study hint You might be asked about the design of this study. This is not easy to answer because it depends on which hypothesis is being considered. A central aspect of the study is that two different age groups are used, so a simple answer is that it is an independent groups design.

Strengths

- The Ramponi et al. (2004) study had good controls. For example, the exposure of the words was well controlled and the weak and strong word pairs had been developed earlier using other people and were explained carefully. The controls mean that the study can be replicated, which makes it easier to test for reliability and it is more scientific.
- The study has credibility. We expect that incidental retrieval using strongly associated word pairs should be the same for both age groups because the replies are more

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automatic. Older adults, however, find it harder to construct links to intentionally remember word pairs. The explanation for the age differences is credible, which is a strength.

Weaknesses

- It is an experiment that tests recall of word pairs. This is an artificial task, which may lack validity because it is not usual in real life to carry out such tasks. Real-life retrieval would probably involve meaning and as meaning is involved in testing levels of processing, the validity of the other levels (e.g. phonemic) is questionable.
- The age of the older adults ranged from 63 to 84 years and they could be sensitive about memory loss. It would be necessary to debrief the participants and to explain the theory in sufficient detail for the older adults to know that their worse recall was to be expected. There is no reason to think that the participants were distressed, but this ethical issue should be considered in this study and in any replication of it.

Table Strengths and weaknesses of the study by Ramponi et al. (2004)

2.3	Strengths	Weaknesses
	<ul style="list-style-type: none"> ● It is an experiment with careful controls, sampling and procedures. It is replicable and can be tested for reliability ● It has credibility because it says that older people have little problem with 'automatic' pairs but find it more difficult to learn new associations 	<ul style="list-style-type: none"> ● The tasks are not artificial. In real life people do not learn word pairs, so the tasks lack validity ● The situation is artificial, so there is a lack of ecological validity; older people might be more affected by the unusual situation than younger people ● There is an issue over ethics as older people may be more concerned about memory loss so any replication of the study would have to consider this

Unit 1

Chapter 2 Key issue

The cognitive interview

Cognitive psychology looks at issues to do with information processing, including input, processing and output. When interviewing takes place the questions are the input, processing occurs and the answer is the output. It is possible that the processing might distort the answer. An area where this has been studied is police interviewing. The cognitive interview is said to be successful in obtaining useful and accurate information.

Describing the key issue

Rather than merely asking a sequence of questions, cognitive interviews use the experiences, emotions, thoughts and situations of witnesses in order to obtain witness statements. There is focus on the setting, the state of mind of the witness at the time, what he or she was thinking about and so on. Interviewers help witnesses to 'go back' to the situation by asking them to describe what happened immediately beforehand. Another technique is to ask them to start their statements at different places in the sequence of events. The cognitive interview is used currently by most police forces in the USA and the UK. It was developed to replace hypnosis as a technique for obtaining information from witnesses.

In California, it was decided by a court hearing that the cognitive interview was reliable and it is now part of standard police training. In the UK, a 1996 survey showed that 23 out of 25 police training facilities have an average of 7 hours of training on cognitive interviewing. From the focus of the cognitive interview in training it appears to be the most useful way of getting eyewitness information. However, police in the field say that it takes too long. If there is another crime to deal with and they want information quickly, they are likely to use other techniques. If they do not want too much information, because there is no one to follow it up, they will not use the cognitive interview.

So although the cognitive interview might generate fewer errors than a standard interview, it is time consuming and may generate too much information. The issue is whether the technique is useful, which depends on the accuracy of the generated information, together with the practical issues of time and quantity of information.

The cognitive interview tends to mean different things to different people, partly because it is a collection of techniques rather than a procedure. Techniques include:

- 'change perspectives' — interviewees are asked to look at things from different points of view
- 'reinstate context' — interviewees are asked to take their thoughts back to the time
- 'report all' — interviewees are asked to provide detail, not just what they think is important

Application of concepts and ideas

- The cue-dependent theory of forgetting helps to explain why the cognitive interview is a successful way of obtaining accurate information from witnesses. Asking people to reinstate the context at the time enables them to remember retrieval information. This can then be used to cue the required information.
- Retrieval environment cues include the setting itself, the emotions of witnesses, what they were thinking at the time and what they actually saw. The cognitive interview involves the interviewer finding various ways of reinstating those cues, such as by asking witnesses to start their recall from an unusual place.
- Acknowledging that an individual's thoughts and state of mind can affect recall is consistent with the idea of reconstructive memory, which suggests that what is

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remembered is altered to make it fit in with the person's schemata and expectations. Eyewitnesses being asked to remember clearly what they did not focus on well at the time may cause them to reconstruct their memories from bits of remembered information, which means that the evidence will not be reliable. If an interview helps them to fill in the gaps by reminding them of the rest of the situation and schema at the time, those gaps might be more accurately filled. The cognitive interview does just that.

