Tutorial Letter 203/2/2017

Cognition: Memory, Thinking and Problem Solving

PYC3703

Semester 2

Department of Psychology

Feedback – Assignment 02

BARCODE

Dear Student

In this tutorial letter we provide the correct answers to the questions in Assignment 02, with short explanations as to why a particular alternative is correct. If you answered a question incorrectly please read the explanation in conjunction with the discussion in the prescribed book. Use the page references given, or the index in the prescribed book, to locate the appropriate page in the book where the topic is discussed. In the comments below CP stands for the currently available edition of the prescribed book: Sternberg, R.J. and Sternberg, K. (2016). *Cognitive Psychology (7th edition).*

Please note that this assignment contributes to your final mark. The two assignments together count 20% of your final mark, and the examination makes up the other 80%. Your final mark for the module will consist of your year mark (maximum of 20%) for the two assignments (Assignment 01 and 02) plus your examination mark (maximum of 80%).

Your PYC3703 teaching team

QUESTION 1

- - - - - recall refers to a task used in memory experiments in which the participant must produce items in the exact order in which they were presented.

1. Exhaustive
2. Free
3. Serial
4. Ordinal

Answer: Option **3** is correct.
See CP, p. 161 for more information on serial recall.

QUESTION 2

Whenever we read, we unconsciously and effortlessly remember the meanings of particular words as well the process of how to read. These two 'reading processes' are examples of everyday activities that primarily involve - - - - - memory.

1. episodic
2. explicit
3. implicit
4. conscious

Answer: Option **3** is correct.
Implicit memory refers to the use of information from memory that one is not consciously aware that one is doing so (see CP, p. 164).

QUESTION 3

According to the memory model developed by Atkinson and Shiffrin (1968), - - - - - is/are structures and - - - - - is/are the information stored in the structures.

1. stores; memory
2. nodes; network
3. network; nodes
4. memories; store

Answer: Option **1** is correct.
See CP, p. 162 for Atkinson and Shiffrin's discussion on their mulitistore model.

QUESTION 4

After a test, Jill identified and then learned the information that she had forgotten for the test. She noted that there was a 'saving' in that the information was learned faster the second time. Jill has discovered the concept of - - - - - .

1. partial-report method
2. subsequent refinement
3. relearning
4. permastore

Answer: Option **3** is correct.
The notion of 'relearning' (see CP, p. 163), pertains to the general finding that a shorter period is needed, or a 'saving' occurs, when you learn the same information or task a second time. This effect probably stems from the fact that some residual memory relating to your first learning experience still remains, and this may facilitate the subsequent learning of the same information so that it now becomes easier. In CP the relearning effect is described in terms of both the motor performance of rats repeating a motor task, and the example of learning a foreign language such as Spanish a few years after a first attempt to learn the language.

QUESTION 5

Which part of the working memory model allows for an interface that can integrate different types of information from various systems?

1. Central executive
2. Episodic buffer
3. Phonological loop
4. Visuospatial sketchpad

Answer: Option **2** is correct.
The central executive stores information received from the visuospatial sketchpad and phonological loop and combines this into a single episodic representation (see CP, p. 177-180).

QUESTION 6

Several recommendations have been made to improve eyewitness testimony. Which of the following *is not* one of those recommendations?

1. Present suspects one-at-a-time to eyewitnesses in the line-up.
2. Tell eyewitnesses that the perpetrator may not be in the line-up.
3. Construct line-ups with individuals who look similar.
4. Place more trust in confident eyewitnesses testimony.

Answer: Option **4** is correct.
The research about eyewitness memory discussed in CP (pp. 232-234) indicates that eyewitnesses are often very confident about their memory even in cases where the memory is known to be false, or can be shown to be inaccurate. These memories are therefore not always reliable and trustworthy.

QUESTION 7

The expression 'You can't teach an old dog new tricks' would support which theory of forgetting?

1. Repression
2. Retroactive interference
3. Proactive interference
4. Recency effect

Answer: Option **3** is correct.
This popular saying is an idiomatic expression that, of course, does not literally refer to dogs but to the observation that people who have well-developed skills and behaviours are sometimes very 'entrenched' in the ways they do things. Such people are often very unwilling to adapt or change their behaviour in accordance with new methods or new technologies. The idiomatic expression essentially states that 'old behaviours' hamper the learning of 'new behaviours', and therefore implies that proactive interference occurs because the implication is that the knowledge and skills already acquired in doing a task are obstructing (i.e. interfering) with the ability and willingness to adopt a new way of doing that task. See CP on page 224 where proactive interference is explained.

