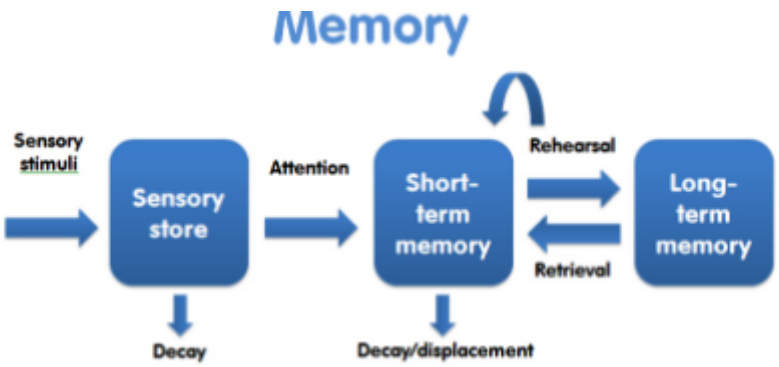
The Guide to the Cognitive Psychology- Essentials

	Topic Checklist	Read notes	Made notes	Practised q's/essays
1	The multi-store model of memory (Atkinson and Shiffrin, 1968), including short- and long-term memory, and ideas about information processing, encoding, storage and retrieval, capacity and duration.			
2	The working memory model **(Baddeley and Hitch, 1974).**			
3	Explanation of **long-term memory** – episodic and semantic memory **(Tulving, 1972).**			
4	Reconstructive memory **(Bartlett, 1932)** including schema theory			
5	Individual differences in memory ● Memory can be affected by individual differences in processing speed or by schemas that guide the reconstructive nature of memory. ● Autobiographical memory is by nature individual.			
6	Developmental psychology in memory, including at least one of these: ● Sebastián and Hernández-Gil (2012) discuss developmental issues in memory span development, which is low at 5-years old, then develops as memory develops, up to 17-years old. ● Dyslexia affects children's memory, span and working memory which can affect their learning. ● The impact of Alzheimer's on older people and the effects on their memory.			
	2.2 Methods Experiments			
7	Designing and conducting experiments, including field and laboratory experiments.			
8	Independent and dependent variables.			
9	Experimental and null hypotheses.			
10	Directional (one-tailed) and non-directional (two tailed) tests and hypotheses.			
11	Experimental and research designs: repeated measures, independent groups and matched pairs.			

12	Operationalisation of variables, extraneous variables and confounding variables.			
13	Counterbalancing, randomisation and order effects.			
14	Situational and participant variables.			
15	Objectivity, reliability and validity (internal, predictive and ecological).			
16	Experimenter effects, demand characteristics and control issues.			
17	Quantitative data analysis ● Analysis of quantitative data: calculate measures of central tendency, frequency tables, measures of dispersion (range and standard deviation), percentages. ● Graphical presentation of data (bar graph, histogram).			
18	Decision making and interpretation of inferential statistics ● Non-parametric test of difference: Mann-Whitney U and Wilcoxon. ● Probability and levels of significance ($p \leq .10$ $p \leq .05$ $p \leq .01$). ● Observed and critical values, **use of critical value tables** and sense checking of data. ● One- or two-tailed regarding inferential testing. ● Type I and type II errors. ● Normal and skewed distribution.			
19	Case study of brain-damaged patients, including Henry Molaison (HM) and the use of qualitative data, including strengths and weaknesses of the case study.			
	2.3 Studies			
20	Classic study **Baddeley (1966b)** Working memory model: The influence of acoustic and semantic similarity on long-term memory for word sequences.			
21	Contemporary Study: **Sebastián and Hernández-Gil (2012)** Developmental pattern of digit span in Spanish population.			
22	**Key question** How can knowledge of working memory be used to inform the treatment of dyslexia?			
23	**2.5 Practical investigation** An experiment to look at acoustic similarity of words and the effect on short-term memory.			
	Write up the procedure, results and discussion section of a report.			

CONTENT in Cognitive PSYCHOLOGY

TOPIC 1: Multi-Store model - Atkinson & Shiffrin (1968) (Link to quizlet)



Definitions

Encoding = Transforming sensory experience into a form that can be held/used by the memory system

Capacity = The amount of information that can be stored by the memory system

Describing the 3 parts:

Sensory Register

AO1		AO3 Research - Strength	AO3 Research - Weakness
Capacity			
Duration	A few hundred milliseconds	Sperling (1960) link	
Encoding	According to the sensory experience		

Short-Term Memory

AO1		AO3 Research - Strength	AO3 Research - Weakness
Capacity	7+/-2 chunks of information	Miller (1956)	
Duration	Unrehearsed info held for up to 30 secs before being lost	Peterson & Peterson (1959)	
Encoding	Acoustically		

Long-Term Memory

AO1		AO3 Research - Strength	AO3 Research - Weakness
Capacity	Unlimited	Linton (1976)	
Duration	Potentially a lifetime	Bahrick (1975)	
Encoding	Semantically	Baddeley (1966b) p.76	

Other Assumptions:

AO1		AO3 Research - Strength	AO3 Research - Weakness
Unitary	There is only one store for each (SR, STM & LTM)	Glanzer & Cunitz (1966) Brain Scans Clive Wearing & HM (STM intact but no new LTM)	KF – STM visual better than verbal Clive Wearing – LTM skills unaffected (piano playing)
Linear	All info must pass through in a set order	Brown-Peterson Technique – Rehearsal prevents info going into LTM	KF – Could make LTM though STM affected Flashbulb memories

AO3 + STRENGTHS

1. **Lab experiments** such as Glanzer and Cunitz (serial position effect) support the model as it shows recency (evidence for duration of STM) and primacy (role of maintenance rehearsal).
2. **Other Lab experimental** evidence from Miller (digit span test 7+/- 2 items or chunks, Peterson & Peterson (duration STM upto 18 – 21 seconds)
3. Support from **Case studies** such as amnesia cases where patients have lost their LTM or STM abilities. EG. Clive Wearing case study shows damage to hippocampus prevents LTM formation; HM showed damage results in no transfer to LTM while STM intact:
    a. HM had brain surgery to his hippocampus, which left him unable to recall things that had to just happened. It was concluded that he could not move memories into LTM. Hippocampus may be an area for STM

AO3 - WEAKNESSES:

1. Too oversimplified
2. Tests are artificial (Lab experiments; Digitspan test) lacks mundane realism and ecological validity.
3. WMM shows STM more complex and cannot explain dual task experiments.
4. Cannot explain why some things are easier to recall or *HOW* information is processed.