- One problem with interviewing is that the individual is likely to have gone over the story more than once before the interview takes place, i.e. the material has been rehearsed. According to the multi-store model of memory, the story will be in the long-term store. By starting the story at a different point and changing the order in which the events are told, a person may remember more accurately because he or she is not just repeating the story 'remembered' after rehearsal.
- Interviews can involve leading questions, which Loftus has shown can change the individual's memory. Loftus and Palmer (1974) showed that merely changing the verb, for example using 'hit' or 'smashed' in a particular question led to cars being judged as going faster. Interviews should not use leading questions. Training for the cognitive interview covers not using leading questions.
- Geiselman and Fisher (1992) developed the cognitive interview to include context reinstatement. This links to the idea of context-dependent forgetting explained by Tulving.
- The cognitive interview was developed in response to police officers asking for a way to improve witness recall, so it has a practical application.

Unit 2

Chapter 3 Study in detail

Bachrach et al. (1991)

The 1991 study by Bachrach et al. is covered in depth here, to make it more interesting for you. The headings provide a structure for the study and you should use the same headings — aims, procedure, results and conclusions — when making your own notes.

Aims

The 1991 study by Bachrach et al. aimed to look at the effectiveness of psychoanalytic therapies by examining other studies into the effectiveness of the therapies. They wanted to compare the findings of many different studies and to draw conclusions from the comparison. While carrying out the meta-analysis they also found areas requiring further research and another aim was to look for such information.

Procedure

The research method was meta-analysis. Many studies were reviewed and their methods and conclusions compared in order to draw overall conclusions. They then carried out an overall analysis of these (other people's) data.

Bachrach et al. (1991) used two different types of study:

- First, they studied at least five main quantitative studies of people undergoing psychoanalysis or related therapy. Quantitative means that the researchers looked at, for example:

- the percentage of patients finishing the treatment
- the severity of impairment of the patients involved in the treatments

The total number of patients involved in all the quantitative studies was 550, most aged between 20 and 30 years, although there were also some older patients. Both genders were represented and there was a broad range of impairment. There were 370 analysts involved in the studies and four different training centres. Most of the analysts were students of psychoanalysis.

- Second, they looked at clinical follow-up studies in which, a few years after treatment had finished, unstructured interviews were carried out by analysts who were not those who had treated the patients. The interviews were about symptoms, transference and cure. After analysing their results, the follow-up analysts compared their findings with those of the treatment analysts.

Explore Bachrach et al. (1991) present lots of detail about the individual studies that they analysed. Here, the aims, procedure, results and conclusions are about the meta-analysis, not the individual studies. It is useful and interesting to learn about the individual studies, if you have the opportunity.

Results

There were five main findings and/or comments from Bachrach et al (1991).

1 Suitable patients do benefit

The first main finding from the other studies is that patients that are deemed suitable for analysis do get considerable therapeutic benefit from the treatment. Many of the studies

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found this; the quantitative studies showed between 60% and 90% improvement. One problem with this finding is that many studies did not look at the change for the individual. The quantitative studies tend to find trends, rather than how individuals benefited. Freud (1933) criticised the idea of using statistics to evaluate analysis because this does not look at individual experience.

Even though it was found that suitable patients benefit, the clinical follow-up studies showed convincingly that cure was never complete. Many such studies, using the interview methodology, found transference residues that still guided the individual's behaviour, even with the other benefits of the analysis. **Transference** is the term Freud used when patients transfer their feelings onto the analyst. The feelings can be of hate or of love, but the transference is part of the cure. Transfer residue means that transference is not completely resolved, which leaves the patient with some unresolved issues, resulting in neurotic reactions. Freud said (1937): 'The business of the analyst is to secure the best possible psychological conditions for the functions of the ego; with that it has discharged its task.' This suggests that Freud agreed that analysis would not lead to a complete cure.

2 *Analysability and therapeutic benefit are related, but different*

Analysability refers to a judgement about how suitable a patient is for analysis, and how far he/she develops an analytic process during the treatment. Developing an analytic process means a patient using insight and guidance from the analyst to examine his/her own data. The judgement before treatment is based on various factors, including how open the individual is to ideas. Where impairment is severe, analysis might not be a suitable treatment. In general, patients were chosen for how much they were likely to benefit from insight.

Therapeutic benefit refers to how much the analysis improves the individual's situation and problem. A relationship was found between how well the analytic process develops and how much therapeutic benefit there is. About 50% of those judged suitable for analysis developed a psychoanalytic process. This is important because if there is therapeutic benefit without the patient developing an analytic process, it could be said that the benefit does not come from a treatment based on psychoanalytic principles. The analysis might work, but not in the way the theory predicts. Fifty per cent seem to have improved without the insight that the theory says will lead to the cure. Judgement about therapeutic benefit must be made after the analysis has ended.

