Year one topics – Memory revision

Coding

Coding refers to the process of transferring information from the environment into your memory, and this can take place in several different ways depending upon which memory store the information is trying to get into (sensory memory, short-term memory, long-term memory).

Visual/structural processing – this refers to processing something by what it looks like;

Auditory/acoustic processing – this refers to processing something by what it sounds like. For example, songs/poems are stored and remembered because words are converted into phonetic sounds which are transferred to the memory stores through the process of rehearsal;

Semantic/deep processing – this refers to processing something by what it means. For example, dates are remembered because meanings such as birthdays, anniversaries are attached to them, etc.

Research into encoding:

Baddeley (1966)

- **Aim** - To explore the effects of acoustic and semantic processing in the short- and long-term memory stores.
- **Method** - Baddeley gave different lists of words to four groups of participants to remember – group one were given acoustically similar words such as cat, cab, can. Group two were given acoustically dissimilar words, such as pit, few, cow. Group three were given semantically similar words, such as great, big, large. Group four were given semantically dissimilar words such as good, huge, hot. Participants were shown the original words and asked to recall them in the correct order that they were shown.
- **Results** - when participants had to recall this task immediately (STM recall), they tended to do worse with acoustically similar words. When participants had to complete this recall after a 20-minute interval (LTM recall), they did worse with semantically similar words.
- **Conclusion** - Baddeley concluded that these results suggested that the short-term memory relies heavily on acoustic processing, whereas the long-term memory relies primarily on semantic processing.
- **Evaluation** – Baddeley's study can be considered to be lacking in ecological validity in that this type of experimental hypothesis has no real basis in real life and therefore cannot be applied to any real-life situations because we are more likely to go through the process and rehearsal and recital in meaningful contexts as opposed to just learning lists of words for the sake of it; for example, people in different professions are more likely to learn words in meaningful contexts that relate to their job or education – a sociology teacher would rehearse & recite sociological concepts

after deep-processing them, a doctor would rehearse & recite medical concepts after deep-processing them, etc.

Capacity

Capacity refers to how much information can be held in your memory. For example, someone can only hold 7+/-2 pieces of information in their STM at one time.

Research into capacity:

Jacobs (1887)

- **Aim** – To measure the digit span of the short-term memory.
- **Method** – Participants were read lists of either numbers or letters that they had to serially recall immediately after presentation. Jacobs gradually increased the length of these digits until the participant could only recall, in the correct order, 50% of the information they were presented with.
- **Results** – Jacobs found that there was a difference in the capacity for numbers and for letters. On average, participants could recall 9 numbers, but only 7 letters. He also noticed that recall seemed to increase with age. Eight year olds could recalled on average 7 numbers, whereas 19 year olds recalled 9 numbers.
- **Conclusion** – The short-term memory has a capacity that can hold between 5-9 pieces of information at a time (7+/-2), and as age increases we appear to develop better strategies of recall.
- **Evaluation** – This study can be considered to be culture-biased because it makes assumptions about digit-span based on anglo-centric, Western norms in relation to memory capacity. For example, Naveh-Benjamin & Ayres' (1986) research into digit-span provides counter-research to Jacobs' digit-span in its research into digit span cross culturally; they found that those mother-tongue was not English (e.g. Arabic, French speakers) had a shorter digit span than participants in Jacobs' original study because of the number of syllables within the numbers (digits) they were asked to recall – e.g. quatre-vingt-dix-neuf has more syllables than its English equivalent, ninety-nine.

Duration

Duration refers to the length of time a piece of information can be retained in our memory. By its very nature, the short-term memory has a very brief duration. Our STM is a temporary store, and anything we need to remember for longer needs to be transferred to the long-term memory (LTM).