Practice Questions on the MSM:

1. Describe 1 factor that a definition of cognitive psychology might include (3)

2. The following questions relate to the three stores: sensory memory, STM and LTM
   a) Which of the three stores has an unlimited capacity? (1)
   b) which of the three stores is modality specific (to do with encoding)
   c) which of the 3 stores lasts about 30 seconds (1)
   d) Which of the 3 stores uses a mainly semantic mode (1)

3. Explain the differences between the three stores in the multi store model (6)

4. Research has suggested that the encoding and capacity of short-term memory are different
   from the encoding and capacity of long-term memory.
   Explain what is meant by encoding. (2 marks)

5. Jamie wanted to contact his doctor. He looked up the number in his telephone directory. Before he dialled the number, he had a short conversation with his friend. Jamie was about to
   phone his doctor, but he had forgotten the number.
   Use your knowledge of the multi-store model to explain why Jamie would not remember the doctor's number. (4 marks)

6. The multi-store model of memory has been criticised in many ways. The following example illustrates a possible criticism. Some students read through their revision notes lots of times before an examination, but still find it difficult to remember the information. However, the same students can remember the information in a celebrity magazine, even though they read it only once.
   Explain why this can be used as a criticism of the multi-store model of memory. (4 marks)

7. Assess 2 theories of memory in terms of the methods used to get evidence for them (4)

8. Evaluate 1 theory or model of memory in terms of 2 of the following criteria: methodological issues, ethical issues, alternative theories, research evidence for contradictory claims or its practical applications. (4)

9. Using evidence, evaluate the multi store model as an explanation of how we remember (12)

TOPIC 2: Working Memory Model Baddeley & Hitch (1974) (Link to quizlet)

(There's more to STM…)

AO1			AO3 Research - Strength	AO3 Research - Weakness
Central Executive		- **supervises and coordinates** the other **subsidiary** systems -**decides which information is attended to** and **which parts of the working memory to send that information to** be dealt with. -**very limited capacity**		Eslinger & Demasio (1985) (see google slide 5)
Phonological Loop	Phonological Store	-olds spoken info for about 1.5 to 2 secs. - Preserves the order of information -Written words must be converted to spoken words to enter phonological loop.	Paulesu et al. (1993) p.98 supports articulatory loop separate from phonological store	
	Articulatory Loop	used for words heard or seen, silently repeated (sub-vocal) – (inner voice)		
Visuo-Spatial Sketchpad		Deals with what info **looks like** (visual) and **how it is laid out** (spatial) E.g getting from one room to another or counting the number of windows in your house.	Supporting 2 separate slave systems: Baddeley & Hitch Dual Tasks p.98	Darling et al. (1972) p.99 (visuospatial isn't one unit) Liberman (1980) Blind people have spatial awareness. (see google slide 4)

AO3 + STRENGTHS:

1. **Dual tasks: Evidence for separate processing in memory:** Baddeley found that people could NOT do two tasks that used visual or auditory processing as well as they could do two tasks, one involving visual processing and one processing sounds, so he came up with the idea of one component dealing with sound and one dealing with vision. Central executive explains how the processing is controlled.

2. **Case study evidence:** Williams syndrome where sufferers have normal language ability BUT impaired visual ability: showing evidence for two separate processing areas for visual and verbal information.
3. Highlights that memory is an active process rather than being passive.
4. It has a practical application to the real world- dyslexia can affect either the phonological loop or the visuo-spatial scratchpad and therefore strategies can be put into place to help with reading and writing.
5. Evidence of separate processing : Klaver and Zhao: visual information disrupted with visual interference task, same with spatial and spatial interference tasks.

AO3 - WEAKNESSES:

1. It only looks at short term memory- there is no explanation about how information is transferred between short and long term memory.
2. It has highlighted the role of sensory memory but ignored most of the senses- e.g- touch, smell, taste
3. Very little is known about the decision making activities of the central executive.

PRACTICE EXAM QUESTIONS ON THE WMM:

1. Tick **two** of the boxes below to indicate which of the following are features of the working memory model. (2 marks)

   A Serial position curve
   B Incidental learning store
   C Central executive
   D Phonological loop

2. Three components of the working memory model are the central executive, the phonological loop and the visuo-spatial sketchpad.
   Briefly outline **each** of these components.

   Central executive
   Phonological loop
   Visuo-spatial sketchpad

   (6 marks)

3. An experiment was carried out to investigate the working memory model.
   One group of participants was asked to carry out two visual tasks at the same time. A different group of participants was asked to carry out a visual task and a verbal task at the same time. The results showed that the participants who carried out two visual tasks

at the same time performed less well on the tasks than participants who carried out a visual task and a verbal task at the same time.

Use your knowledge of the working memory model to explain this finding. (3 marks)

4. Describe the working memory model of memory (6)

5. Explain 2 reasons for accepting the WMM as a model of memory and 2 reasons for rejecting it (8)

6. A study was carried out using two lists of 15 words. One list had words of three letters that sounded alike (eg: can; man; ran) and one list had words of three letters that did not sound alike (eg: ben; wam; moo). One set of ppt's had the first list to read through for 10 seconds. After a gap of a few seconds, they recalled as many words as they could from the list.

    a) Was this experiment about STM or LTM and why? (2)
    b) Which of the lists would you expect to show better recall and why (using working memory model in your explanation) (4)

7. A brain scan shows that one area of the brain is more active when a person is doing a verbal task. However, when this person is doing a visual task, a different area of the brain is more active.