3 *Those judged most suitable for analysis were not those who benefited most*

The evaluation of patients before treatment seems to have very little link to how well those patients eventually do. The studies used careful measures to find the 'right' patients including evaluation committees, diagnostic testing and combinations of these. However, such processes were not very successful. There were patients judged not likely to benefit who did benefit and patients judged likely to do well who did not benefit. At termination, when it was decided by both patient and analyst that treatment should cease, patients were found to have been more severely impaired than was first thought. Bachrach et al.(1991) thought that perhaps there was insufficient evaluation of how well a patient would trust the analyst or how much potential there was for the patient and analyst to work together.

4 *Most of the analysts were students who may not have carried out successful analysis*

In most studies, experienced analysts supervised the student analysts and examined their work. However, because the analysts were students, some difficult cases were excluded and the experience may not have been what happens usually in psychoanalysis. Work is needed to study the effectiveness of psychoanalysis using experienced analysts.

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5 The criteria necessary for the meta-analysis to be successful were often not met

Bachrach et al. (1991) had certain criteria that they wanted to be met before holding that their findings were solid. These were that:

- analysis was taking place
- the patients' experiences were the same
- the psychoanalytic process studied should be a typical one with typical patients
- the studies were all measuring the same factors

First, they needed to know that treatment was taking place. Student analysts were monitored, but their processes may have been different, so what the treatment was is not clear. Analysis is private. What analysts think that they say to patients may not be what they do say. Tape recordings can be useful (but were not used) and process notes (which were used) are valuable. So the criterion that analysis was taking place was not met.

Second, the treatment should have been the same for all patients, which it was not. Most analysts were students and the studies should have looked at the effectiveness of the analysis when carried out by trained and experienced analysts. So the criterion that the patients' experiences were the same was not met.

Third, the analyses should have been typical, with typical patients. This was often not the case because the analysts were students and the patients were handpicked for them. However, some studies claimed that the patients were representative of usual patients. The criterion that the psychoanalytic process studied should be a typical one, with typical patients, was partially met.

Fourth, the variables that were measured needed to be carefully operationalised. However, this was difficult. Variables included terms such as 'improvement', 'therapeutic benefit', 'analytic process', and 'circumstances of termination'. These sort of factors needed to be clearly and carefully defined so that they were measured in the same way in all the studies, which was not the case. So the criterion that the studies were all measuring the same factors was not met.

Conclusions

One conclusion that Bachrach et al. (1991) drew was that patients deemed suitable for analysis did benefit. Those who benefited most were those with the highest level of pre-treatment functioning (so they could bring more insight to bear on the issues raised). Sometimes, those judged as likely to benefit did not and those thought of as more severely impaired did. Another conclusion was that it was difficult to predict outcomes from initial evaluation. There were also methodological weaknesses in the studies, including lack of consistent definition of terms. Finally, it was concluded that the quantitative studies gave trends rather than information about specific individuals, but that the trends were useful because they suggested areas for further research. Box 3.1 briefly outlines these conclusions.

Box 3.1 Conclusions of the meta-analysis by Bachrach et al. (1991)

- Patients suitable for psychoanalysis derive therapeutic benefits.
- Those who benefit most are those with the highest level of pre-treatment functioning.
- However, some of those with high functioning before treatment do not benefit, and others, more severely impaired, do.
- It is hard to predict outcomes from initial evaluation.
- There are methodological weaknesses in the studies, such as lack of consistent definition of terms.
- The quantitative studies produce trends and provide ideas for further study.

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Evaluation of the study by Bachrach et al. (1991)

Strengths

- As part of their findings, Bachrach et al. (1991) evaluated the studies from which they were gathering data. For example, they pointed out that definitions of factors were different, which would affect validity, as the studies were then not measuring the same thing. They pointed out that the patients were carefully selected, which is likely to mean there were biased samples. Their study is stronger because, as they draw conclusions, they recognise problems with their data.
- The study used data from so many other studies, at different centres, with different analysts, using different methods to choose patients and using both quantitative and qualitative data. In spite of these differences, there were common findings — for example, that the longer the time in analysis, the more likely there was to be therapeutic benefit. The strength is that reliability is shown, because similar results are given in different studies and circumstances.

Weaknesses

- Using data from many different studies, with different methodology, definitions and analytical techniques, means that there is likely to be low validity. Each study may not have been measuring the same thing. Bachrach et al. (1991) acknowledge this problem. This important weakness of meta-analysis must be recognised.
- Many of the quantitative data were gathered from the 1960s to the 1980s and analytical techniques have changed since then. Meta-analyses have to use published studies, the results of which might be out-dated.