QUESTION 8

Which one of the following statements regarding the sensory store is incorrect?

1. It stores visual information for a very brief period of about a quarter of a second.
2. It holds an exact image of each sensory experience.
3. It stores auditory information for a brief period of about 4 seconds.
4. The total capacity of the sensory store is approximately 7 $\pm$ 2 bits of information.

Answer: Option **4** is correct.
The sensory store is a very brief store but the iconic store (which keeps visual information for very brief periods) can retain at least 9-12 symbols as Sperling's initial partial-report procedure and the subsequent research on the capacity of this store showed. The claim made in option 4 is incorrect because it pertains to Miller's finding about the capacity of short-term memory, and not to the sensory store. The statements made in all the other options are correct (see CP, pp. 179-180).

QUESTION 9

Thabo is studying the chapter on memory in his cognitive psychology book, and tries to remember the content by repeating it each fact several times. Thabo is making use of the memory strategy of - - - - -.

1. maintenance rehearsal
2. metacognition
3. learning by mnemonic
4. elaborative rehearsal.

Answer: Option **1** is correct.
In maintenance rehearsal, the individual simply repeats the items to be remembered. Such rehearsal temporarily maintains information in short-term memory without transferring the information to long-term memory. Without any kind of elaboration, the information cannot be organised and transferred (see CP, pp. 210-211).

QUESTION 10

An investigator asks some participants to count the numbers of letters in each of the names on a long list of Russian rivers. She asks other participants to pronounce each river's name and asks, for instance, 'Does it rhyme with Vienna?' (for Lenna). She asks still other participants to place the river on a map and to observe into which larger body of water it flows. Which approach to memory and forgetting is this researcher interested in (select the option this is most likely)?

1. Interference theory
2. The visual sketchpad of working memory
3. The recognition-by-components model
4. The depth-of-processing approach

Answer: Option **4** is correct.
The two tasks used by the investigator involve different modes of processing. In the rhyming task the participants only focussed on sound structure but not on meaning whereas placing the river on the map and tracing the flow of the water involves semantic processing. The researcher is therefore exploring the effect of two different levels of processing on memory (i.e. a shallow phonological level and a deep semantic level). The level of processing approach is discussed in CP (pp. 200-202).

QUESTION 11

Enhanced vividness and perceptual detail of our recollections has been associated with - - - - -.

1. the person's metacognitive skills
2. a memory's emotional intensity
3. cognitive maturity
4. activation of information in working memory

Answer: Option **2** is correct.
Flashbulb memories are extremely vivid and detailed memories and one of the conditions for someone experiencing such a flashbulb memory is that it the event in question evoked a strong emotional effect in that person (CP, p. 230). Emotional intensity is therefore a prerequisite for a flashbulb memory.

QUESTION 12

This specific 'sin' from Schacter's 'seven memory sins' is illustrated by the example of someone who has information 'on the tip of his or her tongue,' but is unable to retrieve it.

1. Transience
2. Bias
3. Persistence
4. Blocking

Answer: Option **4** is correct.
Schacter's seven sins of memory are described in CP (pp. 231-232). The sin of 'blocking' is specifically associated with the 'tip of the tongue' phenomenon.

QUESTION 13

A heuristic is a - - - - -.

1. flash of insight
2. guiding principle or 'rule of thumb' used in problem solving
3. methodical procedure for trying all solutions to a problem
4. way of making a compensatory decision

Answer: Option **2** is correct.
A heuristic is a general rule or procedure used as an aid in problem solving and decision making, but it is not a failsafe method and does not necessarily lead to a correct answer. Thus, the heuristics such as 'availability' and 'representativeness' do not always produce a correct, but rather a tentative and approximate, answer. The main advantage of a heuristic is that it provides a quick answer. Note also that heuristics are typically unconscious processes, we are usually not consciously aware that we are applying a heuristic. Option 3 is incorrect, because the statement made in this option defines an algorithm.