    (a) Explain how this could relate to the working memory model. Refer to different parts of the working memory model in your answer. (4 marks)

    (b) Give an example of an appropriate verbal task and an appropriate visual task which could be used during the brain scan.

    Verbal task

    Visual task

    (2 marks)

Tulving (1972) Types of LTM Summary Table

TOPIC 3: Tulving's LTM (Link to Quizlet)

AO1	AO3 Strength	AO3 Weakness
Episodic -**Mental diary** **-Time and context references** -Input is continuous - Retrieval using cues which are encoded at the point of learning -Forgetting due to retrieval cue failure -Memory trace can be transformed/changed Examples include autobiographical memories and flashbulb memories. -autobiographical record of personal experiences. (Birthdays, holidays etc). - the strengths of the memory is influenced by emotion.		
Semantic **-Mental Encyclopaedia** **-Independent of time referencing** **-Input can be fragmentary** -Retrieval possible without learning -Not cued retrieval (senses will not trigger a memory) -Memory trace is more robust and less susceptible to transformation -contains all knowledge, facts & meanings. - Semantic memories are easier to recall due to the amount of links of several interrelated memories (not a single memory) associated in different brain areas.	The Classic Cognitive Study by **Baddeley (1966b)** also supports the existence of semantic memory. Baddeley found that participants struggled with word lists linked by a common theme, which suggests the semantic similarity confused LTM. Unrelated word lists were not confusing. This suggests at least part of LTM works semantically.	
2 separate stores – episodic & semantic	Butterworth (2002) – see slide 10 on Tulving google slide in shared folder. The deterioration of dementia patients also suggests that episodic and semantic memory are separate because episodic memory is lost first and semantic memory last. Tulving carried out a case study of Kent Cochrane (K.C.) who suffered brain damage in a motor accident in 1981. K.C.'s	It seems as if semantic and episodic memory both rely on each other and might not be all that separate. For example, if you learn that you husband or wife is unfaithful (episodic memory) you will probably trust them less (semantic memory) – which suggests that the two are linked. **Squire & Zola (1998)** put this to the test. They examined

	hippocampus was destroyed in the injury and he lost all episodic memory. However, K.C. could still remember things he had learned in books, like dates or definitions (such as the difference between a stalagmite and a stalactite) - in other words, his semantic memory was still intact. This is evidence for a difference between episodic and semantic memory.	children with amnesia (who never got a chance to acquire a semantic store in the first place) and adults with amnesia (who had semantic and episodic memories from before suffering brain damage). The participants' episodic and semantic memories seem to be equally impaired which supports the idea that the two memory functions are linked or even the same thing.

AO3+ STRENGTHS

1. Neurophysiological evidence of brain damage (accident or disease) to those areas where episodic memories are affected has shown two memory systems present. (HM could not lay down new semantic or episodic memories). Episodic memories affected with damage to prefrontal lobe damage.

2. KC. impaired episodic information (could not form any personal memories) but semantic memory intact. Evidence two types LTM

AO3- WEAKNESSES

1. Because both LTM stores work together it is difficult to conduct research because they cannot be studied in absolute isolation.
2. CW has impairment to episodic and semantic memories but could remember rehearsed / practical memories(playing the piano) suggesting there is another LTM for rehearsed memories.

EXAM QUESTIONS ON TULVING'S LONG-TERM MEMORY

1. Decide which of the following 'memories' are episodic and which are semantic:

- Recall of my first visit to a new dentist
- Recall of the king of England at the time of Oliver Cromwell
- Recall of the French word for house
- Recall of what I did yesterday afternoon
- Recall of how to form the present tense in Latin of a verb with 'are' (5 marks)

2. What are two differences between semantic and episodic memory when it comes to retrieval? (2 marks)

3. Evaluate Tulving's ideas about episodic and semantic memory (12 marks)

TOPIC 4: Reconstructive Memory (1932) (Link to Quizlet)

AO1		AO3 Research - Strength	AO3 Research - Weakness
Perception	Perception of object determines how it is remembered.	Ppts assign verbal labels to objects/shapes they see. These names affected the representation they had of the object.	
Imaging	'Effort after meaning' = ppts connect a stimulus to their own experience/interests	Ink Blots	
Remembering	Memory is reconstructed each time it is recalled. IT is distorted, transformed and simplified.	War of the Ghosts story – (see google slide 12)	War of the Ghosts has little relevance to everyday memory. Bartlett did not follow standardised procedures when students were reproducing the story. There was no scoring system to measure changes in words during recall. Could be seen as unscientific and subjective
Schemas	**Parcels of stored information about a specific event or object.** Each has some fixed info and some variable info. We use these schemas **based on our past experiences** when we recall an event to fill the gaps (**confabulate**). **Memories are not a blank tape.**	Loftus & Palmer (1974) Google Slide Bransford (1979)	Steyvers & Hemmer (2012): Bartlett over emphasises that memory is flawed & inaccurate: Experimental research deliberately induce errors in recall. In a real context, without manipulated material, schematic recall can be accurate.

AO3+ STRENGTHS:

1. There is much evidence for the theory (Brandsford & Johnson, including work of Loftus on EWT.
2. The theory can be tested experimentally because the IV can be operationalised and measured to establish cause and effect.

AO3- WEAKNESSES

1. Bartlett's story did not make sense so the ppts could have altered it because of demand characteristics. However Bartlett used a culturally different on purpose to test his theory.
2. The theory describes memory as reconstructive but does not explain how it is processed or how schemas are aCquired in the first place.

POSSIBLE EXAM QUESTIONS RECONSTRUCTIVE MEMORY

1. Evaluate the significance of reconstructive memory as a theory of everyday memory, using your knowledge of Bartlett's (1932) War of the Ghosts study. (8)

2. Tim came home from school and said to his Mum: 'In our lesson today, the teacher read out a story called the War of the Ghosts. Then we all had to write down what we could remember of the story. It was very difficult. I wrote that the two boys went fishing in a fishing boat, but really one of them went to a battle in a canoe!!'