Research into duration:

Peterson & Peterson (1959) – Duration of the STM

- **Aim** – To test how long STM lasts when rehearsal is prevented.
- **Method** – Participants (24 undergraduate students) were shown a consonant trigram briefly (i.e. CVB, SKD). Participants were then asked to count backwards in multiples of three from a specified number to prevent rehearsal until they were told

to stop. After intervals of 3-18 seconds, participants were asked to recall the original trigram. The procedure was repeated multiple times using different trigrams.

- **Results** – Participants were able to recall about 80% of trigrams after a 3-second interval. Progressively fewer trigrams were recalled as the length of the interval increased. After 18 seconds, fewer than 10% of the trigrams were recalled correctly.
- **Conclusion** – Short-term memory has a limited duration when rehearsal is prevented. It thought that this information is lost from the short-term memory due to trace decay.
- **Evaluation –** This study can be said to be lacking in ecological validity because it is unrepresentative of real-life situations and reductionist in that it fails to acknowledge the reasons why people are likely to remember or forget words and process them through the memory system. For example, people may be more likely to remember trigrams if they resemble airport codes or their own initials, etc.

Bahrick et al. (1975) – Duration of the LTM

- **Aim** – To establish the existence of very long-term memory (VLTM) and to see whether there was any difference between recognition and recall.
- **Method** – Investigators tracked down the graduates from a high school in America over a 50-year period. 392 graduates were split into two groups and shown photographs from their high school yearbook. Recognition group: For each photo, participants were given a group of names and asked to select the name that matched the name in the photo. Recall group: Participants were simply asked to name the people in the photos without being given a list of possible names.
- **Results** – In the recognition condition, participants were: 90% accurate after 14 years of graduation, 85% accurate after 25 years, 75% accurate after 34 years and 60% accurate after 47 years. In the recall condition, participants were not so successful. They were: 60% accurate after 7 years and less than 20% accurate after 47 years.
- **Conclusion** – People can remember certain types of information for almost a lifetime. VLTM appears to be better when measured by recognition rather than recall tests.
- **Evaluation** – this study can be praised for its extremely high of ecological validity because this is something that we are likely to experience in real life. However, this study can be criticised in that it doesn't acknowledge individual differences in rehearsal and recital; e.g. it may be easier for some participants to recall the names of their classmates because they have kept in touch with them or have had personal relationships with them, or because of context cues in the environment that are associated with specific people, etc.

<u>Retroactive interference</u>

Retroactive interference occurs when new information interferes with old information. An example of retroactive interference would be learning Italian, and because you're learning Italian, you forget all of the French you already knew.

Research into retroactive interference:

McGeogh & McDonald

- **Aim** – To investigate whether interference effects forgetting in the LTM.
- **Method** – Participants were given a list of adjectives to learn, until their recall of those words was perfectly accurate. Participants were then split into six groups. Five groups were given new material which varied in similarity to the original list and asked to learn this material too. The sixth group was a control group and were not given a list of new material to learn and allowed to rest.
- **Results** – The more similar the new material was to the original, the more the recall of the original list declined. The control group of participants who had no new material to learn had the highest recall of all groups, because they had no additional material to interfere with the material they'd already learnt.
- **Conclusion** – Retroactive interference affects recall. The more similar the second list was to the first, the more it interfered with the participants' recall.
- **Evaluation** – this study can be criticised because of its lack of ecological validity; while this study can be said to fit common sense, it can be said that the lack of ecological validity stems from the length of time between the initial learning and the time of recall. For example, to heighten the ecological validity of this study, the length of time would be much longer – e.g. calling your new boyfriend by your ex-boyfriend's name. McGeogh & McDonald's study can be further criticised for being reductionist as it does not take a holistic perspective as to why we forget things and why we remember things – we are more likely to remember a list of words if we can attach meaning to them by semantically processing them as opposed to just structurally processing them.

<u>Retrieval failure</u>

The retrieval failure theory of forgetting assumes that we forget due to insufficient cues during recall. If memory cues are not available at the time of recall, this makes it more difficult to recall the information we're looking for, if at all.

There are two main types of retrieval failure: context-dependent forgetting and state-dependent forgetting.