QUESTION 14

One aspect that distinguishes them from novices, is that experts - - - - -.

1. have loosely interconnected and scattered units of knowledge in their area of expertise
2. use a 'working backward' strategy in which they try to find a problem solving strategy that makes use of the given information
3. are more likely to use the means-ends type of analysis in problem solving
4. take time to first represent and understand a problem before attempting to solve it

Answer: Option **4** is correct.
Experts have acquired a vast amount of background knowledge about their area of specialisation. When they have to solve a problem in their area of specialisation, they spend most of their time on first conceptualising the problem and determining the appropriate strategy to use. Novices spend much less time on global planning and often try to solve the problem without understanding it properly.

QUESTION 15

'Often, when you're faced with a contradiction, it does no good to sit at your desk doing calculations - you just go round and round in circles. What does sometimes help is to let the problem cook in your brain's back burner while you sit on a park bench and watch your daughter play in a sandbox' (Steven Weinberg, physicist). This statement by Weinberg illustrates to the concept of - - - - - in problem solving.

1. positive transfer
2. insight
3. incubation
4. functional fixedness

Answer: Option **3** is correct.
Weinberg's recommendation is to allow the problem to 'incubate' in the mind (see CP, p. 420), and he is therefore implying that incubation is a good strategy for difficult problems. The idea is that unconscious processes will churn away in the background while you are not consciously thinking about the problem, and that this may lead to a solution. Option 2 is incorrect because insight is the result and not the cause of such an unconscious problem-solving process. Option 1 is also incorrect because Weinberg does not indicate any structural similarity between watching his daughter play in the sandbox and the actual problem that needs to be solved, so positive transfer is not relevant here.

QUESTION 16

Which view of insight suggests that there is something special about insight? Support for this view is that problem-solvers show poor ability in predicting success until just prior to solving the problem. Thus, problem-solvers for insight problems lack an incremental increase in terms of predicting success of finding a solution.

1. The Neo-Gestaltist view
2. The nothing-special view
3. The three-process view
4. The normal-to-special process view

Answer: Option **1** is correct.
The Neo-Gestaltist view of insight is described in CP (pp. 412-413). This theory is based on the claim that problem solvers are not aware of any slow or incremental improvement in their ability to solve the problem when they are struggling with an 'insight' problem, and they cannot predict whether they are on the right track. Their solution to such insight-based problems is therefore not a gradual accumulation of partial insights (as in means-ends analysis), but has an all-or-nothing aspect to it, they just suddenly 'see' the solution.

QUESTION 17

This iterative method of problem solving involves reducing the difference between your current state and your goal state.

1. Global planning
2. Fluid intelligence
3. Means-ends analysis
4. Componential analysis

Answer: Option **3** is correct.
Means-ends analysis is described in Table 11.1 (CP, p. 406). The method tries to achieve the goal state by setting and trying to solve a set of sub-goals each taking the problem solving process closer to the end or goal state. Because the method successively tries to solve sub-goals in order to reach the end goal it is called iterative (a term meaning to repeat a technique or strategy to make small advances). Option 4 is incorrect because componential analysis is not defined in terms a difference between the current and goal

state but simply a general analytical strategy used for problem solving, and it is defined in terms of mental processes (called components) such as encoding, mapping and inferring relations. Option 1 is incorrect because global planning is part of Sternberg's componential analysis applying to the encoding phase of problem solving, and an initial planning aspect of problem solving, rather than a specific method for attaining a goal state.

QUESTION 18

All of the following statements describe assumptions of an early model of decision making, the 'economic man and woman', except one. Identify the assumption not associated with this model.

1. Decision-makers are completely informed of all possible options and all possible outcomes of their decision options.
2. Decision-makers are infinitely sensitive to subtle differences among decision options.
3. Decision-makers are aware that making errors in judgment is inherent in decision-making.
4. Decision-makers are fully rational in regard to their choice of options.

Answer: Option **3** is correct.
The three assumptions made in this model are listed in CP (p. 441). As can be seen in this list there is no requirement or condition in this model that humans should be consciously aware of the fact that making mistakes (i.e. faulty judgments) is an integral part of the decision making process. Note also that the latter idea clashes with the assumption that humans are fully rational, which is explicitly made in the model.