3. Discuss what Bartlett's theory and research into reconstructive memory and at least one theory of language and thought tell us about the possible relationship between language and thought. Refer to Tim's conversation with his mother as part of your answer. (8 MARKS)
4. You are sitting in a lesson and suddenly hear a loud explosion outside. You run to the window with all your classmates and see a large cloud of smoke and people running around. You are questioned the next day by the police about what happened.

   Using your knowledge of psychology, explain why your recall of the event might differ from others who saw the same incident. (4 marks)

TOPIC 5 : Individual Differences : See other notes throughout (Key study, Seb Hern-Gil)

- Processing speed: How long people take to process and record information, i.e writing notes from the board. This is likely due to processing speed and short term memory capacity. Both of these things are affected by age, younger children have a shorter digit span than older children, suggesting memory capacity increases with age. (Sebastian and Hernandez-Gil, 2012).

- Schemas: experience based perception affecting how things are remembered. Therefore this affects how individuals will recall information.

- Episodic memory (individual memory of events)

- Autobiographical memory, a combination of episodic, personal experiences, specific objects, people and events experienced at particular times and places.

Dyslexia

- Dyslexia is Specific Learning Difficulty (SpLD)
- Dyslexia affects the way information is processed, stored and retrieved.
- Specifically focussed around reduced phonological loop capacity
- Definition: a general term for disorders that involve difficulty in learning to read or interpret words, letters, and other symbols, but that do not affect general intelligence.

TOPIC 6 Developmental Psych: See notes on S H-G too.

Alzheimer's; This is optional. You do not have to learn this, is you learn about Dyslexia.

	AO1	AO2 - Application
Symptoms & Features & Prevalence	-affects 850,000 people in the UK. It is set to rise to 1 million people by 2025. -The most common cause of dementia is Alzheimer's. - usually affects the elderly but there are 40,000 people under 65 in the UK with dementia. - common symptoms of dementia include: -Loss of memory –confusion -Depression -Mood swings -Exhaustion -Semantic memory seems to be lost separately, because sufferers may recognise a friend but forget their name. -Dementia involves loss of memory but sufferers don't lose *all* their memories. They often lose memories of events from in their past.	-Schmolck et al's study into semantic LTM applies to this, because they found semantic LTM is stored in a different part of the brain. -Tulving's ideas about episodic LTM apply to this. More recent episodic memories are lost first, but sufferers often keep memories from their youth or childhood right to the end.
Diagnosing Dementia	**Prof. Bruno** at Liverpool Hope University has developed a **test to diagnose dementia before the effects start to show themselves.** His patients do a word recall test from a list of 15 words.	Displacement theory applies Prof. Bruno's test. The primacy effect means the early items in a list are well-rehearsed and go into LTM, making them easy to recall. Middle items are displaced because there is

	Normal memory should recall many of the first 4 words from the list but **some patients recalled words from the middle of the list instead.** These patients turned out to be much more likely to develop dementia. Bruno makes a distinction between "healthy" memory loss from old age and "**pathological**" memory loss that his test seems to detect. Prof. Bruno hopes tests like this will help pick up a warning sign of dementia before sufferers realise there is anything wrong with their memories.	no time to rehearse them. This happens because, according to the Multi Store Model, STM has a maximum capacity of 9 items. If a person doesn't experience displacement, it means that they weren't rehearsing the primacy items. This suggests a problem with LTM which Prof. Bruno calls "pathological".
Cognitive Stimulation	-works best for patients in the mild to moderate stages of dementia. It can slow down the progress of the disease as well as reduce stress and loneliness. Variations of Cognitive Stimulation involve using music or introducing patients to pets. A charming version of this is in Seattle where the 400 residents of Providence Mount St Vincent **Residential Home** ("The Mount") meet up with 150 kindergarten children 5 days a week. Staff report that the residents become lucid when they play with the children and join in their games and storytelling. They refer to this as "***moments of grace***".	- often starts by focussing on early memories from childhood and young adulthood. Most dementia sufferers **will be able to access these episodic memories**. The idea of Reconstructive Memory can be applied to this therapy. If memories are reconstructed using schemas, anything that reinstates schemas will help with memory. A lot of elderly people find themselves cut off from familiar things. The kindergarten at The Mount may remind sufferers of when they had children or when they were children themselves, activating schemas.
Validation Therapy – e.g. Hogeway Village	**Hogewey** is a care home in the Netherlands for elderly with extreme dementia. Most are over the age of 80. Hogewey is unusual because the patients live nearly normal lives there. There are no locked doors and residents (they are never called 'patients') are free to wander about: join clubs, go for beauty treatment, perform music, play bingo, take walks. Different parts of the village look like different types of homes – **upper class** with lace and chandeliers, **cultural** with books and art, **urban** with pop radio and cafes. All the waiters and shopkeepers are actually nurses and orderlies.	Reconstructive Memory can be applied to the dementia village at Hogewey. Each of the different parts of the village (cultural, urban, etc) corresponds to a different set of schemas. Someone who grew up in a wealthy home will have schemas corresponding to the high class part of Hogewey and find it easier to remember things like episodes and procedures. This makes it possible for them to be active and fit. This is in contrast to normal hospitals which are strange places for most patients, who take to their beds and decline. Tulving's ideas of episodic and semantic LTM also apply to Hogewey. Because recent episodic memory is

	Rather than continually being told they are wrong and deluded about things, the residents are allowed to live out their imagined life. This reduces stress and keeps the residents active, so that they need less medication and are more fit than most dementia sufferers.	lost, sufferers often “live in the past” and find their present situation distressing. Staff do not contradict the residents but “go with” their beliefs and behaviour instead.