Research into context cues and forgetting:

Godden & Baddeley (1975) – Diver's study

- **Aim** – To prove that forgetting occurs when we try to recall something in a different context to the place we learnt it.
- **Method** – Divers learnt a list of ten words either underwater or on land. Four groups were created, each with a separate condition.
- Group A) Learnt on land, recalled on land; Group B) Learnt on land, recalled underwater; Group C) Learnt underwater, recalled underwater; Group D) Learnt underwater, recalled on land.

- **Results** – Accuracy of recall for the lists of words was 40% lower in conditions were contexts were mismatched.
- **Conclusion** – There was a correlation between the similarity of context and the accuracy of recall. The more similar the context, the higher the accuracy of recall.
- **Evaluation** – This study can be criticised for lacking population validity in that it uses a sample of participants with specialist skills which may give them an unfair advantage in that their level of comfort both on land and under water is more congruent than that of those in the general population and so there are generalisability with the research sample used in Godden & Baddeley's research.

Research into state cues and forgetting:

Carter & Cassaday (1998) – Drug study

- **Aim** - To show that when your physiological/psychological state is different at recall than it was at learning, forgetting will occur.
- **Method** – Participants were given an anti-histamine for hayfever, which had a mild sedative effect, causing drowsiness. This created a different internal physiological state than the participants' normal state. The participants had to learn lists of words and passages of prose and recall them. Participants were split into four groups. Group A) Learn on drug, recall on drug; Group B) Learn on drug, recall sober; Group C) Learn sober, recall sober; Group D) Learn sober, recall on drug
- **Results** – Recall was worse when the physiological states were mismatched.
- **Conclusion** – Our state of mind affects what kind of information we recall.

Eyewitness Testimony

Eyewitness testimony refers to evidence given by a witness recounting a significant event such as a crime or a serious accident.

Post-event discussion

Post-event discussion refers to when co-witnesses discuss the event and their individual testimonies become contaminated. This is because they combine their memories with the information they gain from someone else's memories. This is one of the reasons why a jury isn't allowed to discuss a case outside of the courtroom, because perceptions become distorted by other jury members' opinions, etc. of the case.

Research into post-event discussion:

Gabbert (2003)

- **Aim** – To investigate the effect of post-event discussion on the accuracy of eyewitness testimony.
- **Method** – Participants watched a video of a girl stealing money from a wallet. The participants were either tested individually (control group) or in pairs (co-witness group). The participants in the co-witness group were told that they had watched

the same video, however they had in fact seen different perspectives of the same crime and only one person had actually witnessed the girl stealing. Participants in the co-witness group discussed the crime together. All of the participants then completed a questionnaire, testing their memory of the event.

- **Results** – Researchers found that 71% of the participants had mistakenly recalled details that they could not have seen in their video, but did pick up from the post-event discussion. In a control group where no discussion took place, 0% made mistakes in recall.
- **Conclusion** – Post-event discussion has a powerful effect on the accuracy of eyewitness testimony.
- **Evaluation** – This study can be praised because of the widespread implications its research topic has had on society and the criminal justice system, as this has led to witnesses to crime etc. In the criminal justice system being kept separate until each has given a testimony so the most valid, objective account of their experience, thus decreasing the likelihood of skewed eyewitness testimonies.

Leading questions

A leading question is a question that is phrased in such a way that it produces the desired response of the interviewer.

For example, 'how tall is the man?' would be a leading question, because it implies his height, and this would produce a response pertaining to how tall the man was. However, the question 'what was the man's height?' would not be a leading question, because it allows the interviewee to make their own decision that is not prompted by the interviewer.