Table Strengths and weaknesses of the study by Bachrach et al. (1991)

3.2	Strengths	Weaknesses
	<ul style="list-style-type: none"> ● The study is strong because the meta-analysis evaluates as part of the analysis; they are able to point out strengths and weaknesses of the studies on which their evaluation is based ● There is reliability because even though the studies are different, they show similar findings, which makes those findings reliable 	<ul style="list-style-type: none"> ● There is low validity because the different studies operationalise the features differently; it is difficult to compare the studies and to conclude that they are measuring what they claim to measure ● Many studies that they analysed took place 30 years previously and psychoanalysis has changed since then

Unit 2

Chapter 3 Key issues

Debate concerning the issue of how early childhood experiences may guide later sexual orientation

Gender behaviour is taken on when a boy resolves the Oedipus complex and identifies with his father or a girl resolves the Electra complex and identifies with the mother. So early childhood experience (the Oedipus complex is in the phallic stage) guides later gender behaviour. Early experience guides sexual preference because one aspect of resolving the Oedipus complex is that in the genital stage boys and girls get together, whereas in the latency stage children prefer to be friends with those of their own gender.

Describing the issue

Different societies have different approaches to gender behaviour. Margaret Mead outlined three systems she found in New Guinea:

- One group of people had males displaying 'our' female gender behaviour and vice versa.
- A second group had both males and females behaving harshly and in a work-like manner.
- A third group had yet different behaviour, with females dominating.

Her conclusions have been questioned, but there are other studies that show such differences. It seems that at least some gender behaviour might come from customs and norms rather than from biology. However, sexual orientation tends to be thought of as biological. Researchers such as LeVay claim that there are brain differences between males and females and that homosexual behaviour seems to stem from brain differences. The issue of sexual orientation, focusing on homosexuality (which was labelled as a mental illness early in the twentieth century), is of interest. The question is whether sexual orientation is due to biological differences (including brain differences), differences in norms and values in a society or differences explained by early childhood experiences.

Application of concepts and ideas

According to the psychodynamic approach, the first 5 years of life are important. Near the end of this period, children start acting like their same-sex parent. They also resolve important issues that guide their subsequent behaviour.

- One such issue is sexual orientation. The third stage of psychosexual development, the phallic stage, is where the superego develops. In the phallic stage, boys go through and should resolve the Oedipus complex; girls should resolve the Electra complex. The resolution of the Oedipus complex leads to opposite-sex sexual orientation. Freud also suggests that if there is no resolution in the phallic stage, sexual orientation can be affected and that homosexuality is a consequence of this lack of resolution.
- However, it has been shown that single parenting, or other types of parenting where the mother or father is absent at the age when the Oedipus and Electra complexes are said to work, does not mean that all those children have a different sexual orientation. This throws doubt on the explanation. Malinowski, an anthropologist, studied the Trobriand Islanders. He found a society where the uncle took on what we see as the father's role (disciplining and guiding) and where the father was more of a playmate. However, this different social set-up did not mean that the children when older had same-sex sexual orientation. This is evidence against the claim that early childhood experiences are responsible for later sexual orientation. There might be biological differences that are responsible, or an alternative explanation, rather than the resolution of the Oedipus complex.

Unit 2

Debate about whether dreams have meaning

Freud saw dreams as ‘the royal road to the unconscious’. However, there are other theories about dreaming — for example the biological theory that dreams sort out the day’s events ready for the next day. The debate is about whether dreams have meaning, as Freud claimed, or whether they have some other function.

Describing the debate

There are many websites and other sources dedicated to explaining the meaning of dreams. For example, colours and some objects in dreams are said to have specific meaning. It is thought that dreaming can be measured by rapid eye movements and the evidence from this is that everybody dreams. People who claim not to dream probably do not remember their dreams. Most people will claim that at least some of their dreams are disturbing and most people have dreams about people they know and events that they recognise. It is usual to say that at least some dreams, possibly the disturbing ones, mean something to the dreamer.

An alternative theory is the restorational theory of sleep that claims that sleep serves a biological function and dreams have no meaning. Perhaps dreams restore the brain to its natural state by removing the day’s thoughts. The activation synthesis theory of dreaming suggests a different explanation.

If dreams have meaning, and if the dreamer understands the dreams, it is thought they might help in sorting out problems and in decision making.