METHODS

TOPIC 7: Lab and Field Studies

Lab studies: LINK

AO1 - Facts and Features	AO3 Evaluation
Standardised procedures	Can repeat and test results for reliability
Objective Measures	Increase validity
Controls extraneous variables	increase internal validity
Manipulates IV and test DV	Establish cause and effect
Reduces test to one IV	Reductionist, may miss other causes
Uses artificial tasks	Lacks mundane realism
In an artificial setting	Lacks ecological validity
Often has sampe from one place/country	Can be hard to generalise to other cultures
Demand Characteristics/Researcher Bias	Lowers internal validity

Field Studies

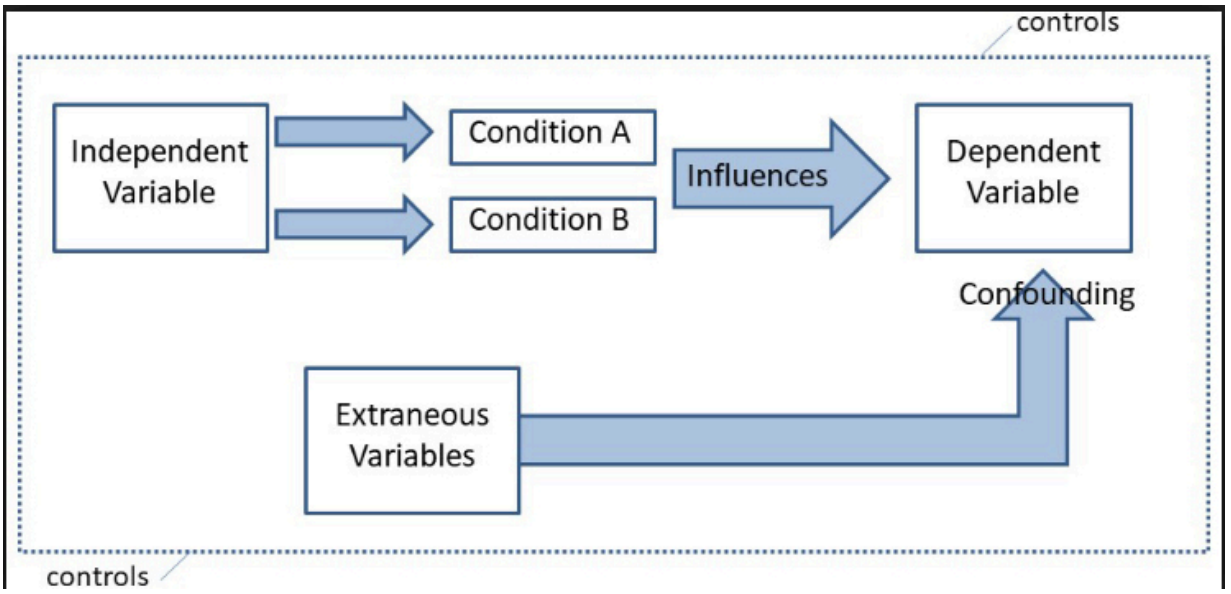
AO1 - Facts and Features	AO3 Evaluation
Standardised procedures	Can repeat and test results for reliability
Objective Measures	Increase validity
Controls ***some*** extraneous variables	less internal validity than lab expt but more than observations

Manipulates IV and test DV (observations don't have Iv and DVs, field expts do - like Sebastian Hernandez-Gil)	Establish cause and effect
Reduces test to one IV	Reductionist, may miss other causes
Uses artificial tasks	Lacks mundane realism
In a natural setting	High ecological validity
Often has sample from one place/country	Can be hard to generalise to other cultures
Lower in demand characteristics	If ppt unaware of expt due to natural setting

Comparing Lab & Field:

	LAB EXPERIMENTS	FIELD EXPERIMENTS
STRENGTHS	Controlled setting produces high internal validity Easy to control extraneous variables and measure DV	Realistic setting/task may have high ecological validity Participants may be less likely to show demand characteristics
WEAKNESSES	Artificial setting/task may lack ecological validity Participants may show demand characteristics	Uncontrolled setting produces low internal validity Hard to control extraneous variables and measure DV

TOPIC 8 : IVs & DVs LINK



DV (Dependent Variable):

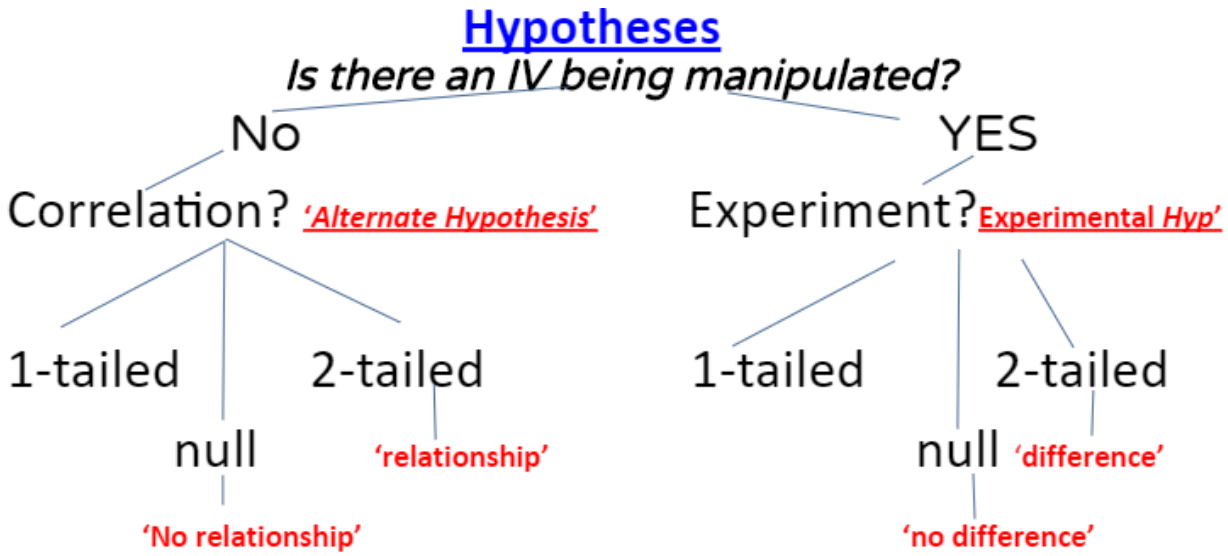
You choose something to **measure**. e.g. what affects exam results?