QUESTION 19

When making a decision, the use of one's individual values versus one's use of objective criteria is reflective of what concept?

1. Subjective utility
2. Subjective probability
3. Conditional probability
4. Pragmatic reasoning

Answer: Option **1** is correct.
The term 'utility' denotes value, and subjective utility is therefore a judgement about the subjective (i.e. personal) consequences of a decision. Option 2 is incorrect because subjective probability refers to a subjective estimation of the likelihood of particular outcomes of a decision, and not to the 'utility' of those outcomes with regard to the individual (CP, p. 442).

QUESTION 20

This notion of 'satisficing' is not consistent with the model of 'economic man and woman', but does support the idea of - - - - - .

1. opportunity costs
2. subjective probability
3. bounded rationality
4. perspective effects

Answer: Option **3** is correct.
The term 'bounded rationality' is used to refer to the fact that humans are not perfect or ideal decision makers, because they often rely on suboptimal decision making strategies such as 'satisficing' (CP, p. 455).

QUESTION 21

Janet is trying to solve a syllogism. The particular sequencing of the terms has prevented her from reaching an accurate conclusion. Instead of first deciding whether the syllogism is deductively valid, she jumps to a conclusion. Janet was influenced by - - - - - effects/reasoning.

1. premise-phrasing
2. foreclosure
3. ad hominem
4. overextension

Answer: Option **1** is correct.
Janet jumped to a conclusion and was therefore probably influenced by the phrasing of the premise (e.g. a particular word or expression). 'Premise-phrasing' occurs when the order of words or statements in an argument influences our interpretation of the validity of the argument. It is associated with a form of faulty reasoning where someone is unduly influenced by the formulation (words or expressions) in a premise instead of considering the logical form of the syllogism in sufficient detail (CP, p. 468).

QUESTION 22

Satisficing makes it more difficult for people to make fully rational decisions because, in satisficing, - - - - -.

1. we consider the additional variable of an incentive, or reward, in the decision-making process
2. we limit the number of options we consider in causing us to seek to minimise pain
3. we often become irrational and unable to make a well-reasoned decision
4. we do not consider all possible options, but rather consider a few until we find one that is satisfactory

Answer: Option **4** is correct.
In decision making, s*atisficing* means that a decision is taken once the minimum criteria for an adequate solution have been satisfied (COG, pp. 442-443).

QUESTION 23

Which one of the following is *false* regarding deductive and inductive reasoning?

1. Deductive reasoning involves reasoning from general principles to specific facts or instances.
2. Syllogisms involve deductive reasoning.
3. Inductive reasoning is based on a logical process of inferring specific facts from general observations.
4. Inductively reasoned arguments can be disproved by even one contrary observation.

Answer: Option **3** is correct.
The statement in this option is false because the opposite of the claim made, is true. It is much more straightforward to prove conclusions using the deduction method that it is when using an inductive approach. Inductive reasoning is the typical reasoning pattern used in empirical science where generalisations and hypotheses are derived from observational data. This type of reasoning is used to test hypotheses but cannot really 'prove' that a particular hypothesis is true. For this reason, researchers say that they find support for a hypothesis and do not claim that that they have proven a hypothesis (an almost impossible task). Inductive proofs do exist in mathematics but even there they are often quite difficult and require a number of conditions to work. Deduction is a much easier technique for proof in mathematics and logic, because it relies on a logical process of inferring (deducing) specific information from the general information that is assumed or given. Options 1, 2, and 4 are incorrect because the statements made these options are all true.

QUESTION 24

Which one of the following is a *modus tollens* argument?

1. If you are born, then you have parents. You do not have parents. Therefore, you are not born.
2. If a fly bites you, then your arm swells. A fly bites you. Therefore, your arm swells.
3. If you eat too much, then you get fat. You do not eat too much. Therefore, you do not get fat.
4. If fish live in the water, then they have gills. Fish do not live in the water. Therefore, they do not have gills.