Application of concepts and ideas

- Freud used dream analysis and symbol analysis in case studies to try to uncover unconscious urges. He thought dreams could reveal these urges and, once revealed to the patient, then energy held back to deal with these repressed wishes would be released and the person would be freed from the issues involved.
- The manifest content of a dream is what the dreamer remembers. The latent content is the underlying meaning of the dream, which is hidden by symbols. The latent content is found by decoding the symbols in the manifest content.
- The approach does not say that symbols have specific meanings, such as the house being the soul of the person. Each dream is individual in its meaning because each person has different thoughts hidden in the unconscious.
- The other side to the debate is that dreams are just about the day’s events. They could be biological in that they are connected with neurotransmitters from the day and interpreted by a still active brain during sleep. There are other explanations that also do not hold that dreams have meaning.
- The psychodynamic approach holds that dreams have meaning and that it is important to uncover that meaning to cure the patient of neuroses or other mental health problems. However, it is not proven that this is the case. The problem is that dreams are not testable in an objective and scientific way. They are not measurable and they are not accessible. Any interpretation by an analyst is open to subjectivity. Even if it is true that dreams have hidden meanings, it is not possible to prove it.

Unit 2

Chapter 4 Study in detail

De Bellis et al. (2001)

De Bellis et al. (2001) carried out a study using MRI scanning to find out if there are sex and age differences in brain development during childhood and adolescence.

Aims

The study aimed to investigate three areas of the brain to find out if the volume of those areas changed over time from childhood to adolescence and whether there were differences between the sexes. De Bellis et al. (2001) used MRI scanning, measured the relevant areas and then tested the results for age and sex differences, both separately and together. Previous studies had shown a reduction in grey matter and increases in white matter and in the corpus callosum over time.

Background literature and information

De Bellis et al. considered the findings of other studies. Post-mortem studies had shown how, during childhood, the brain changes in terms of reducing the number of synapses (pruning) and increasing **myelination** (myelin is a protective insulating covering round nerve fibres).

MRI scanning shows that after the age of 4 years, the volume of cerebral grey matter decreases, which might be linked to the pruning of synapses. Cerebral white matter increases from childhood to late adolescence, as does the size of the corpus callosum (links the two hemispheres). Other studies show that grey matter increases up to adolescence and then decreases, so not all findings agree — but they all point to changes in the white and grey matter as well as in the corpus callosum. The white matter and the corpus callosum may increase because of myelination. There are differences in ability between males and females — for example in visuospatial tasks — and there may be sex differences in brain development in disorders such as autism and attention deficit hyperactivity disorder (ADHD). These are the sorts of findings that led De Bellis et al. (2001) to carry out their study of sex and age differences in brain development.

Procedures

The participants were healthy children and adolescents (61 males and 57 females) with an age range of 6 to 17 years. They were found by advertisement and asked to take part in the study. They underwent clinical evaluations to ensure that there were no mental disorders in the participants in the sample. There were no significant group differences in age, race, socioeconomic status, handedness or IQ (average 116 points). Males were significantly taller than females. Written informed consent was obtained from parents for the study to take place.

Before the procedure, the participants were placed in a machine that reproduced the sights and sounds of the scanner. This was to encourage them and to help reduce head movements.

MRI scanning was used to gather the data. The participant's head was placed in the scanner, wrapped to be comfortable and to help keep it still. There was careful positioning to obtain the right image for results. The participants watched videos of their favourite films during the scanning and were motivated to keep still by letting them see their scans afterwards and explaining that if they moved, the image would be blurred. No sedation was used. A neuroradiologist carried out all the scans and a child-adolescent psychiatrist supervised the procedure.

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The images from the MRI scans were analysed using computer software that gives valid and reliable measurements of specific structures using hand tracing. Measurements were made by trained and reliable raters who were blind to participant information. When the results were correlated, reliability levels between raters were as high as 0.99. Careful attention was paid to how the areas of grey matter, white matter and the corpus callosum were separated and measured.

Results

Results showed age-related changes between genders:

- The grey matter, white matter and corpus callosum all showed significant differences when sex by age interactions were tested.
- Girls showed significant developmental changes with age but at a slower rate than boys.
- Males had a 19.1% reduction in grey matter between 6 and 17 years of age compared with a 4.7% reduction in females.
- Males had a 45.1% increase in white matter compared with a 17.1% increase in females.
- Males had a 58.5% increase in the corpus callosum compared with a 27.4% increase in females.

Conclusions

Overall, the volume of grey matter showed the expected decrease and the volume of white matter and the corpus callosum size showed the expected increases with age. There were also sex differences, in that although the increases and decrease concerned the same areas, the degree of change was less in females than in males.

Evaluation by De Bellis et al. (2001)

The researchers offered some criticisms of their study:

- This was a **cross-sectional study** (different participants were tested at one moment in time) and needs to be replicated **longitudinally** (the same participants would be tested over time).
- Giedd et al. (1999) also showed the same increases and decrease, which adds to the reliability of the findings.
- There were quite large differences between participants of similar ages, which suggests the need for further investigation.
- Many participants had high IQs and it was a high-functioning group, so the sample showed some bias.
- Grey and white matter had to be separated by estimation as they are not areas that are easily measured.
- The sampling and procedures were careful and controlled.