IV (Independent Variable): Think of all the things that affects exam results. **Isolate** one of these - that is your IV. e.g. amount of sleep. You can choose 2 **conditions** for your groups e.g. 10 hours sleep vs 3 hours sleep

Extraneous variables: All the other things that affect exam results need to be **controlled** e.g. revision/teachers/age

Confounding variables: Any variables that affect your DV that you did not or **could not control** in the expt.

TOPIC 9 & 10 : Experimental and null hypothesis. One-tailed/Two-tailed



- ***Include both co-variables OR IV & Dv***
- ***Operationalise both***

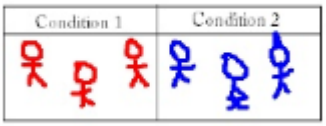
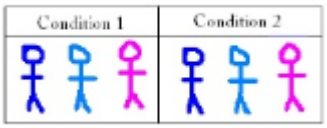
Experimental Hypothesis:

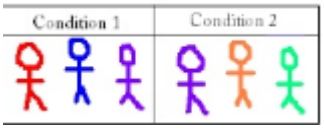
a) **One-tailed** (Has a direction): "students who sleep for 10 hours will have higher exam results than students who sleep for 3 hours"

b) **Two-tailed** (Has not got a direction): "***There will be a difference*** in students' exam results between the students who sleep for 10 hours and the students who sleep for 3 hours"

c) **Null Hypothesis:** "***There will be NO a difference*** in students' exam results between the students who sleep for 10 hours and the students who sleep for 3 hours"

TOPIC 11 : Experimental Research Designs LINK

AO1	AO3 Strengths	AO3 Weaknesses:
Independent measures design; participants only take part in one condition of the IV. Sometimes a researcher *has* to use independent groups design. For example, if the IV is naturally-occurring, like "gender", and it's just not possible to assign someone to both conditions. "Quasi-Experiments" 	1. No **order effects**: As participants only take part in one condition (e.g. in the hypnosis or no hypnosis condition) they do not get any practice between conditions. So there are no **practice** or **fatigue effects**. 2. **Demand characteristics** are less of a problem as they are less likely to guess the aim of the research if they only take part in one condition	1. **Individual differences** between groups: The main problem with independent measures designs is that the groups might not be the same to begin with. 2. You need a lot more participants to carry out independent groups design: a complete set of people for each condition. That can be time-consuming and (if you are paying them to take part) expensive.
Repeated measures design: all participants take part in all conditions. 	No **individual differences** between groups. In the repeated measures design as the participants in each condition are the same people there are no individual differences between groups (in this case pain levels).	**Order effects**: If participants take part in both conditions then one of two things can happen. If they so a similar activity twice then they can get better at the second activity because they have had practice. This is known as **practice effects**. Similarly if they do a similar activity twice then they may perform worse the second time because they become bored or tired by the task. This is known as **fatigue effects**. **Demand characteristics** may be a problem as they are more likely to guess the aim of the research if they take part in both conditions Different tests may be needed (one of the tests might be 'harder' than the other)
Matched pairs design	Unlike an independent measures design there are **no**	Matched pairs designs can be time consuming and

This is a form of independent measures design. If we cannot use a repeated measures design it is sometimes possible to match every subject in one group with a very similar person in the other group. Participants can be matched on variables, which are considered to be relevant to the experiment in question. For example, pairs of participants might be matched for age, gender and their scores from intelligence or personality tests. How they are matched depends on what is being studied. 	**individual differences** between groups. This is because they have been matched to their conditions. So we know that the groups are very similar before we start. No **order effects**: no **practice** or **fatigue effects**. The same test can be used **Demand characteristics** are less of a problem as they are less likely to guess the aim of the research if they only take part in one condition	expensive. More participants are required

TOPIC 12: Operationalising of variables, extraneous variables, confounding variables

Operationalising examples:

The variable	The operationalised variable
Aggression from children in a playground	The frequency of aggressive acts such as hits, shouts and pushes observed in a playground
Problem solving ability	Time taken to complete a puzzle
Older adults	Individuals aged 60 years old or more
Stress	Cortisol level

Think: What would you write as the title in the results table? - That is operationalised.

Extraneous variables:

- Any variable, other than the IV, that may affect the DV.
- These can mask the effect of the IV on the DV.
- Researchers should eliminate or minimise their influence.
- They can be random factors that affect any condition of the IV.
- e.g. There is noise from roadworks throughout the memory task

Confounding variables:

- a variable other than the IV that affects the DV.
- The confounding variable, however, will affect only one condition of the IV e.g. there is noise from roadworks during only one of the conditions.

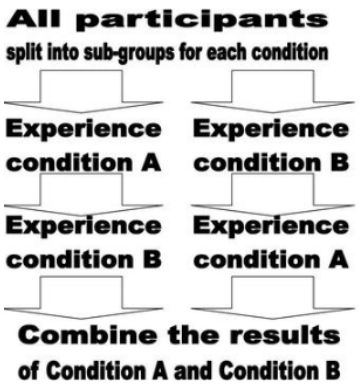
TOPIC 13: Counterbalancing, randomisation and order effects

Order effects: a confounding variable introduced because the participants experience every condition of the IV.

- Fatigue effects are order effects where the participants' performance goes down through boredom or exhaustion
- Practice effects are order effects where the participants' performance goes up through familiarity with the test
- Make it much more likely the participants will figure out the purpose of the experiment and that introduces demand characteristics: the participants behave unnaturally because they are trying to do what they think the researchers want them to do.

Randomisation means determining which condition a participant experiences by random chance (tossing a coin, drawing a card). Some people might do the experimental condition first, then the control condition; other people might do it the other way round.

Counter-balancing is similar, but there's no randomness. Just split the group into sub-groups: one sub-group does the experimental condition first, then the control; the other sub-group does it the other way round.