Answer: Option **1** is correct.
A *modus tollens argument* has the general form*:*

If P then Q
Not Q therefore not P

Option 1 satisfies the schema above, as can be seen if we substitute *You are born* for "*P"* and *You Have parents* for "*Q"*:

If (*you are born)* then (*you have parents*)
(*You do not have parents*) therefore (*you are not born*)

QUESTION 25

The conditional proposition is 'If X is a chair then it is a piece of furniture'. Given this condition, Lesiba is told 'X is a piece of furniture', and then infers 'X is a chair'. The fallacy reflected in Lesiba's reasoning is called - - - - -.

1. affirming the antecedent
2. affirming the consequent
3. denying the antecedent
4. denying the consequent

Answer: Option **1** is correct.
The example illustrates a valid form of reasoning as in the previous question, namely 'affirming the antecedent'. The reasoning in the example is valid because it is possible that X may be another type of furniture (e.g. a desk or a bed). Thus, although we know that X is a chair we can logically exclude the possibility that X could be another type of furniture without additional information

QUESTION 26

Evidence from more naturalistic studies of decision making, reveal that when solving conditional probabilities most people recognise and use the (a) - - - - - argument, but fail to use the (b) - - - - - argument.

1. (a) modus ponens; (b) modus tollens
2. (a) modus tollens; (b) modus ponens
3. (a) consequent; (b) antecedent
4. (a) modus ponens; (b) consequente

Answer: Option **1** is correct.
Research suggests that people are much more inclined to use a conformation strategy than to really test/ disprove a hypothesis. This tendency is illustrated in the Wason selection task where people find it difficult to apply the modus tollens reasoning pattern needed to test the validity of the ruler or proposition given to them (see CP, pp. 461- 463, and note in particular Table 12.3).

QUESTION 27

Consider the following rule:

If a card has an L on one side, it has a picture of an apple on the other side.

Four cards are placed on the desk in front of you.

You are then asked to test this rule using the information displayed on the one side of four cards as shown below, and are asked to turn over the appropriate TWO of these cards to test the rule:

C	**Orange**	**Apple**	**L**

Which TWO of the cards above must you turn over to test the rule, and logically correctly determine whether it is being violated.

1. The card with the L and the card with the orange
2. The card with the L and the card with the apple
3. The card with the C and the card with the orange
4. The card with the C and the card with the apple

Answer: Option **1** is correct.
This example is based on the Wason selection task described in CP (pp. 461-463). To see if the rule is correctly applied, and thus to verify that the conditional statement is true, you must test for both the *modus ponens* and the *modus tollens* conditions. You must first turn over the 'L' card to see whether it has 'Apple' on the other side (i.e. the modus ponens test), and you must then also turn over the card with Orange' on it to make sure that it does NOT have an 'L' on the other side (i.e. the modus tollens test). Note that turning over the card with Apple' on it to see whether it has an 'L' on the other side is not a crucial test of the rule. Suppose you turn over the card with the 'Apple' on it and find that it does not have an 'L' on the other side, you cannot then conclude that the rule is incorrectly applied because the rule does NOT state that if a card has an apple on one side it must have an 'L' on the other side. Note that turning over the card with 'Apple' is using denying the antecedent, which is an invalid form of reasoning, to test the rule.

QUESTION 28

Cosmides (1989) proposed that these two kinds of inferences were particularly useful during social interactions in our evolutionary history. These are - - - - -.

1. physical prowess and sociability
2. cheater detection and hunter detection
3. cost-benefit relationships and cheater detection
4. temperament and relationships benefits

Answer: Option **3** is correct.
Cosmides' research is discussed in CP (p. 464-465). He theorised that early humans may have had reasoning schemas specifically targeted at social exchange situations, where they had to determine the pros and cons of exchange 'transactions' and also to quickly detect when someone is untrustworthy (a cheater). Option 2 is incorrect because the need to detect whether someone is a hunter is probably a less important factor in social exchanges than to evaluate the actual 'costs' and 'benefits' of the exchange (i.e. what can be gained from it), and in any case is not an aspect stressed in Cosmides's theory.

QUESTION 29

With syllogisms there are some combinations from which one is unable to 'draw logically valid conclusions'. Identify which combination of forms would be considered not logically valid.