Evaluation of the study by De Bellis et al. (2001)

Strengths

- The study used careful controls, including trained raters who did not have information about the participants. Each participant was positioned carefully in the scanner so that images of the correct parts of the brain would be made. Therefore, the study is replicable and can be tested for reliability.
- Although it was a volunteer sample, there was some matching with regard to socio-economic status, IQ, race and handedness. So an attempt was made to make sure that, as far as possible, it was not a biased sample. Although there was some doubt about the IQ, which on average was felt to be high, this was the case for all participants so was controlled.

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Weaknesses

- It was hard to operationalise the dependent variable, which means it was difficult to measure the grey and white matter. If the volume of these areas had to be estimated it might mean that the findings are not reliable or valid.
- The overall sample consisted of high-functioning children and young people — they had an average IQ of 116. This could have affected the brain differences found and could have been a confounding variable.

Table Strengths and weaknesses of the study by De Bellis et al. (2001)

4.1	Strengths	Weaknesses
	<ul style="list-style-type: none"> ● Controls were used, such as raters who did not know the aims of the study; there were procedural controls such as careful positioning of the head for the scan ● The sample was planned to take into account handedness, socioeconomic status, IQ and race so that these issues could not be said to have affected the findings 	<ul style="list-style-type: none"> ● The measuring of the dependent variable was not easy because the volume of the grey and white matter had to be estimated; there is no set way to measure these areas; this may reduce reliability and validity ● The sample showed some bias because the participants were high functioning with an average IQ of 116

Unit 2

Chapter 4 Key issue

Does taking drugs during pregnancy have a harmful effect?

The question of whether taking drugs during pregnancy has a harmful effect covers both recreational drugs (e.g. alcohol and nicotine) and other drugs (e.g. heroin). The issue also covers medication. Not only might drugs affect the pregnant woman, there is also the effect on the baby to consider. The effects of drugs are usually concerned with neurotransmitters and synaptic transmission, but hormonal transmission can also be affected.

Describing the issue

It is accepted generally that drugs, even prescribed drugs, are harmful because they affect biological functioning in ways that can be dangerous. The effects of drugs such as heroin are well known; nicotine and **alcohol** can also have serious effects.

Alcohol is one of the most dangerous drugs for pregnant women, particularly in the early weeks.

When a woman is pregnant, there is a need to consider the harmful effects both to the woman and to the child. Some drugs are damaging at certain times during pregnancy; others are harmful throughout. Many of the baby's organs and systems are formed within the first 10 weeks, so those first weeks are important, particularly where alcohol is concerned, because malformations can occur.

After 10 weeks, organs are still developing, as is the nervous system. Continued drug use may also increase the risk of miscarriage.

Certain types of medication can be harmful. Most such drugs carry a warning on the packaging that anyone who is pregnant should consult a doctor before taking the medication.

Application of concepts and ideas

- Alcohol is particularly harmful because it breaks down to a cell-damaging compound that the foetus will absorb. Foetal alcohol syndrome can include abnormal facial features and heart defects, as well as impeded growth and mental retardation.
- Nicotine consumption can also affect growth. It may be that it slows the appetite of the woman so that she does not gain weight and it might affect the ability of the developing baby's lungs to absorb oxygen.
- Cocaine and methamphetamine (crack and speed) are stimulants of the central nervous system. They suppress the mother's appetite, cause blood vessels to constrict and the heart to beat faster. This increases the risks of miscarriage and premature labour, and of problems with the placenta.
- If the mother uses cocaine, heroin or methamphetamine, the baby may be born dependent on the drug, so might suffer withdrawal symptoms such as shaking, sleeplessness and muscle spasms. There may be learning difficulties stemming from the mother's use of such drugs.
- Prescribed drugs can also cause problems. For example, anticonvulsants used to prevent epileptic seizures are associated with heart defects and mental retardation.
- Some drugs work at the synapses and mimic neurotransmitters. They either block messages by filling the receptors so that the neurotransmitter cannot cross the gaps or enhance the message by passing it on.
- Aspirin and ibuprofen can also cause problems because they inhibit the production of hormones that start off labour; delay can be dangerous. This shows how drugs not only relate to the central nervous system and synaptic transmission but also to hormone production.

Unit 2

Chapter 5 Study in detail

Pickens and Thompson (1968)

Pickens and Thompson (1968) investigated operant conditioning in rats. You can use it as an example of an animal study and when discussing ethical guidelines with regard to animals.

Aims and background

Pickens and Thompson (1968) worked with rats in laboratory conditions. They investigated the use of cocaine as a reinforcement for behaviour using the principles of operant conditioning. Other studies had shown that cocaine acted as a reinforcer in rats.