TOPIC 14: Situational and Participant Variables

These are examples of extraneous variables and can be confounding if not controlled.

Participant variables

differences between the participants themselves. Obviously, everyone's different and most participant variables (height, birthday, number of siblings) don't make much difference to a study, but others (intelligence, level of education, personality) might make a big difference.

Situational variables

changes that occur in the situation the participants are in. This includes things like the weather and heat, how crowded the room is and the time of day as well as "outside interference" like interruptions or distractions (a fire alarm, for example).

Experimenter effects

changes the experimenter makes, usually without realising it, by treating some participants differently from others. It's a form of bias and it often involves encouraging participants to act or respond in a particular way through body language or tone of voice.

TOPIC 15:Objectivity, reliability and validity (internal, predictive and ecological).

Objectivity

- Science tries to be objective. This means that scientists try to stay detached from what they are studying and don't let their feelings or emotions affect their conclusions. One way it does this is by focusing on quantitative data.

Psychologists often decide how scientific a piece of research is by asking whether it is reliable and whether it is valid.

Reliability

- Science tries to be **replicable**.
- Scientists can repeat your research and check your results; this is called the peer review process and it is part of what makes science objective. They can also use your techniques to build on your research.
- A really scientific procedure ought to work the same way every time is used.
- **A reliable procedure should always work the** same way whenever you use it, and should produce the same results every time it's used on the same people.
- For example, an interview is reliable if you always ask the s**ame questions, in the same way and in the same order.** If you change the way you word the questions for certain people, or even just change your tone of voice or body language, you might make the interview unreliable.
- research is reliable if it is well-designed with **standardised procedures** that can be replicated accurately. It is unreliable if the researchers have to make on-the-spot decisions, use their imagination or bring personal bias into the study.

Even if research is reliable, that doesn't mean it has to be valid...

Validity

- A really scientific theory ought to make successful **predictions** about what will happen in real-life situations.
- A valid procedure gives true results because **it's studying what it's meant to be studying.**
- For example, a valid IQ test really will measure your intelligence and only your intelligence. A lot of IQ tests are invalid because you can get extra points for being

well-educated, having a lot of general knowledge or coming from a certain background – things that don't necessarily have anything to do with intelligence.
- research is valid if the behaviour being studied is natural and realistic and not influenced by outside factors. Research becomes invalid (and un-scientific) if there are lots of other possible explanations for the results that are just as plausible as the one being offered.

- **Internal Validity** is whether the study is properly controlled; if it lacks internal validity, then outside forces (extraneous variables) may be causing the results instead
- **External validity** is whether the study is natural and realistic; if it lacks external validity, it the results cannot be generalised to other settings or situations
- **Predictive Validity**, which is whether the study predicts what will happen in similar situations in the future; if it lacks predictive validity, the circumstances of the research are unlikely to happen again

A valid test automatically has to be reliable… but just because a test is reliable, that doesn't automatically make it valid.

TOPIC 16: Experimenter effects, demand characteristics & control Issues

Topic 17: Quantitative Data Analysis

TOPIC 18: Statistics: Mann-Whitney & Wilcoxen, Distributions

TOPIC 19: Case Studies inc. HM

HM - Case Study - named in your spec - need to learn!

APRC

Aim: To investigate the extent and nature of H.M.'s memory deficits and how they relate to his brain damage.
Sample: One adult male, **H.M.**, aged 27 at the start of the first case study. H.M. suffered from both retrograde amnesia (loss of memories from before his brain operation) and anterograde amnesia (loss of memories after his brain operation).

Procedure:
In the 1962 case study, Milner asked H.M. to copy a five-pointed star by drawing between the lines of a template. However, H.M. could only see the reflection of the star and his hand in a memory. This made the task difficult. As with the maze task, Milner asked H.M. to re-attempt the task many times, to see if he grew more skilled at the procedure even though he didn't remember doing it before.

Results: Over 252 attempts, H.M. never showed any improvement in the maze task. However, H.M.did show improvement in the star-tracing task, making fewer mistakes on each attempt.

Conclusion: H.M. did not improve at the maze task because, when he figured out the correct route through the maze, he immediately forgot it. However, he got better at the star task, despite forgetting his previous attempts. Later in life, he learned to play tennis. This suggests

H.M. remembered *skills* even if he forgot *events*.

AO1 information

Henry Molaison suffered from epilepsy caused by a head injury when he was seven. As he grew up, his seizures got worse, until surgery was his only hope for relief.The pioneering brain surgeon **William Beecher Scoville** proposed to remove the part of the brain that was causing the seizures. Henry agreed to the operation. In 1953, when Henry was 27, Scoville performed bilateral medial temporal lobe resection. This involved removing part of Henry's temporal lobe, including parts of the hippocampus and amygdala.

Henry had severe anterograde amnesia.
He lost the ability to form new memories (STM couldn't go into LTM) he forgot everything that happened to him in a matter of seconds.

Brenda Milner conducted a case study on Henry Molaison and compared her findings with Dr Scoville's medical procedures THE H.M. CASE STUDIES

Case studies AO1 & AO3

- Case studies are used in psychological research when psychologists want or need to study a specific individual or group.
- The case being studied occurs naturally, and the psychologist has no control over the situation. A case study is used, as the researcher cannot control any variables, he simply has to observe and study.
- Case studies allow a researcher to investigate a topic in far more detail than might be possible if they were trying to deal with a large number of research participants
- Case studies use a mixture of qualitative data (observations) and quantitative data (numerical data) i.e. triangulation
- Case studies are not always able to get full informed consent
- Unique

AO3+

- Data tends to be more valid, as it is in depth and focuses on real experiences in a real situation
- This is a valuable research method because it may be the only way to gather rich, detailed, qualitative information in context and with meaning for those concerned
- Sometimes it is the only way to be gathering data about a particular issue, for example, a child who has been deprived of parenting (you cannot set up an experiment to test such a thing)
- Application: what can it be used for?