1. Two universal affirmatives statements
2. Two particular affirmative statements
3. One universal affirmative and one particular affirmative statement
4. One universal negative statement and one particular affirmative statement

Answer: Option **2** is correct.
It is not possible to draw logically valid conclusions from categorical syllogisms containing either two particular premises or two negative premises (CP, pp. 465-466). Note how difficult it is to draw a valid conclusion from an example of two particular affirmative premises (see also COG, p. 465), such as: *Some students at Unisa study cognitive psychology; Some students at Unisa like to play soccer*. Can we infer that some cognitive psychology students like play soccer? No, this cannot be validly deduced based on the premises because the two sets (*cognitive psychology students* and *Unisa students who like to play soccer*) do not necessarily intersect.

QUESTION 30

In the modern Wechsler Adult Intelligence Scale, intelligence is best conceptualised in terms of the following main aspects:

1.	(a) Memory and verbal/symbolic ability;	(b) Quantitative skills such as series completion and block design.
2.	(a) Verbal comprehension and arithmetic ability;	(b) Assembling objects and pattern recognition
3.	(a) Verbal skills and working memory ability;	(b) Perceptual reasoning and processing speed such as symbol search.
4.	(a) Verbal and quantitative ability;	(b) Symbolic abilities such as identifying similarities between concepts, and arithmetic ability.

Answer: Option **2** is correct.
See CP, pp. 485-486 for a comprehensive discussion on the Wechsler Adult Intelligence Scale.

QUESTION 31

In the history of human intelligence research, Thurstone is associated with the idea that intelligence consists of

1. A single general factor and a set of specific factors
2. seven specific factors called primary mental abilities
3. fluid and crystallised intelligence
4. three strata, specific abilities, broad abilities, and general intelligence

Answer: Option **2** is correct.
See CP, p. 489 for a discussion on the seven factors related to intellignence.

QUESTION 32

Which Stanford-Binet test is an assessment of figural/abstract reasoning?

1. Absurdities
2. Verbal relations
3. Number series
4. Pattern analysis

Answer: Option **4** is correct.

See CP, p. 485, Table 13.1, for a discussion on the Standord-Binet Intelligence Scale.

QUESTION 33

Suppose you want to test whether an artificial intelligence program has managed to pass the Turing test. Which one of the following questions would be the most difficult for the program to answer (assuming of course that the program must pretend to be intelligent)?

1. On which day of the week was 13 June 1888?
2. Summarise the plot of the movie '2001: A space odyssey'?
3. Define the concept of 'global warming'.
4. Explain whether it is ethical for one species to enslave members of another?

Answer: Option **4** is correct.
The most difficult question here for a computer would be to discuss the moral issues associated with slavery, because it would be extremely difficult to write an algorithm to simulate the ability to engage in such abstract, philosophical discourse. The other questions are either factual information (options 1 and 2), or the definition of a concept (option 3), and would be much easier to program into a computer.

QUESTION 34

John Searle's Chinese argument is best viewed as a critique of the - - - - - .

1. real intelligence and problem solving capabilities of computational systems
2. ability of computer systems to successfully mimic the language use of ordinary people
3. ability of computer software to simulate thinking and reasoning
4. ability of artificial systems to develop truly human thinking and language abilities

Answer: Option **4** is correct.
Searle's Chinese room argument is specifically aimed at showing that computers are incapable of understanding language (see the Study Guide for PYC3703, pp. 105-106). He argues that computers may be able to 'simulate' language understanding, but that they are incapable of really grasping the meaning of words and sentences. His main point is that computers simply manipulate formal symbols according to instructions (a program), and therefore engage in syntactic processing, but they do not know what those symbols refer to. Hence, they are in the position of the man in the 'Chinese room' who just 'follows a set of rules to manipulate Chinese symbols', without understanding any Chinese himself. Of course, many researchers in artificial intelligence reject Searle's argument, as you will quickly find out if you do some searching on the web

QUESTION 35

- - - - - are/is a type of artificial intelligence that simulate the reasoning and problem solving of competent individuals in a particular domain of knowledge, but do not have any general reasoning skills.

1. The Chinese room program
2. The General Problem Solver
3. The Turing test
4. Expert systems

Answer: Option **4** is correct.
Expert systems are computer systems that have been programmed with a large amount of knowledge in a narrow and specialised area of application. This knowledge typically consists of conditional rules so that the system can make inferences and answer questions and problems posed by the users in the particular domain of application.

Total [35]

NB: Please note that your total out of 35 will be converted to a percentage mark.