The researchers aims were:

- to see how the dosage of cocaine affected the responses
- to see how the schedule (in response to how many pushes of a lever the reinforcement was given) affected the responses
- to see if food was different from cocaine as a reinforcer

Experimentally naïve means that the rats had not been previous subjects in a study.

Procedure

The experiments involved similar **experimentally naïve** male albino rats.

The rats were about 150 days old. For the first two experiments, food and water were freely available and each rat had a device attached so that cocaine could be injected without impeding movement. They were kept in small cages with levers, food, water and a light. The drug could be administered from 9 a.m. to 11 p.m. For the other experiments the apparatus was rather different.

Experiment 1

Two rats were used and their responses to 0.5 mg kg^{-1} of cocaine hydrochloride in solution (the reinforcement) were recorded. Reinforcements were given when the mean number of responses per hour was constant. This usually happened about three days into the study. For example, when a rat had settled to pressing a lever about ten times in an hour, it was reinforced with cocaine every ten presses and that was the start of the study. The researchers then changed when they gave the reward (the cocaine) from relying on the responses:

- to the reward not being linked to the responses
- to the reward being given with a stimulus that led to the reinforcement

They also gave saline instead of cocaine to see the effect.

Experiment 2

They studied the effects of the size of the dose as a reinforcement and how many times the rats would press the lever and wait for the reward of the cocaine. Three rats were used and, apart from a light being on during the reinforcement, the apparatus was as in experiment 1. The dosage was altered to find the higher and lower limits that led to continued behaviour for the reward. Each experiment lasted about 6 hours and each animal was subjected to it twice. They investigated how the dosage affected the frequency of response (how many times the rat pressed the lever in a certain length of time) and the level of response (the time between each response/lever press).

The second phase of experiment 2 took place after one rat had died. The number of responses needed to earn the reward was varied between five and 80 responses. This was to see how long the reinforcement lasted — would the rat continue pressing the lever 80 times and still wait for the reward?

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Experiment 3

Experiment 3 examined the effects of food as a reinforcer. One rat was used and the idea was to see if the rat wanted cocaine or just any reinforcement. The apparatus consisted of a standard chamber with two levers, the light, water bottle and food-delivery mechanism. However, food was not freely available. Each lever press was programmed to deliver food pellets (1, 5 and 20 mg) which were available 24 hours a day. The study for each size of pellet lasted 4 days; each condition was replicated three times, but in a different order.

Experiment 4

Cocaine was given by injection as previously but the responses were reinforced by food. The apparatus was as in experiment 3 but included the cocaine-infusion apparatus of experiments 1 and 2. The rat was trained for 45 days to give ten responses before a food pellet was given as a reinforcer. The training ended after 300 reinforcements. The infusion device was fitted and cocaine was administered hourly. The animal was reinforced by food, but also with the hourly cocaine doses. The aim was to find what effect cocaine had on the food-reinforced response.

Study hint You are unlikely to have to remember all the procedures and results for this study. Choose a few aims with the appropriate procedures, results and conclusions. The main point of including this study is that it is an operant conditioning study that uses animals.

Results

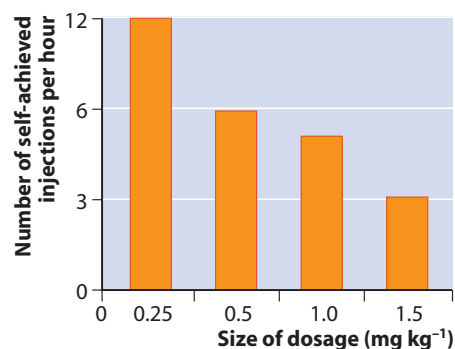
Experiment 1

- When the responses were no longer reinforced by cocaine, but the drug was given hourly, the responses stopped completely. The rat had stopped linking the reinforcer (cocaine) with the response.
- When saline replaced the drug to see if this would bring extinction, there were rapid responses followed by extinction. The response was no longer being rewarded by cocaine, so it stopped.
- When light (the stimulus) was paired with the cocaine and then the cocaine was stopped but the light continued, there was an initial flurry and then the responding stopped. The cocaine was no longer acting as a reinforcer.

Experiment 2

- Cocaine acted as a reinforcer between certain limits; too high or too low a dosage resulted in no response.
- An increased dosage of cocaine resulted in a lower number of responses and a lower response rate.
- At some stage, responses settled (e.g. between 2.0mg kg^{-1} and 3.0mg kg^{-1}).
- When the rats had to make more responses to obtain the drug, they did so to maintain the same overall drug intake.
- There were fairly long pauses after being reinforced with the drug, which could have been because of either the drug itself or the injection.

Figure 5.1 Relationship between the frequency of self-achieved injections and cocaine dosage



Experiment 3

- The greater the food pellet reinforcement, the fewer were the responses (as with cocaine).