AO3-

- They lack generalisability because they are about one individual (or small group) only, so they are specific rather than in general

- The data gathered cannot be applied to any other case, individual or group, as the data is unique
- They are hard to replicate, so cannot be tested for reliability
- Data may be subjective, and therefore cannot be used to build a body of knowledge.

TOPIC 20: CLASSIC STUDY: Baddeley 1966b 'encoding in LTM' Link to quizlet

AO1	AO3+/AO3-
Aim: To see whether LTM encoded acoustically or semantically.	Useful to understand how LTM encodes as used in schools -mindmaps for revision, useful for certain professions who need to use LTM
Mixed men and women from APRU subject panel. Approx 20 per group.	Mainly students: lowers generalisability to wider population because...
4 lists, one per group, from Expt 1. Method as Expt 2Y: four lots of (presentation/distraction/test)	Improved the study to create expt 3 : distraction test increased internal validity - it looked at LTM as STM did not have an effect. The application of finding out that a distraction task was necessary for words to enter LTM has been useful in schools - spaced learning - repeating content/testing content every few lessons
1966	
Lab; **Applied Psychology Research Unit**, Cambridge	Lab: allows cause and effect, Only people from the APRU unit - mainly Cambridge students - so lowers generalizability because… (state findiings!!!). Eurocentric - so LTM encoding may only apply to one culture, language could affect how LTM encodes.
1. Four trials of same list, words presented by slide projector. **One word every 3 seconds, 2 seconds slide change.** **40 seconds** to write down the ten word list **in order** after each trial. 2. Each trial: Presentation/distraction/test. **The distraction test was: 6 lots of an 8 digit sequence, one digit per second. 8 seconds to write down.** 3. 15min task of self-paced digits copying 4. **Asked to write down the ten word list in order - surprise test**	Task: recalling words in order- lacks mundane realism limiting its generalisability Standardised procedures: high internal validity - est cause & effect - findings more valid
Independent groups	No practice effects but individual differences may have lowered internal validity - one group may have had a better memory

EXAM QUESTIONS ON BADDELEY 1966b

1. Baddeley (1966b) conducted a laboratory experiment to investigate the influence of acoustic and semantic similarity of words on long-term memory. Evaluate Baddeley's (1966b) study. (8)
2. Outline the procedure for Baddeley (1966b) study (6 marks)
3. To what extent is Baddeley (1966b) generalisable? (12 marks)

TOPIC 21: CONTEMPORARY STUDY: **Sebastian and Hernandez-Gil (2012)** LINK to quizlet

AO1	AO3+/AO3-
Aim: 1) To investigate the development of the **phonological loop** in Spanish children between the ages of 5 and 17 years 2) Compare findings to their earlier study of **healthy older ppts and those with dementia**	
570 volunteers from Madrid schools. Aged 5-17.	Large sample size, so language affecting digit span can be generalized to other languages with longer syllables.Only in Madrid, so perhaps can't be generalised to Catalonian language. Ages 5-17: vunerable group - ethics need to be considered.
Ppts controlled for education and cognitive levels: no Ps had repeated a year. No hearing/reading/writing difficulties.	Increases internal validity as variables that could affected digit span other than the IV (age) were controlled for.
Selected by school year.	
Independent measures. Digit span test. Random sequence of digits read aloud by experimenters at 1 digit per second. Gradually increased in length.	Lacks mundane realism - not a task we do in real life - perhaps phonological store may be better when processing real-life information, like a shopping list
2012. Task done in Ps breaks individually.	Same time - controlled, however, in break-time so situational variables such as noise may not have been controlled. Individually - less demand characteristics from other ppts
P's school.	Increased ecological validity - ppts may have felt more comfortable
• 3 sequences of 3 digits. • Ps asked to recall in same order. Given	Standardised procedure - increases reliability & ability to establish cause &

e.g. to check they understood. Gradually increased. • Digit span is maximum length at which Ps could recall at least two of the three series with no errors. • Results analysed by school year and by developmental period (5y; 6-8y; 9-11y; 12-14y; 15-17y)	effect
Results: **1) Digit span increases with age** from **3.76 at 5 years to 5.91 at 17 years** **2) Compared to *Wechsler Intelligence Scale for Children IV*:**(english-speaking children) agrees with increase with age, but S&H-G shows **lower digit span in all age groups**	
Results: comparing results to their previous study: Healthy elderly: digit span higher than 6 year olds Alzheimer disease & frontotemporal dementia patients show digit span similar to 6 year olds BUT difference not significant: digit span decreases when you get old, even if you are healthy.	
Conclusions:Word length effect: **during subvocal rehearsal:** • Increased word length → Increased rehearsal time → Loss of info • **Recall processes**: • Increased time to utter word→ Increased chance of memory fade	Application: The findings from S&HG can be applied to the wider society. As they track the development of digit span throughout childhood, it allows us to see at what age learning is easier and can become more valuable. This could have implications for primary education.

EXAM QUESTIONS ON Sebastian and Hernandez-Gil (2012) (This is an option, so the exam question will not name the actual study!)

4. Evaluate your Contemporary Study in Cognitive Psychology (8)
5. Outline the procedure for your Contemporary Study in Cognitive Psychology (6 marks)
6. To what extent is your Contemporary Study in Cognitive Psychology generalisable? (12 marks)

Baddeley Key Study, Classic - LINK

To clarify - difference between 'Baddeley' & 'Baddeley & Hitch'..

Key Study Classic Cog: **Baddeley (1966b)**	Working Memory Model: **Baddeley & Hitch (1975)**
How LTM encoded - semantic or accoustic	STM is actually not unitary - CE, PL,VSSP
Baddeley (1966b)	**Baddeley & Hitch (1975)**
4 word lists - accoustcially similar/dissimilar/semantically similar/dissimilar	Dual Task Expt - 2 verbal tasks poor, 1 verbal 1 visual task done well. Shows 2 slave systems (PL & VSSP) **- limited capacity**
	Improved the theory of STM idea from the MSM - creating a new theory for STM called the WMM

TOPIC 22: Key Question

TOPIC 23: Practical