Research into leading questions:

Loftus & Palmer (1975)

- **Aim** – To investigate the effect of leading questions on the accuracy of recall, and to show that eyewitness testimony is unreliable.
- **Method** – 45 volunteer participants were split into five groups and shown the same videos of car crashes/traffic accidents. After each film, the participants were given a questionnaire to fill out and were asked a critical question ('How fast were the cars going when they _____?') about what they had seen, with a different verb for each group.
- One group was asked 'How fast were the cars going when they smashed?' and the other groups were asked the same question, with the verbs 'collided', 'bumped', 'hit', and 'contacted'.
- **Results** – The more aggressive the verb, the higher the speed estimate of the group was on average. The group who were given the verb 'smashed' estimated the speed of the cars to be 41mph (the highest estimate on average), whereas the group who were given the verb 'contacted' estimated the speed to be 31mph, the lowest estimate on average.

- **Conclusion** – The way in which questions are asked affects how we perceive things, and it was concluded that eyewitness testimony is unreliable due to the fact that leading questions are used, as these distort out memory.
- **Evaluation** – a criticism of Loftus' research would be that there is research to contradict the findings; Yuille & Cutshall found that in a real-life situation, misleading information was not a factor that affected the accuracy of eyewitness testimony.

Role of anxiety on EWT

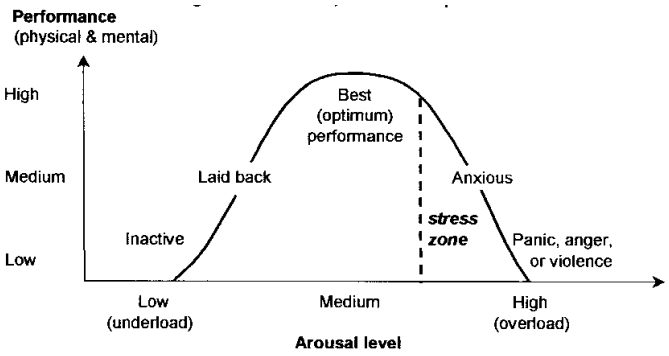
Anxiety is a state of emotional and physical arousal (e.g. worried thoughts/increased heart rate)

Although it is a normal response in some situations, anxiety can affect the accuracy of recall in Eyewitness Testimony

Yerkes Dodson Law – this suggests that there is a relationship between performance and arousal. Increased arousal can help improve performance, but only up to a certain point. At the point when arousal becomes excessive, performance diminishes.

The law was first described in 1908, when Robert Yerkes and John Dillingham Dodson discovered that mild electric shocks could be used to motivate rats to complete a maze. When the electric shock became too strong, the rats would scurry around in random directions to escape.

The experiment demonstrated that increasing stress and arousal levels could help focus motivation and attention on the task at hand, but only up to a certain point.



However, one problem with many lab-based and real life studies of anxiety is that they only compare low and high anxiety groups. Yerkes & Dodson's inverted-U theory cannot be properly tested unless there is a moderate anxiety group as well.

Parker et al. (2006) overcame this problem by interviewing people who had been affected by the destruction wrought by Hurricane Andrew in the USA in 1992. The researchers defined anxiety in terms of the amount of damage the participants suffered to their homes.

The researchers found that there was a link between the level of recall and the amount of damage/anxiety experienced.

Research into the effects of anxiety on EWT:

Negative effect of anxiety:

Johnson & Scott (1976) – Greasy Pen study

- ***Aim*** - To find out whether anxiety in eye witness testimony effected later identification;
- ***Method*** - Participants were exposed to one of two conditions:
    1) Participants overheard a lowkey discussion about an equipment failure. A confederate emerges from the room with a greasy pen;
    2) Participants overheard a heated, hostile argument between two people in the lab. After the sound of breaking glass and crashing chairs, a confederate emerges from the lab holding a paper knife covered in blood.

Participants were then asked to identify the person from a collection of 50 photos.