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- There were no regular spaced pauses after food reinforcement, as there were with cocaine.

Experiment 4

- A cocaine dose of 0.5 mg kg^{-1} produced a pause of approximately 8 minutes before responding continued.
- A dose of 1 mg kg^{-1} of cocaine produced a pause of approximately 11 minutes before responding continued.
- A dose of 1.5 mg kg^{-1} of cocaine produced a pause of approximately 15 minutes before responding continued.
- The length of the drug-induced pauses were dependent on the dosage.
- After the pause, responding was at the same rate as previously.

The length of the pauses in experiment 4 were similar to those found in experiment 2.

Conclusions

- Experiment 1 showed that cocaine was a reinforcer and that the rat responded for the reward.
- Extinction occurred and the study showed operant conditioning, not just the effects of cocaine (the rats only responded if the rewards followed the responses).
- The dosage and when the drug was given are important. If the dosage was too high or too low cocaine did not act as a reinforcer.
- Some signs of damage were found in the rats when the dosage was high, such as weight loss, tremors and confusion.
- The responding for the food in experiment 4 depended on dosage of cocaine. A higher dose gave a longer pause before responding again.

Evaluation of the study by Pickens and Thompson (1968)

Strengths

- The experimental procedures and the care with which they were carried out. For example, the rats in all the studies were similar, the apparatus was similar and care was taken to establish what was being reinforced. The precision and controls mean that cause-and-effect conclusions (involvement of operant conditioning) were drawn.
- The study included replication by using more than one rat and also by repeating the procedures with each rat, over many trials. This means that the results and conclusions are reliable.
- You could argue that the ethics of the study are a strength. Caging was adequate, few animals were used, they had not been used in studies previously and the researchers were competent. These issues match guidelines for using animals in experimental research.

Weaknesses

- The study was not ethical because one rat died during the study, there were many trials in each experiment and the same rat had to stay in the study for many days. The repetition in the study may be seen as excessive, which is not within ethical guidelines — studies must cause as little distress as possible.

Study hint

When using ethics to evaluate a study make sure you use evidence. Don't just say that rats were used and one died, so the study was unethical. Check against guidelines on the use of animals and see if the researchers followed them. Then give evidence to support your argument.

- It was a study of animals and the findings may not be generalisable to humans. Not only do humans have different motivation for drug taking, they have different brain function.

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This could mean that the findings are not helpful in explaining human behaviour.

Table *Strengths and weaknesses of the study by Pickens and Thompson (1968)*

5.1	Strengths	Weaknesses
	<ul style="list-style-type: none"> • The experiments were well controlled, Therefore, cause-and effect-conclusions could be drawn • The repetitions mean that the findings are likely to be reliable; the same procedures were carried out and the same results found 	<ul style="list-style-type: none"> • It could be said to be unethical because of the number of repetitions of each study; each rat was involved in the study for a long time • It is difficult to generalise from animal studies to say that the findings are true of humans because humans are different and, for example, have motivation

Unit 2

Chapter 5 Key issue

The increase in female violence related to changing role models

There has been an increase in female violence, one cause of which could be cultural images that are copied.

Describing the issue

It is thought that now, in the early twenty-first century, there has been an increase in female violence and in 'ladette' culture. In the 1990s, 'ladettes' were drunk and disruptive as only males were formerly. This in itself is not violence but female violence seemed to increase at around the same time. Lara Croft is a PC games 'heroine' who is violent and kills to get her way. 'Bad girls' occur in films, such as Daryl Hannah's role in the film *Kill Bill*. Senior police officers in Scotland have said that there is an increase in actual violence among young women. This is backed up by the number of women being sent to prison in Scotland, which is rising at four times the rate of males.

Explore Use the internet or some other source to look up crime figures and find more evidence that female violence is rising. Consider the types of violence and the age groups in which they occur and link these areas to learning-theory explanations.

Explaining the issue

- The number of role models for 'bad girls' (e.g. Lara Croft) is used to show that social learning theory can explain the rise in violence in young women because the theory states that role models are imitated by those who identify with them.
- According to social learning theory and vicarious learning, when there are role models for a certain type of behaviour, that behaviour will be copied.
- Behaviour that is rewarded is more likely to be copied, particularly if the models on television or in PC games are glamorous or get what they want by such behaviour.
- If fun and liberation are perceived to be the rewards for female violence then it is more likely to be imitated.
- Violent female role models such as in *Kill Bill* may be portrayed as 'sex goddesses'. This pressurises girls to conform to the behaviour because it is likely that they will get positive reinforcement for doing so in the form of admiration from their peers.
- An alternative explanation is that it is alcohol, not social learning, that is leading to the behaviour.
- However, it could be argued that drinking is itself a behaviour that is imitated and rewarded because it is part of the image some young females wish to portray.