- ***Results*** – 49% of participants correctly recalled the confederate from 50 photos in the condition where the confederate was holding a greasy pen knife, whereas only 33% of participants correctly identified the confederate from the condition where he was holding a bloody paper knife.
- ***Conclusion*** – This study demonstrated the 'weapon-focus phenomenon, as the participants' attention was focussed on the weapon that the confederate was holding, and were therefore less likely to identify the man accurately. It was concluded that a weapon focuses the attention and narrows the focus of attention, resulting in accurate central details but less accurate peripheral details.
- ***Evaluation*** – Lab experiment, so therefore lacks ecological validity. Ethical issues are present as the participants aren't protected from psychological harm; presence of the bloody knife could trigger unpleasant memories for the participants, etc. Empirical evidence to support the study's conclusion, as ***Loftus & Burns' study (1977)*** shows that when people are exposed to anxiety provoking situations, they are less likely to recall information accurately. However, the credibility of this study can be challenged by ***Christianson & Hubinette (1993)***, who conducted research using 110 real life eye witnesses who had witnessed one of 22 bank robberies. Some participants were victims, whereas some were onlookers. They found that the victims' recall was more accurate than that of the onlookers', and their recall was accurate even after 15 months. This demonstrates that anxiety did not make recall inaccurate, and in some cases, makes recall *more* accurate.

Positive effect of anxiety:

Yuille & Cushall (1986)

- ***Aim*** – To investigate the accuracy of recall in eye witness testimonies to a real crime.

- ***Method*** – 21 eye witnesses were interviewed by the police. Twenty of these researchers were contacted four/five months after witnesses the shooting, asking them to take part in a scientific study. Of those 20, 13 agreed to take part in the study. These participants were aged 15-32; three were female, 10 were male. The victim did not participant in the study. In the interviews, two leading questions were used. Half of the group were asked if they saw ***a*** broken headlight, and the other half were asked if they'd seen ***the*** broken headlight, when in fact there was no broken headlight on the thief's car. Similarly, half of the participants were asked about ***a*** yellow panel on the car, and the others were asked about ***the*** yellow panel on the car, when in fact there was no yellow panel on the car; it was blue. Finally, witnesses were asked to rate the stress they had felt at the time of the incident, using a tailored seven-point scale. They were also asked in relation, if they had had any emotional problems at the time or since the event, such as sleeplessness. A scoring procedure was introduced to turn the qualitative data collected into quantitative data. This was carefully devised, as the researchers needed to know not only the true details of the event, but also be able to compare the results to those of the police interviews. The researchers decided to use systems of 'action details' and 'description details' to collate information from the interviews. The description details were split further into object descriptions and people descriptions.
- ***Results*** - The researchers ended up obtaining more details than the police had. They found over 1000 details in total compared to the 650 on average found by the police. However, they had asked about information the police were not interested in, such as the colour of the blanket over the body, so this does not make the police interviews unreliable. Yuille and Cutshall asked details such as these so they had more details to test for differences between the witnesses' answers. The police found 392 action details against the researchers' 552 action details. For the police, action details accounted for 60% of total details given, compared to 52% of the total details obtained by the researchers. They both, however, found the same proportion of person details (around 25%). But the researchers found almost double the number of object details the police had found, contributing 12% of the police details against their 23%. What was also found is that the misleading questions had very little effect on their recall. Ten of the eyewitnesses said that there was no broken headlight and no yellow quarter panel at all on the thief's car – which was correct to identify.
- ***Conclusion*** - It was found in the study of Yuille and Cutshall (1986) that eyewitnesses were actually very reliable. There were several factors which made this true, including correctly recalling large numbers of accurate details; almost always arguing the misleading questions and a healthy comparison between the police and researcher interviews. However, they agreed it would be hard to generalise the findings of this study, as the case (as with any other case study) is unique, and it is difficult to find a similar one naturally occurring again. Even more so, as there were only thirteen participants to this study – eight of the original witnesses either moved or did not want to take part. Yuille and Cutshall concluded that eyewitnesses were in fact not inaccurate, contrary to the findings of the vast majority of previous research

into eyewitness testimony, which had all been from laboratory experiments. The misleading questions had had little effect on the eyewitness, which again disagreed with a Loftus' theory of misleading questions.

- ***Evaluation*** - This is a field study that looks at a real incident with real eyewitnesses. It therefore has strong validity, which laboratory experiments which had been previously used to look at testimony lacked. Great care was taken when counting the details from the real incident to make sure that the witnesses' testimonies did not alter that which really happened, and this scoring procedure allowed for reliable findings. The scoring procedure also produced quantitative data from qualitative data, which requires no subjective interpretation and is easier to base conclusions upon. The study is said to lack generalisability as this was a one-off incident and a field study, and the researchers themselves have suggested that this may be a case of flashbulb memory which suggests that certain events are remembered in more detail and more permanently, explaining how those who were more involved in the even remembered more details correctly and were found to be more reliable. There were some weak points in the scoring procedure which was set up, such as with a question based on age: the thief was actually 35 years of age, and when asked to estimate the age, most eyewitnesses said he looked as though he was in his early 20s – which was marked as an inaccurate memory, even though he really did look that age.

Cognitive Interview Technique

You need to be able to:

- Describe the difference between the standard and cognitive interview technique
- Describe the four components
- Evaluate the use of the cognitive interview
- Use research to support/challenge the cognitive interview

Four components of the cognitive interview:

- Mental reinstatement of the context
- Report everything
- Change the order
- Change the perspective

Mental reinstatement & report everything: If there is consistency between the actual incident and the recreated situation, there is an increased likeliness that the witnesses will recall more information, more accurately.

Change the order & change the perspective: Information that has been observed can be retrieved through a number of different routes into an individuals' memory, therefore it is

more productive to vary these routes during questioning. Reduces witnesses' use of prior knowledge, expectations or schemas.

- Takes longer than the standard interview and requires special training of police officers.

Enhanced cognitive interview technique

Fisher et. al developed some additional elements of the cognitive interview technique to focus on the social dynamics of the interactions.

For example:

- When to establish eye contact;
- When to relinquish eye contact;
- Body language of the interviewee/interviewer.

Research support for the CIT

Bull – examined the effectiveness of the four components of the cognitive interview using university students and children. They compared results with a control group/ they found that the best approach to generating accurate information from the participants was a combination of 'report everything' and 'mental reinstatement', rather than using one component on its own.

Stein & Memon – tested effectiveness of cognitive interview in Brazil (where current method was interrogation). Women from the cleaning staff of a university were required to watch a video of an abduction. Compared to the standard interview, the cognitive interview increased the amount of correct information from witnesses.

The cognitive interview was good at producing forensically rich information (e.g. detailed description of a gun).

Sampling techniques

Random sampling – where every member of the target population has an equal chance of being selected. Sample is pulled from there (from a database, hat, etc). No researcher bias. Unbiased, representative sample of a target population. However, it can be very time consuming and is often impossible to carry out, particularly with large target populations.

Systematic sampling – Participants are selected at fixed intervals from the target population. This could be every third person on a class register, or every sixth person who

comes out of a shop. Although each person doesn't stand an equal chance of being selected, at least there is no opportunity for bias in selecting participants. Fairly cheap and fast. Eliminates the possibility of bias in selecting participants. Researchers need to ensure that the list doesn't contain a hidden order (i.e. periodicity). Sample may not be representative.

Opportunity sampling – when the researcher takes a sample of people who are available to take part, who represent the target population. Occurs in field experiment. For example, if we wanted to test helping behaviour, the best way to do so would be to conduct research in a real-life setting. Quick, easy & cheap in comparison with other methods. As it only uses people who are available at the time, the sample may not be representative of the target population. May have researcher bias.

Stratified sampling – Provides a sample that is in proportion, in the relevant characteristics, to the target population. Takes the piss. Census data is often used in stratified sampling. Provides a representative sample. Time consuming and expensive.

Volunteer sampling – This is when the public self-appoint themselves to be part of research experiment. Essentially the same as opportunity sample, but the participants select themselves.